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SUBMITTED TO CONGRESS APRIL 1993

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0605861N	RDT&E,N SCIENCE AND TECHNOLOGY MANAGEMENT	186	843
0605862N	RDT&E,N INSTRUMENTATION MODERNIZATION	187	849
0605863N	RDT&E,N SHIP AND AIRCRAFT SUPPORT	188	859
0605864N	TEST AND EVALUATION SUPPORT	189	867
0605865N	OPERATIONAL TEST AND EVALUATION CAPABILITY	190	875
0605871M	MARINE CORP TACTICAL EXPLOITATION OF NATIONAL CAPABILITIES	191	887
0605873M	MARINE CORPS PROGRAM WIDE MANPOWER SYSTEM	193	889
0205658N	NAVY SCIENCE ASSISTANCE PROGRAM	194	109
0305160N	DEFENSE METEOROLOGICAL SATELLITE PROGRAM	195	177
0901600N	CONTRACT ADMINISTRATION/AUDIT	197	893

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
J0951	TRIDENT II*	42,229	46,927	42,986	CONT.	CONT.
S0004	TRIDENT Submarine System Imp**	30,627	23,475	5,677	CONT.	CONT.
J0091	FBM Systems	7,746	4,862	5,632	CONT.	CONT.
	TOTAL	80,602	75,264	54,295	CONT.	CONT.

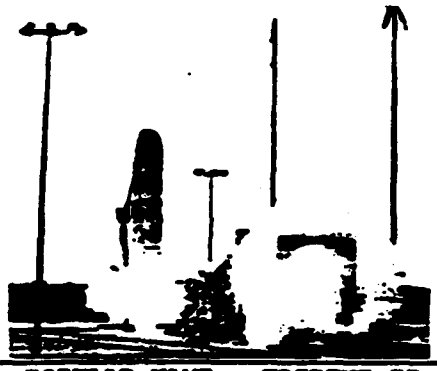
B. (U) DESCRIPTION: The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon of greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This PE supports continued evaluation of the system's long range performance and capabilities and investigations into new technologies to mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. Efforts also continue to support integration of the NAVSTAR Global Positioning System (GPS) capability into the TRIDENT I (C4) weapon system, support of the Navigation Test Ship and investigation of potential opportunities for technology insertion to solve obsolescence problems in the ship installed TRIDENT I (C4) Fleet Ballistic Missile Weapon System. Additionally, effort continues for investigation, identification and resolution of systems design and material problems associated with the Weapon System interface with the TRIDENT submarine baseline.

The TRIDENT Submarine System program develops and integrates command, control and communication improvements needed to maintain TRIDENT submarine operational capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce life cycle costs through obsolete equipment replacement and commonality. The program consists of four major components: (1) CNO mandated 688 Class SSN and TRIDENT Class SSBN commonality initiative comprised of CCS MK2 Mod 3 Combat System and AN/BQQ-5E(V)4 Sonar (together termed QE2), (2) External Communication Upgrades, (3) TRIDENT Command and Control System (CCS) Engineering and Integration (E&I), and (4) TRIDENT OCS Improvements.

* Funded under 0604363N in FY 1993 and prior.
** Funded under 0101228N in FY 1993 and prior.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II



POPULAR NAME: TRIDENT II

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
MILESTONES					
ENGINEERING MILESTONES					
T&E MILESTONES					
CONTRACT MILESTONES					

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	32.630	35.056	31.485	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	9.599	11.871	11.501	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	42.229	46.927	42.986	CONT.	CONT.

B. (U) DESCRIPTION: The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon of greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This PE supports continued evaluation of the system's long range performance and capabilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Developed long term component aging failure analysis impacts.

c. (U) Development contractors performance was evaluated and appropriate incentive payments were made.

d. (U) Supported Phase Two of the SLBM Retargeting System (SRS). This phase will lead to handling a greater number of target changes from JSTPS in a shorter time.

e. (U) Effort for portable flight test instrumentation vans concentrated on system definition and technology selection.

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II

f. (U) Congressionally mandated Gravity Sensor System (GSS) efforts supported proof of concept and initial software design.

g. (U) The Congressionally mandated study on characterization of propellant sensitivities in response to the Drell report began. The $15M appropriated this year initiated a four year effort for analytical modeling, experimental impact testing and small scale material characterization testing.

h. (U) Continued to investigate alternative mechanizations within the weapon system to understand the system implications of potential responses to both the issues raised by the Drell panel and those currently being considered by the Fail Safe and Risk Reduction (FARR) commission.

i. (U) The TRIDENT II R&D program was restructured in FY 1992 to support investigations of four specific areas. Formerly, efforts were directed to counter the Soviet threat as part of the SLBM Effectiveness Enhancement (SEE) program. Some of the SEE technology development efforts were refocused and redirected to mitigate the program impact due to component obsolescence and a rapidly decreasing manufacturing support base. The FY 1992 Congressional Rescission terminated the SEE program, which in turn affected the funds available for the restructured efforts.

(1) (U) Missile Support: This effort examined issues which arise directly from the delay in providing the TRIDENT II capability to the Pacific Fleet TRIDENT SSBNs (D5 Backfit). Technologies were examined to alleviate production difficulties in light of the rapidly decreasing production base and significant increase in environmental restrictions.

(2) (U) Integrated Shipboard Subsystems (ISS): This task is driven by an increasing obsolescence in the components of the shipboard subsystem for the TRIDENT SWS. This effort focused on an examination of alternative architectures with combined subsystem functions. The current system features distributed computers but an alternative system design might feature integrated functions which could reduce life-cycle costs.

(3) (U) Yield/Accuracy: Effort focused on areas that provide the capability of holding the full target spectrum at risk in the absence of required numbers of high yield warheads. Improvements in the missile guidance system in conjunction with a W76 warhead in a MK5 reentry body shell were investigated.

(4) (U) TRIDENT Systems Investigations: This effort conducted limited exploration into changing requirements on the TRIDENT II FBM weapon system. Supported assessment of potential responses to the rapidly changing world environment as reflected in modified targeting requirements on FBM systems.

2. (U) FY 1993 PROGRAM:

a. (U) Continue to investigate, identify and resolve system design and material problems associated with the weapon interface with the TRIDENT submarine baseline.

b. (U) Complete long term component aging failure analysis impacts.

c. (U) Effort will continue to support Phase Two development of the SLBM Retargeting System (SRS)

d. (U) Full scale engineering development of portable flight test instrumentation vans.

e. (U) Effort will continue to support development of the GSS program. Prototype software will be developed, implemented and tested onboard the Navigation Test Ship.

f. (U) The Congressionally mandated propellant characterization study is planned to continue. This year's study will continue experimental impact testing and analytical modeling and small scale material characterization of propellant properties and sensitivities.

g. (U) TRIDENT Systems investigations into analyzing alternative mechanizations within the weapons system to enhance safety or use control features will continue.

h. (U) Congress reduced funding for efforts in support of the four major elements of the restructured TRIDENT II RDT&EN program. Specifically only the Integrated Shipboard Subsystems (ISS) effort continued on possible integrated subsystems with alternative architectures.

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II

i. (U) The Congressionally mandated single piece chip carrier effort will investigate utilization of diamond films to improve thermal conductivity in a single piece chip carrier.

3. (U) FY 1994 PLANS:

a. (U) Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Effort will complete in support of Phase Two development of the SLBM Retargeting System (SRS)

c. (U) The Congressionally mandated propellant characterization study is planned to continue. This year's study will continue experimental impact testing and analytical modeling and small scale material characterization testing of propellant priorities and sensitivities.

d. (U) TRIDENT Systems investigations into analyzing alternative mechanizations within the weapons system to enhance safety or use control features that flow from the DRELL Study and Fail Safe and Risk Reduction (FARR) Report will continue.

e. (U) The Missile effort will address long term needs for technology insertion to assure continued supportability, reliability, safety and environmental sensitivity of the TRIDENT II missile program. Existing areas of concern which will be examined include:

(1) (U) Alternate Post Boost Control System (PBCS) technology
(2) (U) Rocket Motors Technology
(3) (U) Environmental Impact Reduction
(4) (U) Electronics

f. (U) In the area of Integrated Shipboard Subsystems, effort will continue on possible integrated subsystems with alternative architectures. The recent developments in computerized capabilities and multi-computer architectures make possible replacements of the current subsystems with integrated system architectures which could reduce support costs and onboard manning and offer expansion capability to increase mission flexibility.

g. (U) The TRIDENT System Studies task will conduct low level investigations of the changing requirements on the TRIDENT system which are emerging from the changing world environment, the creation of Commander-in-Chief Strategic Command (CINCSTRAT) and the need for TRIDENT system to be more responsible to rapidly changing targeting priorities. These tasks will assure Navy capability to support current or modified mission or performance requirements. Area of investigations could include:

(1) (U) Clear Deck Design
(2) (U) Common Avionics
(3) (U) TRIDENT II MK6 Guidance System Simulation
(4) (U) Random Access Memory
(5) (U) D-5 Alternate Architectures

4. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY:IN-HOUSE: Strategic Systems Programs, Washington, D.C. CONTRACTORS: General Electric Company, Ordnance Systems, Pittsfield, MA; PARAMAX Systems Corp., Great Neck, NY; Charles Stark Draper Laboratory, Cambridge, MA; Lockheed Missiles and Space Company, Sunnyvale, CA; General Dynamics, Electric Boat Division, and others.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support
PROJECT NUMBER: J0951 PROJECT TITLE: TRIDENT II

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: DCP-2/87; TEMP-8/89; OR # 196-02-88 (SRS)-1/88

G. (U) RELATED ACTIVITIES: Program Element 0101221N, Fleet Ballistic Missile System, Project J0091. Developments related to deployed TRIDENT I (C4) Strategic Weapons Systems.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT WPN LI 2&3	1,095,353	981,325	1,128,596	CONT.	CONT.
(U) MILCON	9,200	0	0	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Submarine & Weapons System Support
PROJECT NUMBER: S0004* PROJECT TITLE: TRIDENT Submarine System Improvement

C. (U) DESCRIPTION: The TRIDENT Submarine System Program develops and integrates command, control and communication improvements needed to maintain TRIDENT submarine operational capability through the life cycle of this vital strategic asset. The program conducts efforts needed to maintain strategic connectivity, ensure platform invulnerability, and reduce life cycle costs through obsolete equipment replacement and commonality.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Initiated development of Extremely High Frequency Satellite Communications (EHF SATCOM), and Advanced Narrowband Digital Voice Terminal/Tactical Terminal (ANDVT/TACTERM). Continued development of QE2 (MK2 Mod 3 Combat System and AN/BQQ-5E Sonar System). Completed development of CCS Revision 5.1.

2. (U) FY 1993 PROGRAM: Continue development of EHF SATCOM. Complete development of QE2 and ANDVT/TACTERM.

3. (U) FY 1994 PLANS: Initiate development of MK2 Combat System improvements. Continue development of EHF SATCOM.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCENDIV, Crane, IN; NAVUNSEAWARCENDIV, Newport, RI; SPAWARSYSCOM, Washington, DC. CONTRACTORS: IBM, Manassas, VA; Raytheon, Portsmouth, RI; Martin Marietta Corp., Glen Burnie, MD; General Electric, Camden, NJ; Electric Boat Division of General Dynamics Corp., Groton, CT.

F. (U) RELATED ACTIVITIES: PE 0101224N - SSBN Security/Survivability Program; PE 0101402N - Navy Strategic Communications; PE 0604562N - Submarine Tactical Warfare System; PE 0604503N - Submarine System Equipment Development. Programs develop submarine software and hardware that are directly related to efforts conducted by this program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN (BA1)	#22	36,462	34,983	15,179	CONT.	CONT.
(U) OPN (BA2)	#91	140,836	127,396	45,002	CONT.	CONT.
(U) OPN (BA4)	#178	25,785	14,389	6,384	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

* Previously funded under Program Element 0101228N in FY 1992 and FY 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3-Strategic Programs
PROGRAM ELEMENT TITLE: Strategic Submarine and Weapons System Support
PROJECT NUMBER: J0091 PROJECT TITLE: Fleet Ballistic Missile Systems

C. (U) DESCRIPTION: This effort currently supports integration of the NAVSTAR Global Positioning System (GPS) capability into the TRIDENT I (C4) weapon system, support of the Navigation Test Ship and investigation of potential opportunities for technology insertion to solve obsolescence problems in the ship installed TRIDENT I (C4) Fleet Ballistic Missile Weapon System.
D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1992 Accomplishments: Continued integration of NAVSTAR GPS receiver equipment into the TRIDENT I navigation subsystem and conducted investigations into potential additional uses of GPS in the navigation subsystem. Continued support of the Navigation Test Ship's test program. Efforts were initiated to understand the impact on the TRIDENT I (C4) ship installed weapon system caused by the delay in providing the TRIDENT II capability to Pacific TRIDENT SSBNs (D5 Backfit). This effort also conducted limited exploration into changing requirements on FBM systems to support assessment of potential responses to the rapidly changing world environment as reflected in modified targeting requirements on FBM systems.
2. (U) FY 1993 PROGRAM: Continue integration of NAVSTAR GPS receiver equipment into the TRIDENT I navigation subsystem and conduct investigations into potential additional uses of GPS in the navigation subsystem. Continue support of the Navigation Test Ship's test program. Continue efforts on understanding long-term effects to the TRIDENT I (C4) ship installed weapon system caused by the delay in providing the TRIDENT II capability to Pacific TRIDENT SSBNs (D5 Backfit). Conduct limited exploration into changing requirements on FBM systems. Support assessment of potential responses to the rapidly changing world environment such as modified targeting requirements on FBM systems.
3. (U) FY 1994 PLANS: Continue integration of NAVSTAR GPS receiver equipment into the TRIDENT I navigation subsystem. Continue efforts on understanding long-term effects to the TRIDENT I (C4) ship installed weapon system caused by the delay in providing the TRIDENT II capability to Pacific TRIDENT SSBNs (D5 Backfit). Conduct limited exploration into changing requirements on FBM systems. Support assessment of potential responses to the rapidly changing world environment such as modified targeting requirements on FBM systems.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.
E. (U) WORK PERFORMED BY: IN-HOUSE: Strategic Systems Programs, Washington, D.C. CONTRACTORS: Charles Stark Draper Laboratory, Cambridge, MA; Kaman Sciences Corporation, Colorado Springs, CO; Lockheed Missiles and Space Company, Sunnyvale, CA; Rockwell International Corporation, Anaheim, CA; PARAMAX Systems Corp, Great Neck, NY.
F. (U) RELATED ACTIVITIES: PE 0601221N, J0951; PE 0604777N, Navigation/ID System - Development of the NAVSTAR Global Positioning System.
G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN 1/					
LINES 179 & 239	72,876	44,697	9,865	CONT.	CONT.
WPN 2/					
LINES 1 & 62	1,465	2,193	3,415	CONT.	CONT.

1/ These funds provide for the procurement of test instrumentation; equipment for maintenance, calibration, handling, data processing and tests at shore facilities; alterations to tactical hardware; new tactical hardware; and initial and replenishment spares and repair parts.
2/ These funds support spares and repair parts.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security & Survivability Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0092	SSBN Security Technology	52,357	60,198	19,868	CONT.	CONT.
V1871	SSBN Survivability	17,310*	16,345*	7,967	CONT.	CONT.
TOTAL		69,667	76,543	27,835	CONT.	CONT.

*NOTE: V1871 funded under PE 0603588N in FY 1992 and 1993.

B. (U) DESCRIPTION: The purpose of the SSBN Security & Survivability Program is to ensure the current covert mobility and pre-launch survivability of the Fleet Ballistic Missile Submarine Force with respect to emerging applications of advanced technology in the ocean environment. This program identifies requirements for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile Submarine Force. The SSBN Survivability Program bridges the gap between the SSBN Security Program and full scale development by validating countermeasures and enhancing submarine survivability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security & Survivability Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0092	SSBN Security Technology	52,357	64,519	20,558	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of the SSBN Security Technology Program is to ensure the current covert mobility and pre-launch survivability of the Fleet Ballistic Missile Submarine Force with respect to emerging applications of advanced technology in the ocean environment. This program identifies requirements for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile Submarine Force.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued tactics development and operations assessments.
b. (U) Conducted sea tests to evaluate shallow water active and passive acoustic and passive electromagnetic (EM) sensors
c. (U) Continued programs in active, passive acoustics.
d. (U) Conducted a major sea test to continue evaluation of sensor concepts. in mid-to-high noise environments.
e. (U) Conducted a major experiment to improve performance, test countermeasures. and evaluate tactics.
f. (U) Upgraded the P-3 aircraft capabilities.
g. (U) Developed clutter reduction algorithms
h. (U) Completed analysis of the Standard Leopard I project data.
i. (U) Designed a imaging receiver to improve detection/false alarm discrimination.
j. (U) Conducted test planning for final detection test.
k. (U) Characterized full system transfer functions.
l. (U) Conducted noise measurements and developed a noise cancellation system
m. (U) Developed and validated noise cancellation algorithms for noise measurement tests.
n. (U) Evaluated the vulnerability and upgraded the Preliminary Detectability Assessment (PDA).
o. (U) Conducted signature measurements at Dabob Bay.
p. (U) Developed a 3-D model to study wake horizontal eddy generation and a 2-D Nonlinear model
q. (U) Documented and validated mixed layer hydrodynamic model.
r. (U) Validated a passive optics signal model and developed an empirical noise model with FY-91 passive optics data.
s. (U) Measured the effects of wind-waves by current gradients.
t. (U) Continued development of environmental data bases for use in test planning and detectability assessments.
u. (U) Conducted an acoustics vulnerability assessment.
v. (U) Conducted two sea tests to measure.
w. (U) Conducted an initial sea test to determine signatures and background levels.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security & Survivability Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

x. (U) Conducted final sea test to determine false alarm statistics and long dwell time effects.

y. (U) Developed a highly sensitive meter.
z. (U) Convened an working group to identify technical issues.
aa. (U) Planned a one year project to purchase technologies.

2. (U) FY 1993 PROGRAM:

a. (U) Continue tactics development and operations assessments.
b. (U) Conduct sea tests to evaluate shallow water concepts.
c. (U) Continue investigations to understand signature generation mechanisms.
d. (U) Complete analysis of experimental data to assess performance of arrays.
e. (U) Plan an at-sea test of a towed array.
f. (U) Complete analysis of experimental data from Critical Sea Test 7 (CST-7) and participate in a planned experiment.
g. (U) Continue signature measurements using bottom-mounted sensors.
h. (U) Conduct a experiment and data analysis.
i. (U) Continue development of clutter reduction algorithms.
j. (U) Conduct a final detectability experiment.
k. (U) Conduct studies to address large scan angle effects.
l. (U) Prepare PDAs.
m. (U) Conduct an noise measurement and continue investigation of noise reduction techniques.
n. (U) Convene a Technical Working Group to develop a long-term hydrodynamic measurement model validation plan and plan an at-sea test.
o. (U) Continue model development.
p. (U) Continue maintenance and development of environmental data bases.
q. (U) Analyze FY-92 at-sea measurements to determine signatures and background noise levels for development of advanced sensor.
r. (U) Continue analysis.
s. (U) Conduct final data analysis, and begin updating the PDA.
t. (U) Conduct an experiment to investigate detection concepts.
u. (U) Conduct signature/noise measurement at-sea test with target.
v. (U) Conduct a project to purchase technologies.
w. (U) Complete analysis of sea tests to evaluate shallow water active and passive acoustic, and passive EM sensors.

3. (U) FY 1994 PLANS:

a. (U) Continue tactics development and operations assessments.
b. (U) Conduct a experiment in a convergence zone propagation environment.
c. (U) Conduct an at-sea test of a towed array.
d. (U) Continue maintenance and development of environmental data bases.
e. (U) Conduct assessment of technologies.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security & Survivability Program
PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NCCOSC RDTE DIV, San Diego, CA; NRL SSC, Stennis Space Center, MS; NAVUNSEAWARCEN DET, New London, CT; NRL, Washington, DC; NCEL, Port Hueneme, CA; NAVUNSEAWARCENDIV, Keyport, WA; NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Arete Associates, Sherman Oaks, CA; University of Texas/Applied Research Laboratory, Austin, TX; University of Washington/Applied Physics Laboratory, Seattle, WA; Dynamics Technology Inc., Torrance, CA; American Telephone and Telegraph, Alexandria, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD #011-02 6/91

G. (U) RELATED ACTIVITIES: Not applicable

H. (U) OTHER APPROPRIATED FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Security & Survivability Program
PROJECT NUMBER: V1871 PROJECT TITLE: SSBN Survivability

C. (U) DESCRIPTION: The following projects are being developed under the SSBN Survivability Program: Low Frequency Active Acoustics (LFAA) to acoustic transmissions; the Self Monitor (TSM) to detect own ship the Buovant Cable Antenna Extended Frequency System (BCAEFS) to detect radars while Project Jade (JADE) to warn of detection systems in use; the Tactical Decision Aids for Submarine Security (TDASS /STEALTH) to provide guidance for detection system avoidance; Standard Rampart (RAMPART) to detect own ship Standard Oboe (OBOE) to develop better paints for preventing detection of the communications buoy; Standard Crimson (CRIMSON) to minimize Automated Threat Overflight Monitoring System (ATOMS) to detect aircraft using the Limit Inverse (INVERSE) and Limit Lighthouse (LIGHTHOUSE) which are restricted access programs. Out year countermeasure development programs will include but are not limited to: Extended Frequency System II (EFS II), Electromagnetics (ELECTRO-MAGS), Contaminants, Magnetics, and (VLF ARRAY).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Conducted multiple project submarine sea test. (BCAEFS, ATOMS, TDASS)
   b. (U) Prepared for CRIMSON Large Scale Vehicle (LSV) shakedown tests.
   c. (U) Prepared for JADE-4 (buoy) sea test.
   d. (U) Developed interim LFAA capability using the Low Frequency Acoustic Intercept Receiver (LFAIR) PC based Quick Response Systems (QRS).
   e. (U) Conducted RAMPART-6 sea test (buoy mounted sensor).
   f. (U) Continued OBOE.
   g. (U) Continued project participation in INVERSE.

2. (U) FY 1993 PROGRAM:
   a. (U) Thirteen projects continue with sea/lake tests for JADE, ATOMS, CRIMSON, LFAA, TDASS and TSM.
   b. (U) Complete OBOE with the development of a Draft Utilization Plan.
   c. (U) Plan for transition of the VLF ARRAY Project from SSBN Security.
   d. (U) Complete LFA and SAR TDASS Modules combine with STEALTH.
   e. (U) Initiate transition of BCAEFS to Engineering Development Model (EDM).
   f. (U) Continue project participation in INVERSE.

3. (U) FY 1994 PLANS:
   a. (U) Eleven projects continue with sea/lake tests for LFAA and STEALTH.
   b. (U) Initiate transition of ATOMS, JADE, RAMPART and TSM.
   c. (U) Transition EFS-2 and VLF ARRAY from SSBN Security.
   d. (U) Conclude CRIMSON with quarter scale lake tests.
   e. (U) Conclude project participation in INVERSE.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET, New London, CT; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN DET, Annapolis, MD; NRL, Washington, DC. CONTRACTORS: Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Georgia Tech University, Atlanta, GA; Scientific Atlanta, San Diego, CA; Northwest Research Associates, Belleview, WA; Applied Mathematics Incorporated (AMI), New London, CT.

F. (U) RELATED ACTIVITIES: Not applicable.
G. (U) OTHER APPROPRIATION FUNDS: Not applicable.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: V1265 PROJECT TITLE: Sub Defensive Warfare



POPULAR NAME: Submarine Defensive Warfare System (SDWS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MMD MSII 05/93	AN/WLY-1 MSII 05/94 ADC MK 4 MSIII 3/94	AN/WLY-1 MS III 06/97 MMD MS III 03/97 SMTD MS II 09/96 SMTD MS III 12/01
ENGINEERING MILESTONES	AN/WLY-1 PDR AN/WLY-1 CDR-1	MMD PDR	MMD CDR-1	SMTD PDR 04/97 SMTD CDR-1 10/98 SMTD CDR-2 10/99 MMD CDR-2 AN/WLY-1 CDR-2
T&E MILESTONES	ADC MK 4 DT IIA LAUNCHER QUIETING DT I	MMD DT I ADC MK 4 DT IIB NLQ-1 DT I	AN/WLY-1 DT I ADCMK 4 OT II	AN/WLY-1 DT IIA 09/96; DT IIB 03/97; OT II 06/97; MMD DT IIA 3/95 MMD DT IIB 10/96; OT II 01/97 SMTD DT I 06/96; DT IIA 12/99; DT IIB 06/01; OT II 09/01
CONTRACT MILESTONES	AN/WLY-1 Prototype	MMD EMD	AN/WLY-1 EMD	SMTD EMD & LRIP

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	8,813	19,900	9,472	CONT.	CONT.
SUPPORT CONTRACT	1,650	1,429	953	CONT.	CONT.
IN-HOUSE SUPPORT	25,784	17,384	6,275	CONT.	CONT.
GFE/ OTHER	100	110	100	CONT.	CONT.
TOTAL	36,347	38,823	16,800	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: V1265 PROJECT TITLE: Sub Defensive Warfare

B. (U) DESCRIPTION: This project develops a Submarine Defensive Warfare System (SDWS) to improve the effectiveness and survivability of all classes of US submarines. Project efforts consists of countermeasures devices, launchers, threat detection, and Command and Control systems. Specific devices in development are: Acoustic Device, Countermeasure (ADC) MK 4, an advanced sonar countermeasure device; a Mobile Multi-Function countermeasure device, (MMD); MLQ-1, a special purpose countermeasure device; and an advanced Submarine Torpedo Defense (SMTD) device capable of interception and neutralization of future torpedo threat capabilities. Launcher development efforts are directed to external countermeasure launchers specifically configured to each submarine class for ready stowage and rapid launching of devices, including launcher quieting techniques to meet advanced submarine noise requirements. Threat detection and command and control efforts consist of development of a new sonar intercept system designated AN/WLY-1, which will have torpedo recognition capability for early threat acquisition, classification, tracking and a consolidated command and control subsystem for countermeasure inventory, status, tactical solutions, and launch management of all on board countermeasure devices and launcher systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) ADC MK 4:
(1) (U) Completed fabrication of Low Rate Initial Production (LRIP) units.
(2) (U) Completed dynamic launch DT IIA testing of LRIP units.
(3) (U) Commenced DT IIB (Technical Evaluation) Testing.

b. (U) LAUNCHER QUIETING:
(1) (U) Completed Prototype model fabrication and conducted acoustic and design verification DT I testing.
(2) (U) Continue quieting design studies.

c. (U) AN/WLY-1:
(1) (U) Awarded competitive Prototype system contract.
(2) (U) Completed Prototype system Preliminary Design Review (PDR).
(3) (U) Completed Prototype system Critical Design Review (CDR-1).

d. (U) MLQ-1 Device:
(1) (U) Completed Prototype model fabrication and conducted final in-water DT I testing.

e. (U) MMD Device:
(1) (U) Completed Prototype model fabrication and conducted signal processor and integrated vehicle open ocean testing.

f. (U) SMTD Device:
(1) (U) Completed documentation and requirements.
(2) (U) Completed Prototype subsystem/component design.
(3) (U) Completed in-water propulsion and self noise subsystem DT I testing.

2. (U) FY 1993 PROGRAM:

a. (U) ADC MK 4:
(1) (U) Complete DT IIB.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: V1265 PROJECT TITLE: Sub Defensive Warfare

b. (U) AN/WLY-1:
(1) (U) Complete Prototype system fabrication and factory acceptance testing.
(2) (U) Commence submarine installation of Prototype system.

c. (U) MMD Device:
(1) (U) Complete prototype integrated vehicle range and torpedo DT I testing.
(2) (U) Obtain Milestone II approval.
(3) (U) Award Engineering and Manufacturing Development (ENG & MFGR) Phase contract.
(4) (U) Complete Engineering Development Model (EDM) PDR.

d. (U) SMTD Device:
(1) (U) Complete Prototype model system level specification.
(2) (U) Complete Prototype fabrication and conduct integrated vehicle acoustic, propulsion and guidance DT I testing.

e. (U) LAUNCHER QUIETING:
(1) (U) Continue quieting design studies.

f. (U) NLQ-1:
(1) (U) Complete EDM design, DT I testing, and documentation.

3. (U) FY 1994 PLANS:

a. (U) MMD Device:
(1) (U) Complete EDM CDR-1.
(2) (U) Complete EDM fabrication and factory acceptance testing.
(3) (U) Commence in water demonstration DT IIA Testing.

b. (U) AN/WLY-1:
(1) (U) Complete submarine installation of prototype system and conduct submarine installed at sea DT I Testing.
(2) (U) Obtain Milestone II Decision.
(3) (U) Exercise EDM Option and commence EDM fabrication.

c. (U) ADC MK4:
(1) (U) Conduct OT II (Operational Evaluation Testing).
(2) (U) Obtain Milestone III approval.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

C

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: V1265 PROJECT TITLE: Sub Defensive Warfare

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: Norden Systems, Melville, NY; Bendix, Inc., Sylmar, CA; Hazeltine Corp., Braintree, MA; EML Research, Hudson, MA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

SYSTEM	TOR	DOP	OR	TEMP
ADC MK 4	N/A	N/A	12/76	#1171 (03/88)
AN/WLY-1	09/85	06/86	09/90	#1351 IN PROCESS
NLQ-1	03/86	11/87	07/88	#1338 IN PROCESS
MMD	03/86	11/87	07/88	#1339 IN PROCESS
SMTD	02/88	05/92	06/92	TBD
LAUNCHER QUIETING	N/A	N/A	12/76	#581 REV 1 (08/90)

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN-LINE 58	17,867	12,903	16,245	CONT.	CONT.

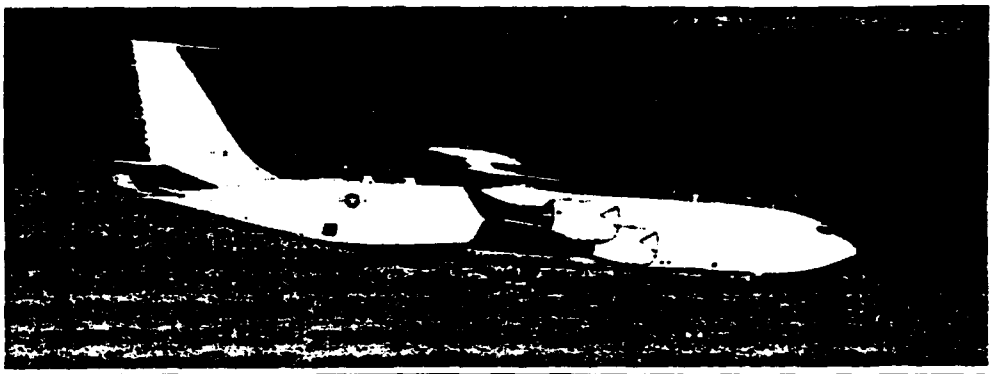
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

SYSTEM	DT-I	DT IIA	DT IIB (TECHEVAL)	OT II (OPEVAL)
ADC MK 4	09/91	03/92	07/93	10/93
MMD	01/93	03/95	10/96	01/97
AN/WLY-1	12/93	09/96	03/97	06/97
SMTD	06/96	1Q/00	3Q/01	4Q/01
NLQ-1	06/93	N/A	N/A	N/A
LAUNCHER QUIETING	08/92	N/A	N/A	N/A

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N — BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: H0793 — PROJECT TITLE: TACAMO



POPULAR NAME: TACAMO

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
HPTS		4/93 MS-II		
BLOCK 9/92 MS-IV/II				5/95 MS-III
ORBIT IMPROVEMENT			10/93 MS-II	5/95 MS-III
ICS			10/93 MS-II	4/95 MS-III
AVR				10/95 MS-II
ENGINEERING MILESTONES				
BLOCK		PDR 3/93 CDR 6/93		
ORBIT IMPROVEMENT			PDR 2/94 CDR 6/94	
ICS			PDR 1/94 CDR 5/94	
AVR				PDR 2Q/95 CDR 3Q/95
T&E				
HPTS	3/92 DTIIB	10/92 OTIIB	6/94 DTIII	1Q/95 OTIII
BLOCK			6/94 DTIII	1Q/95 OTIII
ORBIT IMPROVEMENT			9/94 DTIII	1Q/95 OTIII
ICS			9/94 DTIII	1Q/95 OTIII
CONTRACT MILESTONES				
HPTS	5/92			
BLOCK INCREMENT		10/92 AWARD		
ORBIT IMPROVEMENT			11/93 AWARD	
ICS			10/93 AWARD	
AVR				1Q/95 AWARD

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7.844	15.065	27.361	8.436	91.502
SUPPORT CONTRACT	0	0	0	0	3.138
IN-HOUSE SUPPORT	2.958	4.488	4.740	4.168	49.862
GFE/ OTHER	3.244	0	4.083	5.686	14.990
TOTAL	14.046	19.553	36.184	18.290	159.492

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: H0793 PROJECT TITLE: TACAMO

B. (U) DESCRIPTION: The Very Low Frequency/Low Frequency (VLF/LF) High Power Transmitter System (HPTS) and Dual Trailing Wire Antenna (DTWA) Systems for the E-6A TACAMO and the Air Force National Emergency Airborne command post (E-4B) are required to communicate with the strategic bomber, missile and submarine forces. The transmitter equipment (200KW) provides the E-6A TACAMO aircraft with a state-of-the-art system replacing tube-type equipment that is logistically insupportable. The replacement DTWA will provide increased reliability and a third Utility Wire Antenna (UTWA) for redundant short or long wire capability.

(U) BLOCK UPGRADE: An additional upgrade of the E-6A TACAMO systems are required to ensure communications compatibility within the Strategic Connectivity System (SCS), the system that links TACAMO with other strategic communications platforms and systems. Extremely High Frequency Military Strategic Tactical and Relay (EHF MILSTAR), MILSTAR, Message Processor, Time/Frequency Standard Distribution System (T/FSDS), and Global Positioning System (GPS) upgrades will be installed aboard the E-6A TACAMO as a Block II Upgrade Program. In addition to providing the required E-6A/SCS compatibility, the installation of these systems will provide a significant increase in reliability and maintainability, enhance system communications capability, and provide increased supportability. Production of both HPTS and Block II are scheduled for concurrent installation as the E-6A Avionics Block Upgrade.

(U) ORBIT IMPROVEMENT: Provides the orbit control necessary to prevent Long Trailing Wire Antenna (LTWA) contact with the horizonal stabilizer during orbit maneuvers where bank angles greater than 40° are required. The Orbit Improvement program consists of the installation and integration of auto throttles and modifications to the Flight Management Computer System to precisely control the aircraft's air speed and bank angle, thereby, stabilizing the aircraft during orbit and dampening LTWA oscillations and preventing LTWA contact with the tail. This modification corrects major E-6A OT-III deficiencies.

(U) INTERCOMMUNICATION SYSTEM (ICS): Planned ICS Modifications correct numerous OT-III critical to mission operation deficiencies. Among the deficiencies to be resolved are radio deselections during power shifts, the provision for battery backup of UHF/VLF communications and the provision for ICS communications with a ground observer.

(U) ADVANCED VERY LOW FREQUENCY RECEIVER (AVR): The AVR will replace the present E-6A Very Low Frequency (VLF) receivers as well as the Enhanced Verdin Receive Terminals. The current VLF receiver was developed under 1960's technology and suffers from low reliability and poor performance. The current Verdin Receive Terminal was designed during the 1970's and does not possess the High Data Rate (HIDAR) transmission mode directed by the Secretary of Defense's Worldwide Military Command and Control System Airborne Resources rearchitecture. Increasing non-supportability of both systems is also a prime factor in their replacement decision. The AVR has increased performance, greater reliability with reduced space and weight requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Logistics Review Group (LRG) Audit held for HPTS and Block II.
b. (U) Released request for proposal (RFP) for E-6A Avionics Block Upgrade contract for Engineering and Manufacturing Development (E&MD).
c. (U) Started Development and Operational Test and Evaluation (DT/OT-IIB) on E-6A HPTS in support of Low Rate Initial Production (LRIP) milestone IV/IIA.
d. (U) E-6A Avionics Block Upgrade Milestone IV/II for E&MD.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: H0793 PROJECT TITLE: TACAMO

2. (U) FY 1993 PROGRAM:

a. (U) Complete Development and Operational Test and Evaluation (DT/OT-IIB) on E-6A HPTS in support of LRIP milestone IV/IIA.
b. (U) Continue E-6A Avionics Block Upgrade.
c. (U) HPTS Milestone IV/IIA for LRIP.
d. (U) Continue Integration/Installation (INI) contractor E&MD effort.
e. (U) Preliminary Design Review (PDR) for Block Upgrade.
f. (U) Critical Design Review (CDR) for Block Upgrade.
g. (U) E-6A Avionics Block Upgrade contract award for E&MD in October 1992.

3. (U) FY 1994 PLANS:

a. (U) Complete installation and integration of Avionics Block Upgrade
b. (U) Contractor Testing for Avionics Block Upgrade.
c. (U) E-6A Avionics Block Upgrade and HPTS Developmental Testing support of production milestone (DT-III).
d. (U) Orbit Improvement and Intercommunication System (ICS) Milestone II decisions for E&MD efforts.
e. (U) Award Orbit Improvement and ICS E&MD contracts.
f. (U) Preliminary and Critical Design reviews for Orbit Improvement and ICS efforts.
g. (U) Start Development and Operational Test and Evaluation (DT/OT-III) on E-6A Orbit Improvement and ICS modifications in support of Production Milestone III.
h. (U) Define Navy requirements for the AVR.
i. (U) Define Statement of Work (SOW), specifications and program changes to AVR development contract for integration of AVR into the E-6A.

4. (U) PROGRAM TO COMPLETION: All testing and evaluations of the above programs support FY 95 Production Milestone III decisions with the exception of AVR. AVR's Milestone II is scheduled for 1Q/95. AVR will be tested and is planned to achieve its Production Milestone III decision in FY96.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Indianapolis, IN; NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Rockwell, Dallas, TX; Chrysler Technologies Airborne Systems, Waco, TX.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) HPTS

a. (U) TEMP	5/92
b. (U) Acquisition Plan (AP)	1/92
c. (U) Operation Requirements (OR) Documentation	8/86
d. (U) Integrated Program Summary (IPS)	8/92

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: H0793 PROJECT TITLE: TACAMO

2. (U) E-6A AVIONICS BLOCK UPGRADE	
a. (U) TEMP	9/92
b. (U) AP (Revision 1)	5/92
c. (U) OR	8/92
d. (U) IPS	9/92
3. (U) ORBIT IMPROVEMENT	
a. (U) TEMP	11/92
b. (U) AP (Revision 1)	11/92
c. (U) OR	8/91
d. (U) IPS	7/93
4. (U) ICS	
a. (U) TEMP	11/92
b. (U) AP (Revision 1)	11/92
c. (U) OR	8/91
d. (U) IPS	7/93
5. (U) AVR	
a. (U) TEMP	7/94
b. (U) AP	9/93
c. (U) OR	11/93
d. (U) IPS	7/94

G. (U) RELATED ACTIVITIES: PE 0303131F, (Air Force) Minimum Essential Emergency Communications Network. The VLF/LF HPTS and DTWA Systems for the E-6A TACAMO and the Air Force E-4B are required to communicate with the strategic bomber, missile, and submarine forces.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN-Line 45	57,555	27,346	118,461	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information contained in the Congressional data sheets.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0102427N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Naval Space Surveillance System
PROJECT NUMBER: X0125 PROJECT TITLE: Naval Space Surveillance

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0125	NAVSPASUR	855	863	735	CONT.	CONT.

B. (U) DESCRIPTION: The Naval Space Surveillance (NAVSPASUR) System is an integral component of the U.S. Space Command Detection and Tracking System. This system provides continuous surveillance and unalerted detection of space objects crossing the continental U.S. NAVSPASUR is also the only space surveillance system which provides satellite vulnerability data to the Fleet units. It is a multistatic continuous-wave radar fence consisting of three transmitter sites, six receiver sites, and a computation center. The transmitter and receiver sites are located on a great circle across the southern CONUS, and the computation center is located at NAVSPASUR Headquarters in Dahlgren, VA.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed development and testing of Digital Signal Processing Receiver (DSPR) primary and secondary system Engineering Development Model (EDM).

b. (U) Completed system design documentation for the DSPR.

c. (U) Continued digital filter replacement development.

2. (U) FY 1993 PROGRAM:

a. (U) Research processing alternatives and improve system performance.

b. (U) Continue digital filter development.

3. (U) FY 1994 PLANS:

a. (U) Begin development of a digital replacement for the analog portion of the receivers.

b. (U) Complete digital filter replacement development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVELEX, Charleston, SC

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line 103	2,894	97	2,500	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E1662	F/A-18 IMPROVEMENTS	18,981	14,314	11,452	CONT.	CONT.
E2065	F/A-18 RADAR UPGRADE	49,643	38,042	60,072	64,734	298,376
E2130	F/A-18 FOLLOW-ON VARIANT	350,087	843,101	1,413,972	3,121,356	5,736,516
	TOTAL	418,711	895,457	1,485,496	CONT.	CONT.

B. (U) DESCRIPTION: The F/A-18 is capable of using selected external equipment to perform either fighter or attack missions. The capabilities of the F/A-18 weapon system can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. Continued development capability is required to successfully optimize new F/A-18 weapon system capabilities in the Fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability. The F/A-18 Naval Strike Fighter program transitioned from full-scale engineering development to operational systems development during FY 1983. As F/A-18 squadrons report discrepancies and new requirements, a continuing capability is needed to perform technical evaluations, investigative flight testing, software support, and incorporate pre-planned product improvements (P3I) (i.e., capability enhancements). The F/A-18 radar (APG-65) will be upgraded to the APG-73 to operate in the projected electronic warfare environment of the 1990's. The follow-on F/A-18 (E/F version) is an airframe upgrade incorporating increased capabilities, performance, and survivability necessary to satisfy the continuing requirement to implement new and more effective capability to counter emerging threats. The E/F will have a 53 percent increase in range over the C/D in a high-low-low-high mission carrying three tanks, four 1000 pound bombs, and two AIM-9 air-to-air missiles. The E/F version will have increased internal fuel capacity, increased weapon carriage capability, increased carrier recovery payload, enhanced survivability/vulnerability, increased growth capacity, and increased engine thrust. It will retain all of the P3I efforts developed for the earlier night attack C/D version of the aircraft.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E1662 PROJECT TITLE: F/A-18 Improvements



POPULAR NAME: HORNET

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	(Program Milestones for this project are complete)			
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7.876	4.963	6.992	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	9.049	2.887	3.197	CONT.	CONT.
GFE/ OTHER	2.056	6.464	1.263	CONT.	CONT.
TOTAL	18.981	14.314	11.452		

B. (U) DESCRIPTION: The F/A-18 is a multi-mission strike fighter aircraft that is used in fighter and attack roles through selected use of external equipment (such as external fuel tanks, targeting and navigation Forward Looking Infrared (FLIR) pods). The capabilities of the F/A-18 weapon system are being upgraded to accommodate and incorporate new or enhanced weapons including the AMRAAM, I^{2}R Maverick, Harpoon, and SLAM as well as other advances in technology such as night attack, reconnaissance, enhanced performance engine and radar upgrade to respond effectively to emerging future threats. Continued development capability in terms of software and hardware improvements is required to successfully optimize new F/A-18 weapon system capabilities in the fleet. Continued improvements in reliability and maintainability for the airframe, avionics, and engines are necessary to ensure maximum benefit is achieved through reduced cost of ownership and enhanced availability. As F/A-18 squadrons report system problems and requirements, a continuing capability is needed to perform technical evaluation, investigative flight testing, software support, and incorporate capability enhancements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E1662 PROJECT TITLE: F/A-18 Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage, and any structural deficiencies identified during deployments of the F/A-18 aircraft. This effort resulted in the initiation of a structural engineering change proposal (ECP-440, Former cracks in the Speed breakthrough area) in the FY93 Aircraft Plan.

b. (U) Continued flight testing at NAVAIRWARCENWPNDIV, China Lake, CA and NAVAIRWARCENACDIV, Patuxent River, MD to resolve reported fleet problems and develop recommended improvements. Some results were simulation evaluations of a flight control system as modeled in the MCAIR simulator, comparison reports of NAVY/NASA Control Margin Support, Pitch Control Margin Flight Tests, and other electrical/mechanical production back-up control system flying qualities.

c. (U) Continued hardware and software integration testing for Advanced Tactical Airborne Reconnaissance System (ATARS/RECCE).

d. (U) Initiated development of Pre-planned Product Improvement (P3I) design effort to incorporate an Air-to-Air and Air-to-Ground Multi-Sensor Integration capability in the aircraft.

e. (U) Began second lifetime fatigue testing on Development Test-01 (DT01) test article.

f. (U) Initiated integration testing of Global Positioning System (GPS), ALE-47 countermeasures dispenser, Joint Standoff Weapon (JSOW), BQM-145 (Unmanned Air Vehicle-Medium Range (UAV-MR)), Guided Bomb Unit (GBU-24) and the lightweight gun.

g. (U) Initiated integration of ALR-67(V)3 with on-board avionics and platform mission computers.

h. (U) Initiated design efforts to integrate light weight fuel cells into the aircraft; and completed design efforts analysis with decision not to integrate.

2. (U) FY 1993 PROGRAM:

a. (U) Continue contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and any structural deficiencies identified during deployment of the aircraft.

b. (U) Continue flight testing at NAVAIRWARCENWPNDIV, China Lake, CA and NAVAIRWARCENACDIV, Pax River, MD to resolve reported fleet problems and develop recommended improvements. Begin integration of a ground proximity warning system and a terrain profile matching navigation system for a technical demonstration.

c. (U) Continue ATARS/RECCE integration flight testing at NAVAIRWARCENACDIV, China Lake, CA and Pax River, MD.

d. (U) Continue integration of GPS, ALE-47, GBU-24, JSOW, BQM-145 (UAV-MR), and the lightweight gun.

e. (U) Complete development of P3I (an initial Air-to-Air) and continue development of Air-to-Ground Multi-Sensor Integration capability into the aircraft.

f. (U) Continue fatigue testing on DT01 test article.

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E1662 PROJECT TITLE: F/A-18 Improvements

g. (U) Conduct and complete landing gear planning mechanism testing.

h. (U) Continue ALR-67(V)3 integration and conduct Developmental Test/Operational Test (DT/OT).

i. (U) Begin effort on an improved windscreen.

3. (U) FY 1994 PLANS:

a. (U) Continue Contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage, and any structural deficiencies identified during deployments of the F/A-18 aircraft.

b. (U) Continue flight testing at NAVAIRWARCENWPNDIV, China Lake, CA and NAVAIRWARCENACDIV, Pax River, MD to resolve reported fleet problems and develop recommended improvements.

c. (U) Continue ATARS/RECCE integration and flight testing at NAVAIRWARCENACDIV, China Lake, CA and Pax River, MD.

d. (U) Continue integration of JSOW and BQM-145 (UAV-MR).

e. (U) Continue development of P3I design on the Multi-Sensor Integration capability in the aircraft.

f. (U) Complete fatigue testing on DT01 test article.

g. (U) Complete integration of GPS, ALE-47, GBU-24 and the lightweight gun.

h. (U) Complete ALR-67(V)3 integration effort.

i. (U) Continue/complete the development of an improved windscreen.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Lakehurst, NJ; NAVAIRWARCENACDIV, Trenton, NJ; NAVSURFWARCENDIV, Indian Head, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NRL, Washington, D.C.; OPTEVFOR Norfolk, VA. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell); Control Data Corporation, Minneapolis, MN (ATARS).

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E1662 PROJECT TITLE: F/A-18 Improvements

F. (U) PROGRAM DOCUMENTATION:

F/A-18 DCP	9/86
F/A-18 C/D TEMP	9/87

G. (U) RELATED ACTIVITIES: P.E. 0604314N, Air-to-Air Missiles, project E0981, AMRAAM; PE 0604727N, JSOW; P.E. 0604270N, EW Development; P.E. 0604777N, Navigation ID System, project X0921, NAVSTAR GPS equipment; P.E. 0305141D BQM-145 (UAVMR); P.E. 0603261N Tactical Airborne Recon; P.E. 0204163N Fleet Communications.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT: (F/A-18C/D, FY94 NAVCOMPT BUDGET (Gross P-1)					
QTY	48	36	36	96	1,075
APN-6,7	2,045,404	1,288,802	1,602,154	4,476,345	34,635,154
APN-6	75,211	88,068	83,901	97,295	1,695,807

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: F/A-18 C/D completed OPEVAL (OT-IIB) in 1982. All DT/OT will be of the FOT&E (OT-III) variety.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2065 PROJECT TITLE: F/A-18 Radar Upgrade

PICTURE NOT AVAILABLE

POPULAR NAME: RADAR UPGRADE (RUG)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM		IIB	PR	III	IOC
MILESTONES		4/93	5/94	3/95	20/96
ENGINEERING	CDR(S/W)				
MILESTONES	12/91				TBD
T&E		OT-IIA	OT-IIB-1	OT-IIB-2	OT-III
MILESTONES		12/92	2/94	20/95	30/95
CONTRACT		LRIP-2	LRIP-3		FRP
MILESTONES		3/93	5/94		20/95

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	46.627	29.000	42.276	58.716	259.639
SUPPORT CONTRACT					
IN-HOUSE SUPPORT					
GFE/ OTHER	3.016	9.042	17.796	6.018	38.737
TOTAL	49.643	38.042	60.072	64.734	298.376

B. (U) DESCRIPTION: The F/A-18 radar (AN/APG-65), requires an upgrade to improve electronic counter-countermeasure (ECCM) performance against improved threat electronic countermeasures (ECM). This threat ECM improvement has partially resulted from compromises in the F/A-18 radar performance against various threat electronic warfare systems. The AN/APG-73 radar follows and capitalizes on AN/APG-70 and AN/APG-71 developmental and value engineering programs to maximize shop replaceable assembly (SRA) commonality. Phase II program will develop improved hardware and software for an all-weather Reconnaissance (RECCE) strip map mode. Phase II incorporates the system modifications required to provide a very high resolution ground map capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed final software Critical Design Review, Block IV.

b. (U) Continued roofhouse integration and testing of radar hardware and software.

c. (U) Initiated contractor flight testing of hardware and software design.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2065 PROJECT TITLE: F/A-18 Radar Upgrade

d. (U) Commenced operational testing (OT) of hardware design/developments and software design/coding.

e. (U) Completed installation of NAVAIRWARCENWPNDIV China Lake, CA and McDonnell Aircraft Company (MCAIR) benches.

f. (U) Continued Logistics Review Group (LRG) audit.

g. (U) Completed program review for authorization of long range procurement funds for LRIP-3.

2. (U) FY 1993 PROGRAM:

a. (U) Complete contractor flight testing of hardware and software designs.

b. (U) Conduct Operational Test Readiness Review (OTRR) prior to commencement of OPEVAL OT-IIB-1.

c. (U) Complete operational testing OT-IIA phase.

d. (U) Commence TECHEVAL Development Test (DT)-IIC.

e. (U) Continue Roofhouse integration and testing of Radar hardware and Software.

f. (U) Completed LRG audit 4/93.

3. (U) FY 1994 PLANS:

a. (U) Complete TECHEVAL (DT-IIC).

b. (U) Complete OT-IIB-1 (Joint Canadian/Navy OPEVAL).

c. (U) Complete DT-III.

d. (U) Commence OT-IIB-2 (Navy only OPEVAL).

e. (U) Initiate Phase II hardware and software development which is required to integrate an all weather reconnaissance capability into the AN/APG-73 Radar (in lieu of a side looking radar pod).

f. (U) Complete Roofhouse integration and testing of radar hardware and software.

4. (U) PROGRAM TO COMPLETION: Continue DT and OT of Phase II (RECCE Strip Map Mode) and develop hardware and software through Full Rate Production (FRP) approval and Initial Operating Capability (IOC) in FY96. The Radar Upgrade (RUG) program is planned to complete in FY 1998.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Lakehurst, NJ; NAVAIRWARCENWPNDIV, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; NAVAIRWARCENACDIV, Point Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NRL, Washington, DC. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System Integration); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell).

C

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2065 PROJECT TITLE: F/A-18 Radar Upgrade

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable for Phase I. RUG Phase II for RECCE Strip Map Mode added.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR #022-05-83 promulgated - 25 Jun 84.
OR #199-05-88 promulgated - 27 Jan 88.

G. (U) RELATED ACTIVITIES: P.E. 0205667N, F-14 Upgrade, is directly related to the AN/APG-65 upgrade due to hardware Shock Replacement Assembly (SRA) commonality.

H. (U) OTHER APPROPRIATION FUNDS:

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT: (F/A-18C/D, FY 1994 PRESIDENT'S BUDGET (Gross P-1)					
QTY	48	36	36	96	1,075
APN-6,7	2,045,404	1,288,802	1,602,154	4,476,345	34,635,154
APN-6	75,211	88,068	83,901	97,295	1,695,807

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Memorandum of Understanding signed by Canada on 30 March 1990 for cooperative development agreement. FY90 Canadian contribution totals $38.5M. Nunn Amendment funding applied to this program was $13.6M in FY-90.

J. (U) TEST AND EVALUATION: Based on TEMP approved 4 March 92, the Joint Canadian/Navy OPEVAL (OT-IIB-1) will be completed in 2nd QTR FY-94 and Navy only OPEVAL (OT-IIB-2) will be completed in 2nd QTR FY-95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2130 PROJECT TITLE: F/A-18 Follow-On Variant



POPULAR NAME: HORNET

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992		FY 1993	FY 1994	TO COMPLETE		
PROGRAM MILESTONES	IV/II 5/92				IIIA 2Q97	III 3Q00	
ENGINEERING MILESTONES	IDR 9/92	PDR 6/93	CDR-ENG 9/93 PDR-ENG 10/92	CDR 8/94	EngLPQ 1Q97	FPQ 1Q98	PCA 1Q/00
T&E MILESTONES	TEMP Signed 5/92	1st Engine Test 5/93			1stFlt&OA-I/OT-IIA,B&C 1Q96 /2Q97,1Q98,2Q99		
CONTRACT MILESTONES	EMD CONTRACT 7/92				LRIP-1/2/3/FRP 2Q97/2Q98/2Q99/3Q00		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	321.685	761.042	1,307.118	CONT.	CONT.
SUPPORT CONTRACT	2.507	3.800	6.000	CONT.	CONT.
IN-HOUSE SUPPORT	12.786	19.693	34.328	CONT.	CONT.
GFE/ OTHER	13.109	58.566	66.526	CONT.	CONT.
TOTAL	350.087	843.101	1,413.972	CONT.	CONT.

B. (U) DESCRIPTION: The F/A-18 is a twin engine, mid-wing multi-mission tactical aircraft employed in Navy and Marine Corps strike fighter squadrons. The F/A-18, through selected use of external equipment is designed for flexibility in fighter, attack, fleet air defense, and close air support roles. The F/A-18 E/F variant is an upgrade to the night attack "C" and "D" models. The F/A-18 E/F will be the second major upgrade since the program's inception. The F/A-18 E/F incorporates modification to the air vehicle to increase mission radius, payload flexibility, increase carrier recovery payload and growth potential and improve survivability while maintaining commonality with the F/A-18 C/D Avionics, mission systems and tactical software. The E/F will have a 53 percent increase in range over the C/D in a high-low-low-high mission carrying three tanks, four 1000 pound bombs, and two AIM-9 air-to-air missiles. This will allow the F/A-18 to continue to adapt its strike fighter role to evolving threats into the next century.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued system engineering studies to reduce risk and provide data for configuration definition.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2130 PROJECT TITLE: F/A-18 Follow-On Variant

b. (U) Aircraft Configuration Definition based on the results of engineering studies.

c. (U) Engineering and Manufacturing Development (E&MD) Detailed Specification generation.

d. (U) Continued engine risk reduction effort.

e. (U) Detailed specification review and approval was accomplished.

f. (U) Engineering and Manufacturing Development (E&MD) letter contracts awarded in 7/92 following Milestone II Defense Acquisition Board (DAB) review in 5/92.

g. (U) Began contractor E&MD aircraft design, analysis, and model testing.

h. (U) Performed subsystem design and testing.

i. (U) Conducted software preliminary design.

j. (U) Conducted Initial Design Review.

2. (U) FY 1993 PROGRAM:

a. (U) Continue all engineering and manufacturing design activity leading to the development of the airframe and engine.

b. (U) Conduct Preliminary Design Review.

c. (U) Conduct first engine testing/engine development tests.

d. (U) Conduct preproduction component tests.

e. (U) Conduct flight simulation.

f. (U) Definitize E&MD contracts in 12/92 following completion of COEA required by 5/92 DAB.

3. (U) FY 1994 PLANS:

a. (U) Continue engineering and manufacturing design activity leading to the development of the airframe and engine.

b. (U) Complete Critical Design Review (airframe).

c. (U) Complete structural Assembly Layouts.

d. (U) Start major assembly aircraft (1).

e. (U) Release 90% Structural design - aircraft (1).

4. (U) PROGRAM COMPLETION: Continuing.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Lakehurst, NJ; NAVAIRWARCENACDIV, Trenton, NJ; NAVSURFWARCENDIV, Indian Head, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NAVWPNENGSUPACT, Washington, D.C.; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NRL, Washington, D.C.; OPTEVFOR, Norfolk, VA; NAVAIRWARRCENDIV, Indianapolis, IN; NATSF, Philadelphia, PA; PSD, North Island, CA. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System integration); General Electric Company, Lynn, MA (F-414 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204136N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F/A-18 Squadrons
PROJECT NUMBER: E2130 PROJECT TITLE: F/A-18 Follow-On Variant

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: First Flight moved from 9/95 to 1st Qtr FY96. The Defense Acquisition Board (DAB) occurred 5/92 vice 3/92. The TEMP and the E&MD Contract award change was due to the rescheduled DAB.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: ORD (19 December 1991) TEMP (5 May 92); IPS (26 Feb 92); and APB (11 Jun 92).

G. (U) RELATED ACTIVITIES: PE 0604314N, Advanced Medium Range Air-to-Air Missiles, project E0981, AMRAAM; PE 0604727N JSOW; PE 0604270N, EW Development; PE 0604777N, Navigation ID System, project X0921, NAVSTAR GPS Equipment; PE 0305141D BQM-145 (UAV-MR); PE 0603261N ATARS/RECCE; PE 0204163N Fleet Communications.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

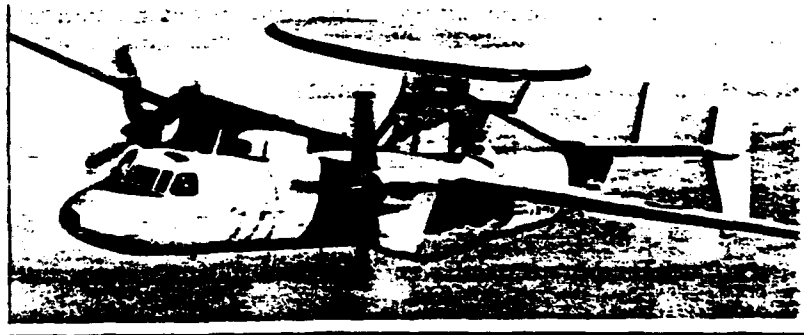
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: In FY 1996, complete first flight.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: E-2 Squadrons
PROJECT NUMBER: E0463 PROJECT TITLE: E-2C Improvements



POPULAR NAME: HAWKEYE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		UDP GROUP II MS III 9/93 MCU MS IV/II 9/93		MCU III FY 99
ENGINEERING MILESTONES			MCU SSS 4/94 MCU SDR 7/94	MCU PDR/CDR FY 95/FY 96
T&E MILESTONES		UDP GROUP II OT-IID 3/93	UDP GROUP II OT-III 6/94	MCU DT MCU OT FY 97
CONTRACT MILESTONES			MCU AWARD 4/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,408	0	43,726	92,949	392,983
SUPPORT CONTRACT					
IN-HOUSE SUPPORT					
GFE/ OTHER	4,860	6,352	5,204	38,103	139,754
TOTAL	6,268	6,352	48,930	131,052	532,737

B. (U) DESCRIPTION: This project provides preplanned product improvements for the evolution of E-2C airborne weapon system capabilities in support of naval warfare command and control requirements. It funds development for the modification/replacement of selected weapon replaceable assemblies of current installed subsystems. Additionally, applying ongoing developments and non-developmental items (NDI) where available, it funds integration and testing of new subsystems for meeting naval and national tasking requirements during the remainder of the E-2C service life. Included in this Update Development Program (UDP) are two sub-projects, UDP Groups I and II to be followed by a mission computer upgrade (MCU). Group I completed improved electronic countermeasures in the radar subsystem and increased target track capacity. Group II extends radar detection range, improves target identification capability and expands

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: E-2 Squadrons
PROJECT NUMBER: E0463 PROJECT TITLE: E-2C Improvements

information processing to assist operator workload. MCU, applying ongoing developments in data processing and target detection, will relieve current bottlenecks in signal and data processing, and permit incorporation of expanded functional capabilities to satisfy evolving operational requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Developmental Testing (DT-IID/DT-IIIA) Technical Evaluation/Board of Inspection and Survey (TECHEVAL/BIS) of UDP Group II.

b. (U) Completed software ground and flight test evaluation (DT-IIE) for UDP Group II.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct Operational Evaluation (OPEVAL) for UDP Group II (OT-IID).

b. (U) Conduct UDP II Milestone III to establish the UDP Group II baseline.

c. (U) Authorize development of new data processing subsystem for the E-2C at MCU Milestone IV/II (MS IV/II), to result in FY 1994 contract award.

3. (U) FY 1994 PLANS:

a. (U) Conduct FOT&E for UDP Group II (OT-III).

b. (U) Contract award for Engineering and Manufacturing Development (E&MD) of MCU.

c. (U) Develop and promulgate System Segment Specification (SSS) for MCU.

d. (U) Conduct System Design Review (SDR) for MCU.

e. (U) Develop Engineering Development Models (EDM) for MCU.

4. (U) PROGRAM TO COMPLETION: Conduct Preliminary and Critical Design Reviews (PDR/CDR) for MCU. Deliver EMDs for MCU. Conduct Developmental Testing and Operational Testing of MCU. Conduct software acceptance testing, Technical Evaluation and Operational Evaluation (TECHEVAL/OPEVAL) of MCU.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD; NRL, Washington, DC; NCCOSC RDTE DIV, San Diego, CA; NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY; General Electric, Utica, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: For MCU: The availability of proven advances in data processing technology provides a low risk opportunity to replace the existing 1960/1970 L-304 Central Processor in the E-2C with a new mission computer. This will simultaneously permit incorporation of expanded functional capabilities to satisfy evolving operational requirements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: E-2 Squadrons
PROJECT NUMBER: E0463 PROJECT TITLE: E-2C Improvements

2. (U) Schedule Changes: For Group II: OPEVAL to commence second quarter FY 1993 vice first quarter FY 1993. Slippage will have no impact if OPEVAL is conducted as rescheduled.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR 31-20	12/66
DCP (Rev 1)	6/71
DCP W-0463-AA	12/90
TEMP 760 (Rev 4)	12/90
TEMP 760 (Rev 5)	In Process
Mission Need Statement	In Process

G. (U) RELATED ACTIVITIES: PE 0602232N, Command, Control and Communications Technology; PE 0602111N, Surface/Aerospace Survivability and Weapons Technology.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN Lines 1/6	529,070	94,788	27,881	0	6,124,139
APN Line 5	60,505	75,156	124,003	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) This cooperative project involves the Egyptian Air Force and the U.S. Navy. The MOU was signed 15 May 91. The project includes design, coding, integration and testing of an Egyptian Air Force (EAF) full capability L-304 mission computer program to implement functions which maximize the tactical capabilities of the Enhanced Main Display Unit.

2. (U) Project planning efforts have been initiated by the Program Executive Officer, Tactical Aircraft Programs and Naval Command, Control and Ocean Surveillance Center, Research, Development Test and Evaluation Division (NRaD), San Diego, CA. Software engineering changes were approved by the Steering Group in Nov 92. The Design Working Group is taking action on the approved changes. The program has been funded by Nunn Program (PE 0603790D) and Egyptian National funds. At this time there is no U.S. corporate involvement.

J. (U) TEST AND EVALUATION:

(1) UDP II/OT-IID; MARCH 1993
(2) UDP II/OT-III; JUNE 1994
(3) UDP II/OT-IV; JUNE 1995

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications

A. (U) RESOURCES: (Dollar in Thousands)

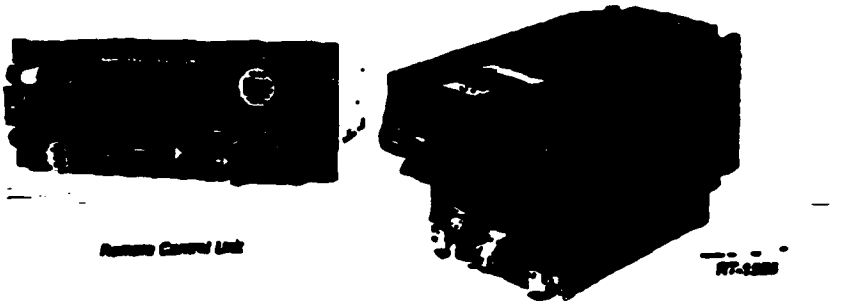
PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0661	Combination Radio	4,314	3,664	508	0	52,882
X0725	Communication Automation	14,908	8,969	4,441	CONT.	CONT.
X2074	Communication Support System	375	6,122	8,181	23,122	40,018
X2083	Shipboard Sincgars/VHF Relay Pall	1,331	4,050	2,298	3,278	16,835
X1083	Shore to Ship Communications Systems (1)	12,019	18,253	17,166	CONT.	CONT.
X0792	ELF Communications (2)	533	562	600	CONT.	CONT.
X0795	Support of MEECN (3)	2,350	1,272	1,241	CONT.	CONT.
	TOTAL	35,830	42,892	34,435	CONT.	CONT.

NOTE: (1) Previously funded in PE 0101402N.
(2) Previously funded in PE 0101401N.
(3) Previously funded in PE 0303131N.

B. (U) DESCRIPTION: This program develops an anti-jam radio system incorporating shipboard interfaces, interference mitigation, radio frequency distribution (including antennas), high speed burst data transmission and relocatable Very High Frequency (VHF) relay. The CSS develops the architecture for an integrated Navy Communication system for Ship-to-Shore and Shore-to-Ship communications defined as the Copernicus TADIXS and prototypes Early Operational Capabilities. It provides for integration of Electronic Counter-Counter Measures radios in Navy ships and replaces existing antiquated VHF (Frequency Modulated) radios. Develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). The ELF communications system provides the Navy with a highly reliable means of transmitting short messages from submarine command authorities in the CONUS to submarines. MEECN is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAM) to our strategic platforms.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: W0661 PROJECT TITLE: Combination Radio



POPULAR NAME: AN/ARC-210

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	LRIP 6/92		MS III 1/94	
ENGINEERING MILESTONES				
T&E MILESTONES	OT (ARC-210) 10/91			
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,321	3,174	210	0	37,308
SUPPORT CONTRACT	0	0	0	0	388
IN-HOUSE SUPPORT	633	190	203	0	12,685
GFE/ OTHER	360	300	95	0	2,001
TOTAL	4,314	3,664	508	0	52,882

B. (U) DESCRIPTION: This project develops airborne tactical jam-resistant radio systems providing DOD/NATO interoperability. The AN/ARC-210 Electronic Counter Counter-Measures (ECCM) Combination Radio provides small, jam-resistant Ultra High Frequency/Very High Frequency communications utilizing HAVEQUICK I/II and Single Channel Ground and Airborne Radio System (SINCGARS) waveforms. Upgrades will incorporate the Downed Aircrew Locating System (DALS), Satellite Communication (SATCOM) and advanced waveform capabilities. Aircraft users include CH-53E, CH-46, UH-1N, F/A-18C, T/AV-8B, AH-1W, SH-60B, E2C, F-14, S-3, P-3, KC-130F/R/T; Air Force B-52, RC-135, U-2; Army ASC-15.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed F/A-18 Operational Evaluation (OPEVAL) for AN/ARC-210 ECCM Radio.

b. (U) Completed AN/ARC-210 Helo Integration.

c. (U) Commenced AN/ARC-210 Helo flight tests.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: W0661 PROJECT TITLE: Combination Radio

d. (U) Obtained Limited Rate Initial Production (LRIP) decision for AN/ARC-210.
e. (U) Completed SATURN waveform provisions into AN/ARC-210.
f. (U) Continued DALS feasibility study.

2. (U) FY 1993 PROGRAM:

a. (U) Prepare specifications for DALS, SATCOM and Data Links.
b. (U) Complete DALS feasibility study.
c. (U) Correct and test F/A-18 OPEVAL deficiencies.

3. (U) FY 1994 PLANS:

a. (U) Obtain Milestone III production decision for AN/ARC-210.

b. (U) Evaluate risk assessment for DALS, SATCOM and DATA Links.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Indianapolis, IN. CONTRACTOR: Rockwell-Collins, Cedar Rapids, IA.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: DALS, SATCOM and Data Link incorporation efforts have been down-scoped.

3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

NDCP	6/78
TEMP	10/90
Acquisition Plan	6/92

G. (U) RELATED ACTIVITIES: PE 0207423F, Air Force HAVEQUICK/HAVESYNC, PE 0604805A, Army SINCGARS.

H. (U) OTHER APPROPRIATION FUNDS: AN/ARC-210 Common OSIP (4-94) and applicable airframe appropriations that will have the AN/ARC-210 installed for future testing/production installations will include: CH-53E, CH-46, UH-1N, F/A-18C, T/AV-8B, AH-1W, SH-60B, E-2C, F-14, S-3, P-3, KC-130F/R/T; Air Force B-52, RC-135, U-2; Army ASC-15.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: F/A-18 deficiencies will be corrected and tested by OPTEVFOR in 3rd QTR FY 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X0725 PROJECT TITLE: Communication Automation

C. (U) DESCRIPTION: Navy Modular Automated Communications System (NAVMACS): Automates the message receiving, distribution and preparation functions aboard ships.

(U) High Speed Fleet Broadcast (HSFB): Resolves long standing throughput and system flexibility shortcomings by replacing the existing Fleet Broadcast with a more efficient, volume responsive broadcast.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) HSFB: Applied Versa Modular European (VME) standards to prototype hardware and procured seven prototype test models for lab integration and fleet demonstration in first quarter FY-93.

b. (U) NAVMACS: Started development of NAVMACS II Local Area Network (LAN) and Common User Digital Information Exchange System (CUDIXS) high data rate interfaces.

2. (U) FY 1993 PROGRAM:

a. (U) HSFB: Procure developmental and operational test systems (DT/OT) to populate one communications area and two battle groups to support a formal DT/OT test and achieve Milestone III production decision.

b. (U) NAVMACS: Rehosting NAVMACS II in the Tactical Computer 3 (TAC 3).

3. (U) FY 1994 PLANS:

a. (U) HSFB: Resolve DT/OT and Milestone III test issues. Revise production specification and award production contract in first quarter FY-94.

b. (U) NAVMACS: Develop, test and evaluate steps to evolve NAVMACS II into the Communications Support Systems (CSS)/COPERNICUS baseline architecture.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Portsmouth, VA. CONTRACTORS: RJO Enterprises Inc, Lanham, MD; SEMCOR, Arlington, VA.; Validity, Landover, MD.

F. (U) RELATED ACTIVITIES: HSFB: The HSFB program is directly related to the following projects: PE 0204163N, NAVMACS; PE 0204163N, Navy Standard Teleprinter.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN					
HSFB P117	0	0	5,640	31,387	42,900
NAVMACSII	6,701	8,056	18,606	95,534	128,557

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X2074 PROJECT TITLE: Communication Support System

C. (U) DESCRIPTION: This project is an initiative to develop the Copernicus Tactical Data Information Exchange Subsystem (TADIXS), an integrated Navy communication system architecture based on shared use of links and multimedia networks. It will provide increased communication survivability, throughput and security. CSS will further integrate the approach to research, development, acquisition and deployment of a total Command, Control and Communications Intelligence (C3I) system supporting Navy missions. The work to be performed is a system engineering effort that generates engineering solutions and guidelines, prototyping and early operational capabilities, and transition plans involving all current and planned Navy communication systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Prototyped Copernicus Command TADIXS with Early Operational Capability (EOC), Phase I.
b. (U) Provided virtual service for voice, video, facsimile, and data.
c. (U) Designed force operational TADIXS for multimedia.
d. (U) Finalized CSS system level architecture.
e. (U) Defined CSS security policy.
f. (U) Completed CSS requirements definition.
g. (U) Completed CSS A-level system specification.

2. (U) FY 1993 PROGRAM:
a. (U) EOC of Force Operations TADIXS, a dynamic Time Division Multiplex Access (TDMA) packet switched service to tactical data users, (EOC, Phase II).
b. (U) Design High Command (HICOM) TADIXS, (EOC III).
c. (U) Design multimedia mission area subnet virtual networks, circuit switch, and resource control and monitoring subsystem, (AICS, EOC III).
d. (U) Design resource planning, monitoring, and management software for the Space and Electronics Warfare (SEW) Commander afloat,(AICS, EOC III).

3. (U) FY 1994 PLANS:
a. (U) Install HICOM TADIX, (EOC III).
b. (U) Finalize Multilevel Security Design.
c. (U) Design Voice Data integration implementation.
d. (U) Demonstrate dynamic internetting using EOC Phase III.
e. (U) Prototype HICOM TADIXS, EOC Phase III, integrating EOC Phase I and PHASE II into an initial full CSS architecture implementation.

4. (U) PROGRAM TO COMPLETION: Complete integration of Copernicus TADIXS.
a. (U) Design submarine implementation for CSS.
b. (U) Implement use of commercial satellite communications as CSS resource.
c. (U) Implement full Copernicus TADIXS capabilities.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NCCOSC RDTE Div., San Diego, CA; NAVELEXCEN, Portsmouth, VA CONTRACTORS: MITRE Corp., McLean, VA; Harris Corp., Melbourne, FL.

F. (U) RELATED ACTIVITIES: Shared Adaptive Internet Technology (SAINT) Communications Shared Network Interface (CSNI) (NATO). PE 0205604N, Tactical Data Links; PE 303109N, Satellite Communications; PE 0204163N, Fleet Telecommunications; PE 0303140N, Information Systems Security Plan. CSS is the system engineering effort which brings all these implementing programs into a single communications architecture.

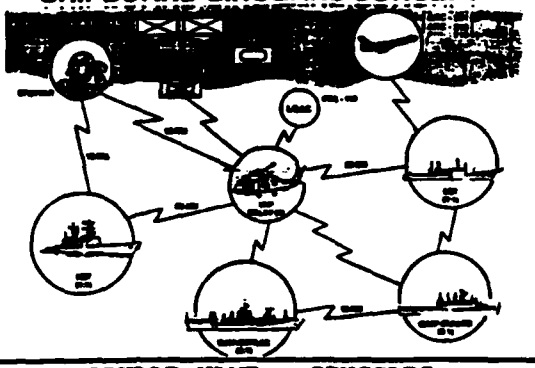
G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable .

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X2083 PROJECT TITLE: Shipboard SINCGARS/VHF Relay Pall

SHIPBOARD SINCGARS CONCEPT



POPULAR NAME: SINCGARS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				Relay MS III 2Q/95
ENGINEERING MILESTONES	6/92 Relay EDM			
T&E MILESTONES			Ship Segment Test & Cert 10/93	FOT&E through 4Q/96
CONTRACT MILESTONES				Relay Segment DT/OT 07/94

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT SUPPORT CONTRACT		1,124	503	2,578	2,404
IN-HOUSE SUPPORT	1,314	2,905	1,708	700	14,236
GFE/ OTHER	17	21	15	0	195
TOTAL	1,331	4,050	2,298	3,278	16,835

B. (U) DESCRIPTION: This project will provide Very High Frequency (Frequency Modulation) (VHF (FM)) jam resistant communications and Digital Communications Terminals (DCTs) for Naval Surface Fire Support and Amphibious Ships, and a VHF relay segment. Shipboard SINCGARS is based on a Non-Development Item (NDI) radio and develops interface mitigation and interface equipment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed Single Audio Switch (SAS) interface for SINCGARS radio for ship segment.

b. (U) Completed Critical Design Review (CDR) for relay segment.

c. (U) Completed first Engineering and Manufacturing Development Model (E&MDM) of relay segment.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X2083 PROJECT TITLE: Shipboard Sincgars/VHF Relay Pall

d. (U) Completed CDR for ship segment.

e. (U) Issued Test and Evaluation Master Plan (TEMP).

2. (U) FY 1993 PROGRAM:

a. (U) Install ship segment E&MDMs aboard 2 ships.

b. (U) Test and certify single channel shipboard SINCGARS and AN/VRC-46 replacement systems.

c. (U) Complete fabrication of 3 relay segment E&MDMs.

d. (U) Commence procurement of production AN/VRC-46 replacement radios.

3. (U) FY 1994 PLANS:

a. (U) Conduct Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) of relay segment.

b. (U) Commence development of co-site mitigation equipment.

c. (U) Commence Procurement of TYPE 1 AN/VRC-() system.

4. (U) PROGRAM TO COMPLETION: Type II system testing complete FY 96

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN; NRL, Washington, DC; NEVELEXCEN, Portsmouth, VA. CONTRACTORS: VITRO Corporation, Silver Spring, MD; MITRE Corporation, McLean, VA; Vredenbury, Reston, VA.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

TOR 135-094-85 Dec 86
TEMP 706-1 (draft - awaiting signature)

G. (U) RELATED ACTIVITIES: PE 0604805A, SINCGARS-Army is lead service for tri-service efforts to insure SINCGARS interoperability among services and platforms. Additionally the Army is providing the receiver-transmitter units to be integrated into the shipboard system.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 116			7,300	CONT.	CONT.
(U) OPN 119		1,383			

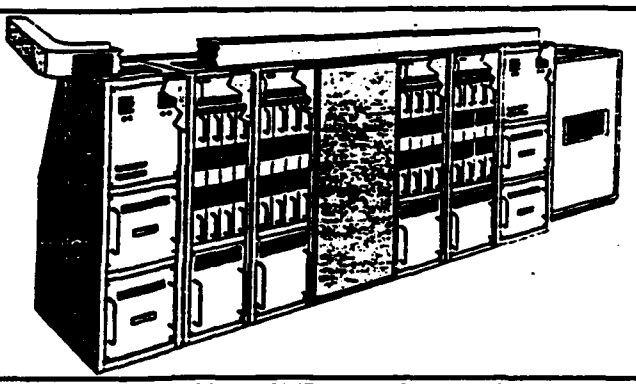
I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION:

a. (U) Approved TEMP - Jul 92.
b. (U) Ship Segment Test and Certification - Oct 93.
c. (U) Relay Segment DT/OT - Nov 94.
d. (U) Follow-on Test and Evaluation (FOT&E) - Continuing through 4Q/96.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X1083 PROJECT TITLE: Shore to Ship Communications Systems



POPULAR NAME: AVR, VME, SCAP, VERDIN & SSPAR

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				CONT.
ENGINEERING MILESTONES		SRR 9/93 SSPAR	PDR 6/94 SSPAR	CONT.
T&E MILESTONES				CONT.
CONTRACT MILESTONES	SSPAR RFP 2/92	SSPAR AWARD 6/93		CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,999	9,522	5,682	CONT.	CONT.
SUPPORT CONTRACT	257	177	177	CONT.	CONT.
IN-HOUSE SUPPORT	7,763	8,554	11,307	CONT.	CONT.
GFE/ OTHER					
TOTAL	*12,019	*18,253	17,166	CONT.	CONT.

* Previously funded in PE 0101402N

B. (U) DESCRIPTION: This project develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program provides enhancements to the shore-to-ship transmitting systems, shipboard receiver systems, and development of the Advanced VLF/LF Versa Module Eurocard (AVR/AME) receiver system (formerly the Compact Very Low Frequency (CVLF) receiver system). Continuing evaluation of this communications system is provided via the Strategic Communications Assessment Program (SCAP). Fixed VLF/Low Frequency (LF) develops an energy efficient, solid state, power amplifier for the VLF shore based transmitters of the submarine broadcast system, investigates improvement of the radio frequency high voltage insulators used in these stations through the High Voltage Insulator Program (HVIP), and measures and analyzes atmospheric noise and signal propagation through the Coverage Prediction Improvement Program (CPIP).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (Funded in PE 0101402N)

a. (U) Made propagation measurements, data reduction and analysis for CPIP.

b. (U) Developed three-dimensional (3-D) electric field prediction program product.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X1083 PROJECT TITLE: Shore to Ship Communications Systems

c. (U) Began testing of non-ceramic HVI.

d. (U) Completed fabrication and retrofit of an improved microprocessor in a CVLF receiver system (1 Engineering and Manufacturing Development Model (E&MDM)).

e. (U) Continued SCAP, HVIP and CPIP atmospheric studies.

2. (U) FY 1993 PROGRAM: (Funded in PE 0101402N)

a. (U) Continue SCAP, HVIP, and CPIP atmospheric studies.

b. (U) Validate 3-D electric field prediction program and continue non-ceramic HVI tests.

c. (U) Award Solid State Power Amplifier Replacement (SSPAR) E&MDM contract.

d. (U) Begin AVR/VME development effort.

e. (U) Continue VLF test bed analysis.

f, (U) SSPAR System Requirements Review (SRR).

3. (U) FY 1994 PLANS:

a. (U) Complete Preliminary Design Review (PDR) of SSPAR E&MDM.

b. (U) Continue SCAP, HVIP, and CPIP atmospheric studies.

c. (U) Continue validation of 3-D electric field prediction program and HVIP tests and new high voltage Radio Frequency (RF) insulator materials investigation.

d. (U) Convert CVLF Program documentation for AVR/VME including the Operational Requirements Document (ORD), Acquisition Strategy Report (ASR), and Acquisition Plan (AP).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC; NAVELEXCEN, Vallejo, CA; NAVSURFWARCENDIV, Crane, IN; NAVCIVENGLAB, Port Hueneme, CA. CONTRACTORS: MITRE Corp., McLean, VA; Johns Hopkins University Applied Physics Laboratory, Laurel, MD; C-Cubed Corp., Arlington, VA; Technology Services Corp., Silver Spring, MD.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

AVR/VME Acquisition Plan (AP) 6/94
AVR/VME ORD/ASR 11/93
SSPAR AP 9/91
SSPAR OR 10/91

G. (U) RELATED ACTIVITIES: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X1083 PROJECT TITLE: Shore to Ship Communications Systems

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

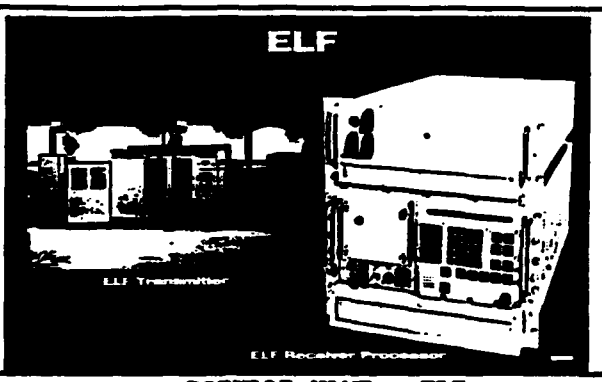
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN P118	1,317	8,466		TBD	TBD

I. (U) INTERNATIONAL COOPERATION AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: T&E of E&MDM in FY 95/96.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X0792 PROJECT TITLE: ELF Communications



POPULAR NAME: ELF

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			PDR 9/94	CONT.
ENGINEERING MILESTONES				CONT.
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT					
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	533	562	600	CONT.	CONT.
GFE/ OTHER					
TOTAL	* 533	* 562	600	CONT.	CONT.

* Funded in PE 0101401N

B. (U) DESCRIPTION: The ELF communications system provides the Navy with a highly reliable means of transmitting short messages from submarine command authorities in the CONUS to submarines traveling at operational speeds and depths. The messages are transmitted from shore-based transmitters in the CONUS. From FY 1992 through mid-FY 2000, Enhanced Data Rate (EDR) capabilities will be developed. Both hardware and software will be designed and modified and undergo testing to validate EDR.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (Funded in PE 0101401N)

   a. (U) Started baselining existing ELF receiver software.

   b. (U) Started EDR studies and high level design.

   c. (U) Demonstrated EDR receiver concept.

   d. (U) Completed Operational Utility Study for EDR.

2. (U) FY 1993 PROGRAM: (Funded in PE 0101401N)

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X0792 PROJECT TITLE: ELF Communications

a. (U) Complete receiver software baselining.

b. (U) Complete receiver software recompilation.

c. (U) Develop preliminary engineering change proposal for message input modifications for EDR.

d. (U) Develop an Operational Concept for EDR.

3. (U) FY 1994 PLANS:

a. (U) Complete message compression design.

b. (U) Start detailed design of EDR message input modifications.

c. (U) Complete Preliminary Design Review for message input modifications.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDET, New London, CT; NAVELEXCEN, Charleston, SC. CONTRACTORS: Not applicable.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

Navy Decision Coordinating Paper (NDCP) (MS II)	10/82
NDCP (MS III)	6/87
Navy Program Decision Memorandum (NPDM) (MS III)	6/87
Integrated Logistic Support Plan (ILSP)	6/87
TEMP (Rev. 3)	6/91

G. (U) RELATED ACTIVITIES: The ELF communications capability is installed in Trident, FMB and Attack submarines.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Communications
PROJECT NUMBER: X0795 PROJECT TITLE: Support of MEECN

C. (U) DESCRIPTION: MEECN is the Tri-Service transmission system which ensures delivery of Emergency Action Messages (EAM) to our strategic platforms. Because of substantial downsizing in the number of MEECN assets such as the CINC Airborne Command Post (ABNCP) fleet, it is necessary to improve the range, timeliness and reliability of MEECN communications to maintain connectivity to the platforms. This project identifies, researches, and develops improvements to the MEECN, primarily in the Very Low Frequency and Low Frequency (VLF/LF) ranges of MEECN. The MEECN Message Processing Mode (MMPM), which reduces transmission time while improving message delivery reliability at greater ranges, was developed under this project and is being implemented in the MEECN VLF/LF Systems. A new High Data Rate (HIDAR) mode which greatly reduces message transmission time, while providing the performance of low data rate modes, is under development. Potential improvements in mode design and signal processing are continually being investigated for MEECN application. Independent assessment, T&E support, and MEECN oversight are provided to other MEECN-related developments and efforts such as the Navy's Non-Linear Adaptive Processor (NONAP) development.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (Funded in PE 0303131N)
a. (U) Continued HIDAR Mode Standard preparation and successfully completed the Critical Design Review (CDR).
b. (U) Identified potential incompatibilities between HIDAR and Crypto Block II, per JCS tasking.
c. (U) Issued program plan to investigate use of submarine buoy antenna depth sensor data to estimate VLF signal phase in high sea states.

2. (U) FY 1993 PROGRAM: (Funded in PE 0303131N)
a. (U) Issue the HIDAR Mode Standard.
b. (U) Support acceptance test and certification of the Enhanced Verdin System (EVS) HIDAR implementation.
c. (U) Report on potential HIDAR/Block II conflicts and their resolutions.
d. (U) Continue supporting NONAP improvements and development of follow-on algorithms such as the Adaptive Locally Optimum Detector (ALOD).
e. (U) Collect buoy antenna depth sensor data and VLF signal phase data aboard operational submarines.
f. (U) Investigate improved Error Detection and Correction Coding (EDAC) in support of Fixed VLF (FVLF) range extension.

3. (U) FY 1994 PLANS:
a. (U) Support test and certification of HIDAR implementations.
b. (U) Assess correlation between VLF signal phase and depth sensor data to determine phase tracker feasibility and provide report.
c. (U) Report on EDAC technique(s) applicable to the FVLF broadcast.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV., San Diego, CA. CONTRACTORS: GTE, Government Systems Corporation, Needham Heights, MA. Technology Services Corporation, Santa Monica, CA. and Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

F. (U) RELATED ACTIVITIES: PE 0204163N, Navy Strategic Communications (Shore-to-Ship Communications Project X1083) contains VLF/LF systems into which improvements, developed under the MEECN project, will be incorporated.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204229N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tomahawk and Theater Mission Planning Center (TMPC)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A0545	TOMAHAWK	28,234	27,048	41,604	CONT.	CONT.
A1784	TMPC	*32,646	*3,556	5,836	6,902	77,736
	TOTAL	60,880	30,604	47,440	CONT.	CONT.

*Previously funded in P.E. 0604367N

B. (U) DESCRIPTION: The TOMAHAWK Weapons System (TWS) provides the Tomahawk cruise missile attack capability against targets at sea (Tomahawk Anti-Ship Missile (TASM)) and on land (Tomahawk Land Attack Missile (TLAM)). The TLAM can be fitted with either Conventional unitary warhead (TLAM/C), a Nuclear warhead (TLAM/N) or a submunition Dispenser (TLAM/D). This program ensures that the TWS exploits state of the art technology to preserve the efficacy of this proven weapon system.

(U) The Tomahawk project includes all missile development, submarine and surface ship weapons control development, as well as launcher system development.

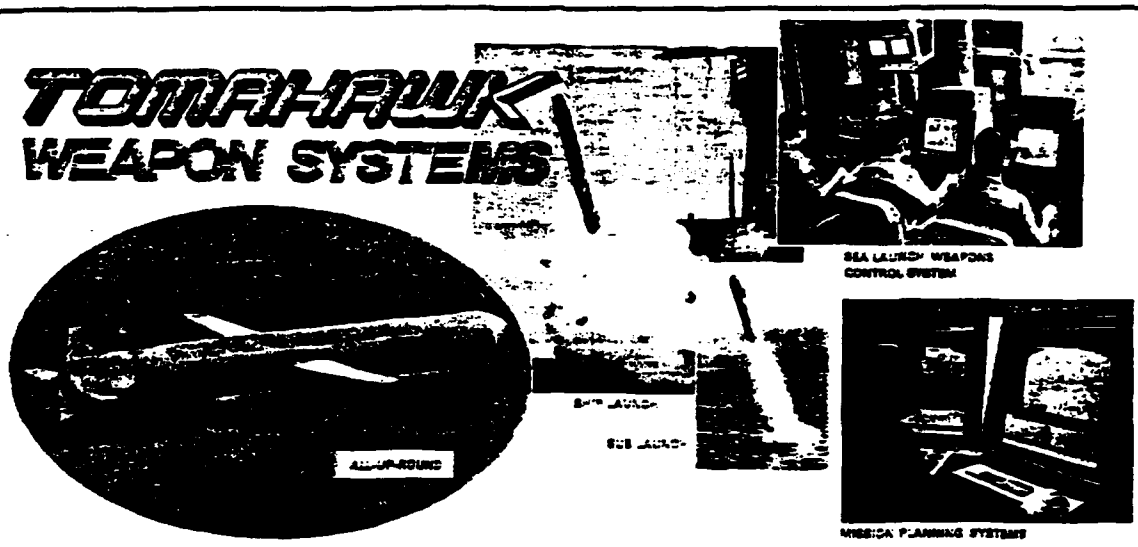
(U) The Tomahawk TLAM Block III system upgrade, recently completed, incorporates the Global Positioning System capability; provides a smaller, lighter warhead, extended range, Time of Arrival; and improves accuracy for low contrast matching (Digital Scene Matching Area Correlator). The Advanced TWS will provide a quick reaction response capability, improved strike planning and mission tasking, real time target and aimpoint selection, autonomous terminal prosecution of the target, improved lethality, and a multi-role mission.

(U) The Theater Mission Planning project provides for the Tomahawk Theater Mission Planning Center Upgrade (TMPCU) and the Afloat Planning System (APS). TMPCU and APS provide mission planning and command and control for the nuclear and conventional TLAM. The TMPCU is software developed to decrease mission planning time and increase the quality and accuracy of each mission. APS takes the mission planning afloat and allows Battle Force/Battle Group Commanders to rapidly plan and/or modify conventional TLAM missions at sea. The Tomahawk Strike Coordination Module of the APS optimizes strike assets by integrating Tomahawk, tactical air, and weapon planning at sea.

(U) These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204229N Budget Activity: 4
PROGRAM ELEMENT TITLE: Tomahawk and Theater Mission Planning Center (TMPC)
PROGRAM NUMBER: A0545 PROJECT TITLE: Tomahawk



POPULAR NAME: TOMAHAWK CRUISE MISSILE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	BLK III MS IIA 1/92 MS III 6/92	IOC BLK III SHIP 3/93 MSIV/II TBIP 4QTR/93	IOC BLK III SUB 12/93 MS IIA ATWCS LRIP 4/94	CONT.
ENGINEERING MILESTONES		DES REV ATWCS	DES REV TBIP	
T&E MILESTONES	DT/OT BLK III			
CONTRACT MILESTONES	BLK III VLS INT ISNSA	BLK III VLS TWS ISNSA	BLK III ADV TWS VLS INT ISNSA	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	13,922	18,531	30,458	CONT.	CONT.
SUPPORT CONTRACT			500	CONT.	CONT.
IN-HOUSE SUPPORT	14,312	8,517	10,646	CONT.	CONT.
GFE OTHER				CONT.	CONT.
Total	28,234	27,048	41,604	CONT.	CONT.

B. (U) DESCRIPTION: The TOMAHAWK Cruise Missile provides an attack capability against targets at sea (TOMAHAWK Anti-Ship Missile (TASM)) and on land (TOMAHAWK Land-Attack Missile (TLAM)). The TLAM can be fitted with either Conventional unitary warhead (TLAM/C), Nuclear warhead (TLAM/N) or submunition Dispenser (TLAM/D).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: Tomahawk and Theater Mission Planning Center (TMPC)
Program Number: A0545 Project Title: Tomahawk

(U) The Tomahawk development encompasses TLAM C/D Block III (BLK III) upgrades and the Advanced Tomahawk Weapons Systems (ADV TWS). The BLK III effort incorporates the Global Positioning System (GPS) capability; provides a smaller, lighter warhead; extended range, Time of Arrival, and upgrades to the Digital Scene Matching Area Correlators (DSMAC IIA) accuracy for low contrast matching. The ADV TWS shipboard system and the Advance Tomahawk Weapons Control System (ATWCS) development provides Flex TLAM/C Planning, GPS-only shipboard planning, automated engagement planning, and Over-The-Horizon (OTH) Tomahawk capability. The ADV TWS and the Tomahawk Baseline Improvement Program (TBIP) development provides a comprehensive baseline upgrade to the TWS to improve system flexibility and responsiveness. Essential elements of the ADV TWS/TBIP include upgrades to the guidance, navigation and control systems along with the associated command and control systems to provide a single variant missile, the Tomahawk Multi-Mission Missile that is capable of attacking sea- and land-based targets in near real time. ADV TWS/TBIP will also develop a hard target penetrating warhead that would provide selected Tomahawk missiles capable of attack of a range of hardened targets.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued engineering development of TLAM BLK III and operational testing (OT) lead to limited and full-rate production decisions.

b. (U) Initiated ADV TWS development to provide automated engagement planning; improved digital TLAM-N and TLAM-C Flex Targeting; improved OTH Tomahawk capability in communications, sensors, interfaces and database processes; developed software for the automate/embed target, tactical and training algorithms; developed Operational Flight Simulation/TLAM upgrade and risk reduction of the TBIP portion of the ADV TWS.

c. (U) ADV TWS/TBIP evaluated potential engineering and propulsion upgrades that enabled Tomahawk to selectively attack certain hardened targets.

d. (U) Developed research efforts to identify sources of new target data.

e. (U) Continued Independent Software Nuclear Safety Analysis (ISNSA), Vertical Launch System (VLS) integration.

2. (U) FY 1993 PROGRAM:

a. (U) Complete development of TLAM BLK III for ships.

b. (U) Continue engineering development of BLK III for submarines, Adv TWS include approval for FY 1994 Engineering and Manufacturing Development (EMD) of the TBIP and ATWCS EMD, ISNSA, VLS integration and Advanced Systems Engineering.

3. (U) FY 1994 PLANS:

a. (U) Commence EMD of the ADV TWS/TBIP to provide guidance, navigation and control systems including associated command and control systems upgrades for a near-real time single land/sea attack missile capability and hardened target capability. Continue ADV TWS/ATWCS EMD operational assessment; VLS integration and advanced system engineering. Achieve BLK III Submarine Initial Operational Capability (IOC).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: Tomahawk and Theater Mission Planning Center (TMPC)
Program Number: A0545 Project Title: Tomahawk

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake and Point Mugu, CA; NAVUNSEAWARCENDIV, Newport, RI; NAVAIRWARCENACDIV, Warminister, PA and Indianapolis, IN; NAVSURFWARCENDIV, Dahlgren, VA and Port Hueneme, CA. Contractors: McDonnell Douglas Missiles System Company, St. Louis, MO; Hughes Missile Systems Company, Tucson, AZ; Johns Hopkins University/Applied Physics Lab, Laurel, MD; Logicon, San Pedro, CA; Lockheed Missiles & Space Company, Austin, TX.

E. (U) COMPARISON WITH THE AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: The ATWCS Acquisition Decision Memorandum delayed Limited Rate of Initial Production (LRIP) to allow for a demonstration of capability prior to the approval for LRIP. This change does not effect scheduled development events but rather realigns them.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	TOR	DOP	OR	NDCP	TEMP
TOMAHAWK Missile (All-up Round)	N/A	N/A	N/A	12/90	8/92
TOMAHAWK Launch platforms	N/A	N/A	N/A	12/90	8/92
TOMAHAWK Missile Block III			11/87	12/90	8/92

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

APPN/	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN Line 5	411,187	411,850	248,288	CONT.	CONT.
OPN Line 175	52,932	52,891	51,736	CONT.	CONT.
OPN Line 176	3,293	3,548	6,144	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the Congressional Data sheets.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204229N Budget Activity:
PROGRAM ELEMENT TITLE: Tomahawk and Theater Mission Planning Center (TMPC)
PROGRAM NUMBER: A1784 PROJECT TITLE: Theater Mission Planning Cente (TMPC)

PICTURE NOT AVAILABLE

POPULAR NAME: Theater Mission Planning Center Upgrade(TMPCU)/ Afloat Planning System (APS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		IOC/TMPCU 3QTR93 MS 2A/IOC APS 6/93	MSIII APS 7/94	FOC APS 4QTR96
ENGINEERING MILESTONES	TMPCU S/W DesRev APS DesRev			TMPCU P2/3
T&E MILESTONES	DT/OTIIA TMPCU DTIIB APS	TECHEVAL TMPCU DT/OT IIB APS	DT/OT IIIB APS OTIIIA TMPCU	
CONTRACT MILESTONES	TMPCU APS TSCM	TMPCU APS	TMPCU APS	APS

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	*28,434	1,903	4,105	5,998	64,418
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	*4,212	1,653	1,731	904	13,318
GFE/ OTHER	0	0	0	0	0
TOTAL	*32,646	*3,556	5,836	6,902	77,736

* Previously funded in PE 0604367N

B. (U) DESCRIPTION: The TMPCU ashore and the APS provide data base generation and processing, flight mission data, command and control information preparation and distribution for Tomahawk Land Attack Missiles, Nuclear and Conventional (TLAM/N and TLAM/C). The TMPCU project designs and develops software to decreas mission planning time in response to contingency requirements, improves the production of mission data for distribution and provides automated command and control information for employment and strike planning. APS utilizes the TMPCU' software on down-sized and ruggedized computer hardware for use in support of Afloat Strike Warfare Commanders. This improves battle-group tactical flexibility and responsiveness while maximizing Tomahawk Weapon Systems (TWS) wartime capability. APS includes the Tomahawk Strike Coordination Module (TSCM) which is a software program that facilitates coordinated planning of Cruise Missiles. These systems will be compatible with the Navy Command and Control Systems TMPC/TMPCU ashore and the TWS.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity:
Program Element Title: Tomahawk and Theater Mission Planning Center (TMPC)
Program Number: A1784 Project Title: Theater Mission Planning Cent

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued TMPCU development to include mass media storage devic and TMPCU integration and development testing.

b. (U) Continued APS development, Engineering Development Model installation and development testing.

c. (U) Developed APS TSCM software.

2. (U) FY 1993 PROGRAM:

a. (U) Achieve TMPCU Initial Operability Capability (IOC).

b. (U) Perform APS Developmental/Operational Testing (DT/OT) IIB testin leading to approval for limited production and IOC.

3. (U) FY 1994 PLANS:

a. (U) Perform TMPCU OT of full capability, imagery integration and continue software architectural enhancements.

b. (U) APS installation of product representative unit aboard ship, commence afloat testing, and operational evaluation (OPEVAL).

4. (U) PROGRAM TO COMPLETION: Complete TMPCU development, imagery integration and architectural software enhancement. Correct APS OPEVAL deficiencies; testing of Special Compartmented Information, Special Isolation Segment (SIS), and P2-P3 software. Complete APS, SIS testing and transition to production in FY 1996.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENACDIV, Indianapolis, IN and Warminster, PA; NAVELEXSYSENGACT DET, Philadelphia, PA; CINCPAC, Camp Smith, HI; CINCLANT, Norfolk, VA. CONTRACTORS: McDonnell Douglas Missiles System Company, St. Louis, MO; Tiburon System Inc., S Jose, CA; Johns Hopkins University/Applied Physics Laboratory, Laurel MD; Scienc Application Inc., Arlington, VA; General Dynamics Electronics, San Diego, CA.

E. (U) COMPARISON WITH THE AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) ENGINEERING CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: APS OPEVAL re-scheduled from FY 1993 to FY 1994 t allow the use of a production representative configuration. Impact of change is minimal.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	TOR	DOP	OR	NDCP	TEMP
TMPC Upgrade	N/A	N/A	N/A	8/88	6/92
APS	6/86	9/87	N/A	8/88	6/92

G. (U) RELATED ACTIVITIES: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: Tomahawk and Theater Mission Planning Center (TMPC)
Program Number: A1784 Project Title: Theater Mission Planning Center

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

APPN	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN Line 5,18	[Procurement justification material does not				
OPN Line 175, 176	contain this level of detail.]				

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the Congressional Data Sheets.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Integrated Surveillance System

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0758*	SURTASS	18,903	22,146	11,019	CONT.	CONT.
X0766	IUSS DETECT/CLASSIF SYS	72,152	67,376	60,762	CONT.	CONT.
TOTAL		91,055	89,522	71,781	CONT.	CONT.

B. (U) DESCRIPTION: The Integrated Undersea Surveillance Systems (IUSS) provides the Navy with its primary means of detection of submarines, both nuclear and diesel. With the end of the Cold War, the program is undergoing a major transition from emphasis on maintaining a large dispersed surveillance force, with many Sound Surveillance System (SOSUS) sites and Surveillance Towed Array Sensor System (SURTASS) ships keyed to detection and tracking of Soviet submarines, to a smaller, mobile undersea surveillance capability that is equally effective against modern diesel submarines.

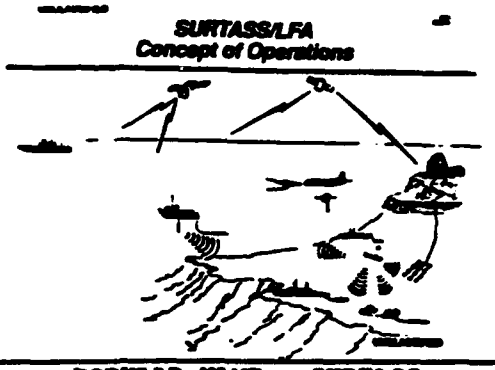
(U) The IUSS Research and Development project consists of SOSUS, Surveillance Direction System (SDS), and Low Frequency Active (LFA) developments. SOSUS will retain the most critical part of its deep water coverage and eliminate coverage no longer in those areas of interest. Processing sites will be reduced and display equipment will be modernized to significantly lower life cycle costs and enable consolidation of the system, and to greatly reduce manpower requirements. The SDS Command, Control and Communications system will align IUSS with the Navy's Copernicus C4I concept, providing a reliable, mobile tactical communications system while maintaining interoperability with shore forces. LFA will provide an active adjunct capability for IUSS passive and tactical sensors, to counter the quieter diesel and nuclear threats of the 1990s and beyond.

(U) The SURTASS project comprises the mobile, tactical arm of the Integrated Undersea Surveillance System, providing long range detection and cueing for tactical weapons platforms against both diesel and nuclear submarines. SURTASS has experienced recent successes against diesel subaarines operating in shallow water. In response to today's fiscal environment, SURTASS is greatly reducing fleet ships, consolidating logistics support, using Non-Developmental Items and commercial hardware, increasing operator efficiency, and incorporating Low Frequency Active sonar capability to detect third world diesel submarines. SURTASS development efforts include: improved detection and classification to counter quieter threats; additional signal processing; a bi-static active capability; integrated active and passive operations; improved Battle Group support; improved information processing; and improved operator training.

*Previously Funded under 0204313N

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS



POPULAR NAME: SURTASS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES		Concept Def. Info Proc Upgrade 7/93		CONT.
T&E MILESTONES	DT IIA3 4/92 DT IIA4 8/92			CONT.
CONTRACT MILESTONES				CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	18,198	21,007	10,079	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	705	1,139	940	CONT.	CONT.
GFE/ OTHER					
TOTAL	18,903	22,146	11,019	CONT.	CONT.

B. (U) DESCRIPTION: The Surveillance Towed Array Sensor System (SURTASS) is the mobile, tactical arm of the Navy's undersea surveillance capability that provides against both diesel and nuclear submarines. In response to today's fiscal environment and the change in world threat, the SURTASS program is moving towards a significant reduction in fleet ships; consolidation of logistics support; use of Non-Developmental Items (NDI) and commercial hardware for data processing; and focused development efforts to use new technology to increase operator efficiency and incorporate Low Frequency Active (LFA) sonar capability for detection of Third World diesel submarines. The SURTASS Block Upgrade and Reduced Diameter Array (RDA) programs provide improved detection and classification capability to counter quieter threats, including diesel submarines, projected in the future.

It also provides for the quieting conversion of a commercial ship to upgrade an active/passive capability for LFA testing and for fleet evaluation and tactics development. Additional upgrades will provide for a capability to multiply effectiveness

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

of the T-AGOS 19 (SWATH-P) class; integrated SURTASS active and passive operations; improved shipboard detection, classification and tracking capability to support Battle Group operations; improved information processing systems to search for quieter targets without increasing manpower or communications bandwidth; realistic training and testing for operators to ensure proficiency; the integration of SURTASS with Integrated Undersea Surveillance System (IUSS) sensors; and the required conversion from Enhanced Modular Signal Processor (EMSP) SEM B to SEM E.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Block Upgrade software code and testing; conducted formal Government acceptance testing.
b. (U) Began integration of Low Frequency Active (LFA) into SURTASS.
c. (U) Began development of LFA capability, Operational Readiness Inspection (ORI) interactive target scenario generator, and Full Spectrum Processing (FSP) to provide detection capability against non-traditional target signals.
d. (U) Began software conversion from EMSP SEM B to SEM E.
e. (U)

f. (U) Delivered RDA Engineering Development Model (EDM) and conducted array subsystem tests.

2. (U) FY 1993 PROGRAM:

a. (U)

b. (U) Begin concept definition phase of Information Processing System to provide more effective SURTASS Battle Group support with reduced manning requirements.

3. (U) FY 1994 PLANS:

a. (U)

b. (U) Conduct Critical Design Review for LFA intergrating and capability.
c. (U)

d. (U) Continue concept definition for Information Processing System.
e. (U) Continue conversion to EMSP SEM E signal processor.
f. (U) Conduct at sea testing of full spectrum processing capability.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDT&E DIV, San Diego, CA; MSC, Washington, DC. CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; AT&T Federal Systems & Advanced Technology, Greensboro, NC.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

F. (U) PROGRAM DOCUMENTATION:

DCP 137	2/90
TEMP 164-1 (REV 1) (SURTASS BLOCK UPGRADE)	4/92
TEMP 1214 (REV 1) (LFA)	9/92
AP 91-06 (SURTASS)	8/91

G. (U) RELATED ACTIVITIES: PE 0204311N/X0766 Integrated Undersea Surveillance Detection/Classification System provides the Reduced Diameter Array (RDA) portion of the SURTASS Block Upgrade in FY 90 and 91, Low Frequency Active (LFA) development, and Surveillance Direction System (SDS) development; PE 0603785N, Combat Systems Oceanographic Performance Assessment - provides acoustic data and modeling support and testing of modifed arrays; PE 0604507N, Enhanced Modular Signal Processor (EMSP)-develops signal processor for Block Upgrade. PE 0603747N X1959 Critical Sea Test provides ship support for EDM and scientific oceanographic and acoustic data for performance models.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
SCN #20	148,509	0	0	CONT.	CONT.
OPN #65	23,574	28,388	9,591	CONT.	CONT.
MILCON #P422	2,025	0	16,780		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) FY 1992: All components of Reduced Diameter Array design tested at sea; Navy acceptance testing of Block Upgrade System; at-sea demonstration of active feasibility and effectiveness.

2. (U) FY 1993:

3. (U) FY 1994:

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0766 PROJECT TITLE: IUSS Detect/Classif Systems

POPULAR NAME: IUSS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				MS II SDS 4Q/96 MS III SDS 2Q/00 MS III B/IOC LFA 10/96
ENGINEERING MILESTONES	SRR SDS 1/92	SDR SDS 10/92 PDR SDS 8/93 FSP DEMO 8/93	Auto Detect DEMO 6/94 CDR SDS 1/94 T-AGOS 23	CONT.
T&E MILESTONES	LFA Sea Test 8 7/92 DT/OTIIA LFA 9/92 LTS Mini-System LFA 11/91	LFA Sea Test 10 6/93 LFA Sea Test 11 9/93	LFA Sea Test 12 3/94 LFA Sea Test 13 9/94	SDS OT II 1/96
CONTRACT MILESTONES	Award FSP/SOSUS Modernization 1/92			CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	63,185	59,835	52,893	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	7,260	7,541	7,869	CONT.	CONT.
GFE/ OTHER	1,707	0	0	CONT.	CONT.
TOTAL	72,152	67,376	60,762	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Undersea Surveillance System
PROJECT NUMBER: X0766 PROJECT TITLE: IUSS Detect/Classif Systems

B. (U) DESCRIPTION: IUSS provides the Navy with its primary means of detection of submarines, both nuclear and diesel. With the end of the Cold War, the program is undergoing a major transition from emphasis on maintaining a large dispersed surveillance force, with many Sound Surveillance System (SOSUS) sites and Surveillance Towed Array Sensor System (SURTASS) ships keyed to detection and tracking of Soviet submarines, to a smaller, mobile undersea surveillance capability that is equally effective against modern diesel submarines. This program provides for a smaller, consolidated SOSUS system; the Surveillance Direction System (SDS) Command, Control and Communication systems; and the development and deployment of a Low Frequency Active (LFA) sonar capability comprised of SURTASS/LFA and SURTASS Reduced Diameter Array (RDA).

(U) Primary Mission: To provide undersea surveillance in areas of interest to national security.

(U) SURTASS and LFA will provide mobile coverage in deep and shallow water. The SURTASS/LFA program will provide an active adjunct capability for IUSS passive and tactical sensors, to counter the quieter diesel and nuclear threats of the 1990s and beyond. The program is developing monostatic LFA for the SURTASS T-AGOS (Small Waterplane Area Twin Hulled - Active (SWATH-A)) platforms, and will also provide for of other IUSS and tactical platform(s) sensors. SURTASS/LFA program components are: (1) T-AGOS 23 class SWATH platform; (2) low frequency high power source array; (3) receive processing subsystem to perform detection, classification and reporting aboard the SWATH ship; (4) reduced diameter SURTASS receive array; and (5) shore display of contact reports.

(U) While maintaining the most critical part of its deep water fixed coverage, SOSUS will be greatly reduced and consolidated, going from Consolidation and integration of shore sites will result in much smaller manpower requirements. Modernization to replace expensive, manpower and space intensive paper writer displays with CRT workstations is cost effective, which allows site consolidations for long-term operational cost savings. It will also incorporate Full Spectrum Processing (FSP) to exploit the full range of acoustic energy emitted by submarines, and automatic detection of threat signals to further reduce manpower requirements. In addition to the primary mission, IUSS provides unique capabilities for monitoring a variety of acoustic signals from the scientific (global warming studies, marine mammal research) to the economic (aiding in detection and monitoring of illegal fishing activities and drug interdiction).

(U) The requirements to

can be optimized through the Surveillance Direction System (SDS) centers for ocean basins. Fully aligned with the Navy's Copernicus C4I concept, SDS will provide both a highly reliable and mobile tactical communications system while maintaining interoperability with shore forces. The following capabilites ill be incorporated:

through rates consistent with a concept of
environment. SDS will be fully integrated with the Navy's Space Electronics Warfare Architecture.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0766 PROJECT TITLE: IUSS Detect/Classif Systems

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Began remoting of NAVFAC Bermuda to NOPF Dam Neck, replacing paper writers with CRT workstations (installed prototype SOSUS workstations at NOPF Dam Neck). Developed SOSUS signal processing for non-traditional acoustic signals Began detailed analysis of third-world diesel signals. Deployed non-traditional processing system for evaluation with focus on operator aids to classification. Designed special project underwater sensor. Completed equipment design to provide cable ships with the capability to install fiber optic cables.

b. (U) Continued SDS design: conducted System Requirements Review (SRR) second quarter; integrated and tested TACCOM systems with IUSS shore system to improve time late and direct support to ASW forces; developed Advanced Surveillance Acoustic Prediction System (ASAPS) to provide an improved performance prediction capability for new systems to include LFA and FDS.

c. (U) Continued LFA FSED; delivered and installed LFA Engineering Development Model (EDM) and RDA subsystem on board the R/V Cory Chouest; conducted DT/OT IIA for LFA.

2. (U) FY 1993 PROGRAM:

a. (U) Deploy and test detection of at two evaluation sites; continue work in automatic classification of non-traditional signals. Begin fabrication of special project sensor. Fabricate prototype cable ship mission equipment for fiber optic cable installation.

b. (U) Continue SDS design; conduct System Design Review (SDR) first quarter; conduct Preliminary Design Review (PDR) fourth quarter; continue TACCOM systems test and integration; continue ASAPS development.

c. (U) Conduct LFA Preliminary and Critical Design Reviews; continue LFA FSED; deploy commercial vessel for LFA testing/Fleet operations in two areas which have both basin and shallow water features. Test will be conducted with other bi-static tactical assets against diesel submarines and will also examine Command, Control and Communications (C3) issues from planning, search, prosecution, and kill assessment.

3. (U) FY 1994 PLANS:

a. (U)

b. (U) Conduct Critical Design Review (CDR) for SDS; begin coding and testing for SDS; continue ASAPS development.

c. (U) Continue LFA FSED: conduct two LFA fleet operations tests in shallow and marginal deep water environments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Integrated Surveillance System
PROJECT NUMBER: X0766 PROJECT TITLE: IUSS Detect/Classif Systems

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDT&E DIV, San Diego, CA; NCEL, Port Hueneme, CA; NRL, Washington, DC; NESEA, St. Inigoes, MD. CONTRACTORS: Hughes Aircraft Co., Fullerton, CA; APL/JHU, Laurel, MD; AT&T Technologies Inc., Greensboro, NC; ARL Univ of Texas, Austin, Texas; Lockheed Sanders Inc., Manchester, NH; IBM, Manassas, VA; AT&T Bell Laboratories, Whippany, NJ; TRW, McLean, VA; E-Systems, Dallas, TX.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F.(U) PROGRAM DOCUMENTATION:

NDCP #78 (SOSUS)	1/80
AP 89-22 (SOSUS)	7/89
OR 246-02-89 (SDS)	6/89
AP 89-1 (SDS)	5/90
AP Update 89-1 (SDS)	12/91
OR 038-95-88 (LFA)	7/85
TEMP 1214 REV 1 (LFA)	6/93
TEMP 1214 REV 2 (LFA)	6/93
DCP T-AGOS-23 SWATH A	8/89
DCP 137 Rev 1 - SURTASS Improvements (incl LFA)	2/90
AP 91-06 (SURTASS/LFA)	8/91

G. (U) RELATED ACTIVITIES: PE 0604784N, Distributed Surveillance System; PE 0204311N/X0758, SURTASS; PE 0603747N, Advanced Undersea Warfare Technology; PE 0604507N, Enhanced Modular Signal Processor (EMSP).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
SCN #20	148,509	0	0	CONT.	CONT.
OPN #62	78,844	85,383	41,964	CONT.	CONT.
OPN #65	23,574	28,388	9,591	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: In FY 1992 the LFA ADM system was replaced with a significantly more capable EDM system on the R/V Cory Chouest. DT/OT IIA was conducted in FY 1992 to demonstrate the operational effectiveness of this new capability. In FY 1993 two LFA tests will be conducted with tactical bi-static platforms in shallow and basin areas. These tests will also test tactics and C3. In FY 1994 two LFA tests in shallow and marginal deep ocean areas will be performed. These tests will be similar in scope to the FY 1993 tests and will test robustness of system performance in different areas. In FY 1995 DT/OT IIB (TECHEVAL/OPEVAL) will be conducted on T-AGOS 23 and prototype testing of new source concepts.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204413N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Amphibious Tactical Support Units
PROJECT NUMBER: S1980 PROJECT TITLE: Amphib Other C2



POPULAR NAME: AN/KSQ-1

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				III 02/95
ENGINEERING MILESTONES	SDR 02/92 PDR 06/92	CDR 11/92		
T&E MILESTONES		DTIIA 08/93 DTIIB 12/93	DTIIC 07/94	OTII 1/94
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	0	0	0
SUPPORT CONTRACT	378	365	365	240	1,586
IN-HOUSE SUPPORT	2,966	3,013	2,458	659	12,936
GFE/ OTHER	0	0	0	0	0
TOTAL	3,344	3,378	2,823	899	14,522

B. (U) DESCRIPTION: The AN/KSQ-1 Amphibious Assault Direction System integrates existing developments into a system which will support the command and control of surface amphibious assaults launched from extended over-the-horizon off shore ranges. The AN/KSQ-1 adapts the USMC's Position Location Reporting System for naval applications and integrates it with shipboard navigation and communications systems. The AN/KSQ-1 is required to identify, track, communicate with, and control landing craft from launch through transit, offload, and return.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

   a. (U) Conducted System Design Review.

   b. (U) Conducted Preliminary Design Review for Subsystems.

2. (U) FY 1993 PROGRAM:

   a. (U) Perform Hardware Integration and Testing.

   b. (U) Perform System Integration and Testing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204413N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Amphibious Tactical Support Units
PROJECT NUMBER: S1980 PROJECT TITLE: Amphib Other

c. (U) Install System for Development Testing.

d. (U) Conduct DT-IIA Basic System Testing.

e. (U) Conduct Critical Design Review.

3. (U) FY 1994 PLANS:

a. (U) Install Software Increment II.

b. (U) Conduct DT-IIB External Systems Integration Test.

c. (U) Install Software Increment III.

d. (U) Conduct DT-IIC TECHEVAL.

4. (U) PROGRAM TO COMPLETION:

a. (U) Conduct Operational Testing.

b. (U) Meet Initial Operational Capability.

c. (U) Projected program completion is Jan 1995.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; MCTSSA, Camp Pendleton, CA; NAVAIRWARCENACDIV, Indianapolis, IN; NRAD, San Diego, CA; NAVELEX, Vallejo, CA
CONTRACTORS: None

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable

2. (U) Schedule changes: Not applicable

3. (U) Cost Changes: Not applicable

F. (U) PROGRAM DOCUMENTATION:

TOR	Not applicable
TEMP	Final document is in signature chop.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U1427[1/]	Surface Tactical Team Trainer	9,265	2,948	5,288	CONT.	CONT
W0431	Tactical Aircrew Combat Training System	8,350	8,470	5,934	CONT.	CONT
W0604[2/]	Training Range and Instrumentation Development	9,545	8,505	7,132	CONT.	CONT
W1998	Tactical Combat Training System (TCTS)	3,620	9,312	13,357	CONT.	CONT
W2124[3/]	Air Warfare Training Development	817	2,013	2,771	943	6,54
X1823	Training and Training Devices Systems	2,208	2,059	2,718	CONT.	CONT
	TOTAL	33,805	33,307	37,200	CONT.	CONT

[1/] Previously funded under Program Element 0604715N, S1427
[2/] Previously funded under Program Element 0604208N, W0604
[3/] Previously funded under Program Element 0604714N, W2124

B. (U) DESCRIPTION: This program develops Tactical Aircrew Combat Training System (TACTS), Instrumentation Systems, Surface Tactical Trainer, Battle For Tactical Training (BFTT)/Cryptologic Systems Embedded Trainer (CSET), Trainin and Training Devices System consisting of Enhanced Naval Warfare Gaming Syste (ENWGS), Tactical Combat Training System (TCTS), and Universal Threat System Simulators. The TACTS provides real-time monitoring and post-exercise debris aircrews flying on instrumented training ranges. Through computer simulation it provides aircrew training in weapons and countermeasures employment and tactics development in multiple warfare areas including air-to-air, air-to-surface, power projection, and defense suppression. This system is the prima training tool used by the Navy's "Top Gun" Fighter Weapons School, the Naval Strike Warfare Center, and the Marine's Weapons and Tactics Instructors cours Range Instrumentation Systems Development program provides development of mar range systems including Range Electronic Warfare Simulator, advanced weapons training systems, laser training systems, fleet telemetry stations, and shall water range technology. The task of Surface Tactical Trainer is development the BFTT/CSET systems to provide realistic joint warfare training including cryptologic training across the spectrum of armed conflict on individual shi and submarines and a means to link these ships together for coordinated inpo training. This system will support the Afloat Trainig Organization and is t planned shipboard portion of the TCTS program. The ENWGS provides a geographically distributed wargaming system which supports the needs and objectives of the Fleet Commanders, the Naval War College, the Joint Warfare Center, and the Tactical Training Groups in the areas of wargaming, tactical decision-making training, and tactics development and evaluation. TCTS will develop fleet deployable instrumentation for sea surface, subsurface, air training and tactics development; accommodate single unit as well as large a battle group training evolutions; provide real-time, accurate feedback for tactics assessment and force employment; generate electronic warfare and wea simulation/stimulation and paired engagement scoring; and support simultaneo simulated and actual battle group/aggressor units and simulated or live fire interactions, including ship based debriefing displays. The program also in development of near term upgrades to the Mobile Sea Range (MSR) during FY-93 UTSS provides current data simulation to a wide range of aircrew simulators three services, using a common threat module and standard threat database.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: W0431 PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

C. (U) DESCRIPTION: This project develops new TACTS capabilities primarily through the integration of additional weapons and aircraft types. This requires development of new aircraft interfaces, weapons and countermeasures simulations, and modifications to displays. Software is also developed to produce computer generated Electronic Warfare (EW) threats to enhance the system's ability to provide training in a realistic EW environment. Various other system performance improvements are also developed to make the system more effective and reliable.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed development of simulations for the Phoenix (Phase II), High Speed Anti-Radiation Missile (HARM) (Phase II), Skipper, Paveway II, and several threat air-to-air weapons. Completed several software enhancements and the upgrade of the Fallon Control and Computational Subsystem.

2. (U) FY 1993 PROGRAM: Complete the development of training capabilities for the AV-8B (night attack), F-14D (Phase I) and Airborne Countermeasures. Complete the initial integration of the Fallon Orange Command, Control, and Communication system and the front end processor. Complete the development of a barrage Anti-Aircraft Artillery (AAA) simulation, pod encryption, and uplink of computer generated threat simulations. Continue developing additional TACTS training capabilities and system improvements.

3. (U) FY 1994 PLANS:

a. (U) Complete the development of a "No Drop" Bomb Scoring (NDBS) capability for the AV-8B (day attack). Complete the development of training capabilities for Phoenix (Phase II) and the Advanced Medium Range Air to Air Missile (AMRAAM) (Phase I). Complete the development of simulation capabilities for the 2S6 AAA and SA-11 (surface to air missile). Continue development of the pod for the Joint Aircrew Combat Training System and continue developing training capabilities for additional aircraft types (e.g., F-14A/B NDBS). Continue developing additional weapons training capabilities (e.g., HARM (Phase III), AMRAAM (Phase II), Harpoon, and threat air-to-air weapons). Continue developing software enhancements and system improvements, including the development of the Advanced Message Oriented Data Security Module.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, and Point Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, and Warminster, PA; NWAC, Corona, CA. CONTRACTORS: Cubic Defense Systems, San Diego, CA; Loral, Sunnyvale, CA; FAAC, Ann Arbor, MI.

F. (U) RELATED ACTIVITIES: TACTS is a joint service program with the US Air Force, as defined by memorandum of agreement. Development of capabilities of common interest are jointly funded (P.E. 0205313F) under the management of a lea service. The lead service is agreed to on a project by project basis.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)	OPN/LINE 154	6,647	3,310	10,112	CONT.	CONT.
	APN/LINE 56	9,626	10,424	14,007	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: U1427 PROJECT TITLE: Surface Tactical Team Trainer

C. (U) DESCRIPTION: Battle Force Tactical Training (BFTT) will provide realistic joint warfare training across the spectrum of armed conflict; realist unit level team training in all warfare areas; a means to link ships together which are in different homeports for coordinated training; external control of stimulation to shipboard systems; and simulation of non-shipboard forces such a friendly and enemy aircraft/submarines. The system will use a distributed architecture in order to employ existing onboard/embedded trainers, and will incorporate Distributed Interactive Simulation protocols. Provide ship's Commanding Officers and Battle Force/Battle Group Commanders with the ability t conduct coordinated, realistic, high stress, combat systems training. This system will support the Afloat Training Organization (ATO) requirements. Cryptologic Systems Embedded Trainer (CSET) will provide realistic training to shipboard cryptologic system operators and teams on their own tactical equipmer CSET will support the ATO and allow crytpologic systems team training to be conducted onboard ships and allow downsizing of the shore-based training infrastructure.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: The FY 1992 effort under this project was cancelled.

2. (U) FY 1993 PROGRAM:

a. (U) Develop the Advanced Development Model (ADM) hardware, software, and interfaces necessary to demonstrate the Proof of Concept of the interconnectivity of the BFTT System.

b. (U) Develop and integrate the computer programs in a Navy Standard TAC 3 for the shipboard scenario generation and control portion of the BFTT progra

c. (U) Provide engineering support to the BFTT Program for development of the Engineering Development Model (EDM) for integration with CG 47 Class AEGIS ships having the AEGIS Combat Training System (ACTS), and FFG 7 Class ships having the Frigate Anti-Air Warfare (AAW) System Trainer (FAST).

3. (U) FY 1994 PLANS:

a. (U) Develop and demonstrate the EDM for FFG 7 Class ships with the Anti-Air Warfare FAST system.

b. (U) Provide engineering support to the BFTT Program, develop and demonstrate the EDM for CG 47 Class ships.

c. (U) Complete the CSET Internal Research and Development (IR&D) effort to include an ADM and produce three Service Test Models (STM).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Port Hueneme, CA and Dahlgren, VA; NAVTRASYSCEN, Orlando, FL; NCCOSC RDT&E DIV, San Diego, CA. CONTRACTORS: COMPTEK, Arlington, VA; EWA, Covington, WV.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN(BA-2/MB91)	3,181	3,916	0	63,445	76,640

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: X1823 PROJECT TITLE: Training and Training Devices Systems

C. (U) DESCRIPTION: The employment of Naval forces in a multi-dimensional warfare environment is a complex operational problem. To counter the threat expected in hostile environments, Naval Officer training must be provided for al mission areas on a real-time basis at the Battle Force/Group level. This training must focus on tactical decision-making, tactics development/ evaluation, and operational planning/execution. Shore-based classroom training and at-sea exercises have historically satisfied the Battle Group tactical training requirement. However, the effectiveness of this approach to training was reduced by the lack of a real-time decision-making environment during shore-based training and the reduction in number and scope of at-sea exercises. Enhanced Naval Warfare Gaming System (ENWGS) provides the decision-making environment and is a critical portion of the training that Battle Group Commanders and their supporting Warfare Commanders receive prior to deployment. ENWGS is a geographically distributed war gaming system that supports the needs and objectives of the Fleet Commanders. Through computer simulation, ENWGS assists Tactical Commanders in planning, executing, and evaluating Fleet operations and exercises. ENWGS also provides the ability to test the Battle Groups' Operation Orders, providing the essential supplement to at-sea operations, prior to deployment. During FYs 1994-1996, ENWGS will complete its conversion to an open systems architecture to provide software portability (Release 4.0) and lead to the development of a shipboard scenario generator (Release 5.0).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted Preliminary Design Review (PDR) of Release 4.0.

b. (U) Conducted Critical Design Review (CDR) of Release 4.0.

2. (U) FY 1993 PROGRAM:

a. (U) Commence and complete code and test of Release 4.0.

b. (U) Perform Final Qualification Testing of Release 4.0.

3. (U) FY 1994 PLANS:

a. (U) Field Release 4.0 and commence development of Release 5.0.

b. (U) Conduct PDR, CDR and Systems Design Review of Release 5.0.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Portsmouth, VA. CONTRACTORS: Computer Sciences Corporation, Moorestown, NJ.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 235	0	0	2,958	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATION AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROGRAM NUMBER: W0604 PROJECT TITLE: Training Range and Instrumentation Development

C. (U) DESCRIPTION: This project develops specialized instrumentation systems for fleet readiness training while minimizing life cycle costs. Tasks include the following systems: Range Electronic Warfare Simulators (REWS) and associated subsystems, Telemetry (TM), Target Control System (TCS), Large Area Tracking Range (LATR), Laser Training Systems, Weapons Impact Scoring Set (WISS), Imaging Weapons Training System (IWTS), Underwater Tracking System - Mobile (UTS-Mobile), Shallow Water Range Technology and Fixed Open Ocean Instrumentation and Range Requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Reached Initial Operational Capability with REWS Threat Radar Simulator (TRS) (Research and Development unit at Southern California offshore Range).

b. (U) Continued development of UTS-(Mobile) (previously called Large Area Underwater Range), LATR, WISS, TCS and TM. Completed testing, evaluation and development of the Laser Evaluation System Mobile engineering development model and obtained Milestone (MS)-III approval for full rate production.

c. (U) Initiated development of IWTS, REWS Computer Threat Simulator (CTS) and continued full scale development of REWS Electronic Warfare Range Operations Center (EWROC). Began EW Response Monitor (EWRM) initial development.

2. (U) FY 1993 PROGRAM:

a. (U) Initiate development of Shallow Water Range Technology.

b. (U) Continue review of long term TCS requirements and development of Shallow Water Range Technology, CTS, UTS-(Mobile), WISS, IWTS, and EWROC. Complete development of LATR and TM.

c. (U) Prepare for REWS EWRM MS-II in 1QTR; UTS-Mobile MS-I in 2QTR. Begin initial development of REWS TRS Multibeam Upgrade and continue initial development of REWS CTS; TM MS-III in 4QTR.

3. (U) FY 1994 PLANS:

a. (U) Prepare for REWS TRS Multibeam Upgrade MS-II in 3QTR and REWS CTS MS-II in 2QTR. Continue development of EWROC, EWRM, TCS, IWTS, and UTS-Mobile. Complete development and testing of WISS and prepare for MS III in 4QTR.

b. (U) Prepare for REWS EWROC MS-III in 2QTR and EWRM MS-III in 4QTR and IWTS MS-II in 4QTR. Begin initial development of Noise Jammer Simulator upgrade.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: IN-HOUSE: NCCOSC WC ISE DIV, San Diego, CA; NAVAIRWARCENWPNDIV, Point Mugu and China Lake, CA; NAVAIRWARCENACDIV, Patuxent River, MD and Warminster, PA; NWAC, Corona, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVUNSEAWARCENDIV, Newport, RI. CONTRACTORS: SRI International, Menlo Park, CA; Bunker Ramo, Westlake, CA; MITRE Corp., Wash., DC; LORAL, Sunnyvale, CA; RCA, Moorestown, NJ; SAIC/MARIPRO, Goleta, CA; EMA, Inc., Lexington Park, MD; EMC, Inc., Lexington Park, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN/-LINE 154	17,080	9,864	9,809	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: W1998 PROJECT TITLE: Tactical Combat Training System (TCTS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1998	Tactical Combat Training System (TCTS)	3,620	9,312	13,357	CONT.	CONT.

B. (U) DESCRIPTION: The Tactical Combat Training System (TCTS) will develop and procure deployable instrumentation designed to provide and evaluate Naval combat training at-sea for single platform, multi-platform (surface ship, submarine, aircraft) and Battle Force multi-warfare training. To accomplish this, TCTS instrumentation will be designed to develop and transmit exercise scenarios; simulate/stimulate all exercise participant sensors/weapons with the exercise scenario; track all exercise participants and events; e.g., weapons engagements; and, provide accurate, realistic, and timely exercise feedback. TCTS will build on technology developed for existing tactical training range systems including Tactical Aircrew Combat Training System and Mobile Sea Range (MSR) and the capabilities developed for the in-port Battle Force Tactical Trainer program. TCTS will incorporate the advanced Distributed Simulation produced protocol data units. The program completes development of near-term upgrades began under MSR to better support fleet at-sea training.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Released Request for Proposal for preliminary design competition.

b. (U) Evaluated proposals and selected three contractors.

c. (U) Initiated preparation for Milestone (MS) I decision.

d. (U) Evaluated technical concepts.

2. (U) FY 1993 PROGRAM:

a. (U) Award three design contracts.

b. (U) Monitor contractor progress, evaluate technical concepts.

c. (U) Achieve MS-I decision.

d. (U) Initiate preparation for MS-II decision.

e. (U) Initiate MSR upgrades for ship weapon system interface development and associated Anti-Aircraft Warfare (AAW), Anti-Surface Underwater Warfare (ASUW) and Antisubmarine Warfare (ASW) display and debriefing capability.

3. (U) FY 1994 PLANS:

a. (U) Achieve MS-II.

b. (U) Award one Engineering And Manufacturing Development (E&MD) contract for engineering development model development.

c. (U) Monitor contractor progress, evaluate engineering approaches.

d. (U) Complete MSR upgrades for ship weapon system interface development and associated AAW/ASUW/ASW display and debriefing capability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: W1998 PROJECT TITLE: Tactical Combat Training System (TCTS)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRWARCENWPNDIV, Pt. Mugu and China Lake, CA; NAVTRASYSCEN, Orlando, FL; NAVUNSEAWARCENDIV, Newport, RI; NCCOSC WC ISE DIV, San Diego, CA; NAVAIRWARCENACDIV, Patuxent River, MD and Warminster, PA NWAC, Corona CA. CONTRACTORS: SRI, Menlo Park, CA; Galaxy Scientific, Inc., West Berlin, NJ; Frontier Engineering, Inc., Stillwater, OK; Prime contractor to be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TOR	06/84
DOP	12/84
OR	01/86
AP	08/91
ORD	09/92
TEMP	09/92

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN/LINE 154	200	4,025	2,000	164,275	170,500

Procurement funds will procure previously developed MSR upgrades for aircraft an submarine data acquisition.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

MS-I	Oct 92
Design Contract Award	Nov 92
MS-II	Mar 94
E&MD Contract Award	Mar 94
Prelim Design Review	Jan 95
Critical Design Review	Nov 95
Technical Evaluation	Jan 97
Operational Evaluation	May 97
MS-III	Oct 97
Production Contract Award	Nov 97
IOC	Jan 00

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Consolidated Training Systems Development
PROJECT NUMBER: W2124 PROJECT TITLE: Air Warfare Training Development

C. (U) DESCRIPTION: This program develops Universal Threat System for Simulators (UTSS) which is designed to provide current and validated threat data to a wide range of aircrew simulators in three services, using a common threat module and standard threat database. Historically, each different simulator has required development and maintenance of separate threat generation system. Development of the standardized UTSS will provide more current threat representation and will eliminate redundant efforts and expense. UTSS will be incorporated on existing and future aviation Flight Trainers, Tactics Trainers and Weapons System Trainers. UTSS is a Navy-led, tri-service program through the Joint Technical Coordination Group - Training Systems Development.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Developed common, validated electronic warfare threat environment technical data base for use in aircrew flight trainers and weapons systems trainers. Issued request for proposals.

2. (U) FY 1993 PROGRAM:

a. (U) Develop Joint Service Charter and agreements for total participation in development and support of UTSS prototype and transition. Define user needs and functional requirements for UTSS.

b. (U) Develop operation of concept and technology assessment.

c. (U) Define and develop integration plan for UTSS modules and database with data driven mathematical models and model library for selected threat systems.

3. (U) FY 1994 PLANS:

a. (U) Develop contract package and award contract and internal tasking for the development of the UTSS hardware. Begin test and evaluation of system.

b. (U) Develop single value master database.

c. (U) Define/determine database parameters along with threat model characteristics to populate UTSS.

d. (U) Investigate Department of Defense standards for development of realtime simulation software baselines.

e. (U) Determine validation process for threat data and modules.

f. (U) Develop interlacing/knowledge based processing capability for potential application to UTSS operating system.

4. (U) PROGRAM TO COMPLETION: This is a contiuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVTRASYSCEN, Orlando, FL; Air Force Electronic Warfare Center, San Antonio, TX; Air Force Aeronautical Systems Division, Dayton, OH; Army Simulation and Training Instrumentation Evaluation Command, Orlando, FL; NAVUNSEAWARCEN Keyport, WA, Newport, RI, and New London CT. CONTRACTORS: GPS Technologies, Arlington, VA; JWK Incorporated, Dayton, OH; and Analysis and Technology, Arlington, VA.

F. (U) RELATED ACTIVITIES: UTSS is a Joint Service program with Army, Air Force, and Marines participation under the Navy lead.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1977	JTIDS	62,130	41,457	11,712	CONT.	CONT.
P2126	MIDS	10,020	13,605	23,214	CONT.	CONT.
P1743	C^2P	7,746	4,899	2,764	3,123	90,629
P1753	LINK 11	1,730	933	1,872	CONT.	CONT.
	TOTAL	81,626	60,894	39,562	CONT.	CONT.

B. (U) DESCRIPTION: This program element develops and improves the Navy's tactical data link systems. It includes the Joint Tactical Information Distribution System (JTIDS), the Multifunctional Information Distribution System (MIDS), the Command and Control Processor (C^2P), and the Link 11 Improvement Program (LEIP).

(U) JTIDS will provide selected U.S. Navy tactical aircraft, U.S. Navy ships, and U.S. Marine Corps ground units with crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have additional capabilities of common grid navigation and automatic relay inherent in the equipment that will enable long range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the NATO MIDS.

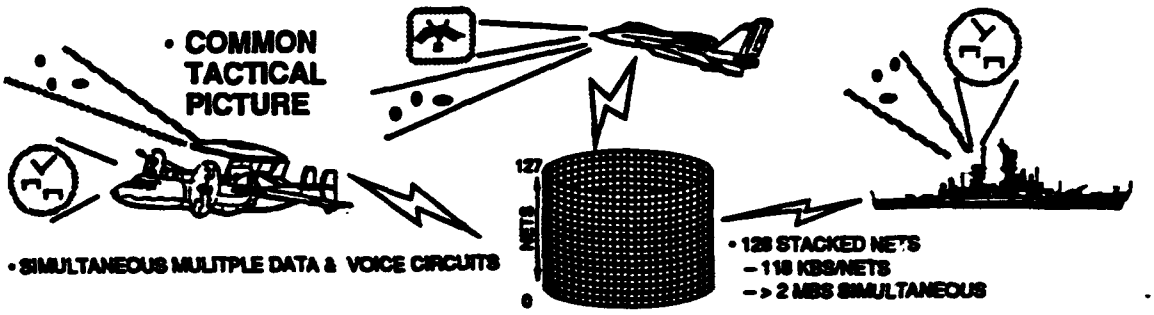
(U) The MIDS program is a multinational cooperative development program to produce a terminal (MIDS-Low Volume Terminal (LVT)) that is smaller, lighter, fully compatible with, and as capable as the JTIDS Class 2 terminal for use in platforms that cannot accommodate the larger, heavier JTIDS terminal. This project funds the costs to integrate and test MIDS in the F/A-18. Terminal development costs are funded in program element 0604771D.

(U) The Command and Control Processor (C2P) program is a software development effort that will provide an interface between the Tactical Digital Information Links (TADILS) (Link 4A, 11 and 16) and major surface ship Command and Control systems (ACDS and AEGIS C&D). The C2P will provide translation between TADILs and isolate all tactical data link equipment, message standards, and protocols from the tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single data base for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems.

(U) The Link 11 Improvement Plan (LEIP) is made up of several efforts to improve existing computer-to-computer digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. Data link improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the Lead Technical Nation to the NATO Improved Link Eleven (NILE) Office.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1977 PROJECT TITLE: Navy JTIDS



POPULAR NAME: Link-16 - Joint Tactical Information Distribution System (JTIDS)
A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	LRIP PH3 NPDM 9/92		AFP DAB 2/94 IOC 1/94	
ENGINEERING MILESTONES	Complete E-2C Int Networks 8/92	Deliver Operational Fixes 3/93		
T&E MILESTONES	DT-IIB 2/92 DT-IIA 1/92 DT-IIC-2 9/92 OT-IIB-2 3/92	TECHEVAL 4/93 OPEVAL 7/93 OT-IIC 10/92		OT-IIIA 4QTR/95
CONTRACT MILESTONES	N/A	N/A	N/A	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	37,118	24,522	7,504	CONT.	CONT.
SUPPORT CONTRACT	904	514	122	CONT.	CONT.
IN-HOUSE SUPPORT	8,183	7,032	2,344	CONT.	CONT.
GFE/ OTHER	15,925	9,389	1,742	CONT.	CONT.
TOTAL	62,130	41,457	11,712	CONT.	CONT.

B. (U) DESCRIPTION: Combat experience gained during the Southeast Asia conflict, Middle East incidents, Grenada, and Desert Storm exposed several deficiencies in U.S. tactical communication, navigation, and identification systems. Extensive analyses of these combat situations indicate that a joint service, high capacity, secure and jam resistant communication and data link would increase force effectiveness and substantially reduce losses due to hostile action and friend-on-friend engagements. These capabilities are critical in the high speed, long range, and electronically hostile environment envisioned in any substantial modern-day conflict. This includes any engagement with minor or third world powers due to the proliferation of high-technology weaponry.

(U) Link 16 is an integration of the Time Division Multiple Access (TDMA) family of Joint Tactical Information Distribution System (JTIDS) terminals and the Tactical Digital Information Link J (TADIL J) Message Standard. It will provide selected U.S. Navy tactical air, U.S. Navy ships and U.S. Marine Corps ground units crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1977 PROJECT TITLE: Navy JTIDS

the additional capabilities of common-grid navigation and the use of automatic relay inherent in the equipment that will enable long-range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the European version, NATO MIDS (Germany, Italy, France, and Spain). This project will fund the costs to integrate and test JTIDS in the E-2C, F-14D, CV, CG, DDG, the required development to accommodate expanded LINK 16 operational capabilities for additional warfare areas, and development of automated network management aids.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed E-2C integration.

b. (U) Continued ship integration.

c. (U) Conducted developmental/operational testing (DT/OT) including DT-II-A, DT-IIC-2, DT-IIE, and OT-IIB-2.

d. (U) Continued multi-platform and joint service testing.

e. (U) Continued joint service Automatic Network Management Aid development.

f. (U) Delivered Engineering & Manufacturing Development terminals for continuing DT/OT.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct OT-IIC

b. (U) Complete ship integration.

c. (U) Continue multi-platform and joint service testing.

d. (U) Continue joint service Automatic Network Management Aid development.

e. (U) Deliver Navy unique and joint service operational networks.

f. (U) Conduct Technical Evaluation (TECHEVAL).

g. (U) Conduct Operational Evaluation (OPEVAL).

3. (U) FY 1994 PLANS:

a. (U) Complete joint service Automatic Network Management Aid development.

b. (U) Develop fixes to deficiencies identified during TECHEVAL/OPEVAL.

c. (U) Achieve Initial Operational Capability (IOC).

d. (U) Support continued development of the Advanced Combat Direction System (ACDS) Block 1 and AEGIS Baseline 5.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1977 PROJECT TITLE: Navy JTIDS

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVSURFWARCEN FLTCOMBATDIRSSACT, Dam Neck, VA; NCCOSC RDTE DIV DET, Warminster, PA; NAVELEXCEN, Vallejo, CA. CONTRACTORS: GEC-Marconi Electronics System Co., Wayne, NJ; Collins Avionics and Communications Division of Rockwell International, Cedar Rapids, IA; Grumman Aerospace Corp., Bethpage, Long Island, NY; The Boeing Corporation, Seattle, WA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

MJCS 194-89 (MROC for JTIDS)	11/89
Joint JTIDS Navy TEMP Annex	5/89
ADM (JTIDS Milestone IIIA)	10/89
ADM (NPDM Milestone IIIA)	4/91
ADM (NPDM Milestone IIIB)	9/92

G. (U) RELATED ACTIVITIES:

1. (U) PE 0205667N, F-14 Upgrade. Aircraft upgrades include integration with JTIDS.

2. (U) PE 0204152N, E^2 Squadrons. Aircraft upgrades include integration with JTIDS.

3. (U) PE 0604771D, Common JTIDS. Funding develops and procures the Navy's Full Scale Development terminals through the Joint Program Office.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN (BA1)	33/				47/
#10,11,24,25	31,918				42,948
APN (BA5)	3/	4/	5/	CONT.	CONT.
#55,140	2,350	11,684	15,732	CONT.	CONT.
APN (BA6)	8,304	5,786	5,691	CONT.	CONT.
#167					
OPN (BA2)	10/	10/	5/	CONT.	CONT.
#85	26,021	30,233	17,472	CONT.	CONT.
SCN	5/	6/	3/		
	12,420	14,947	7,649	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

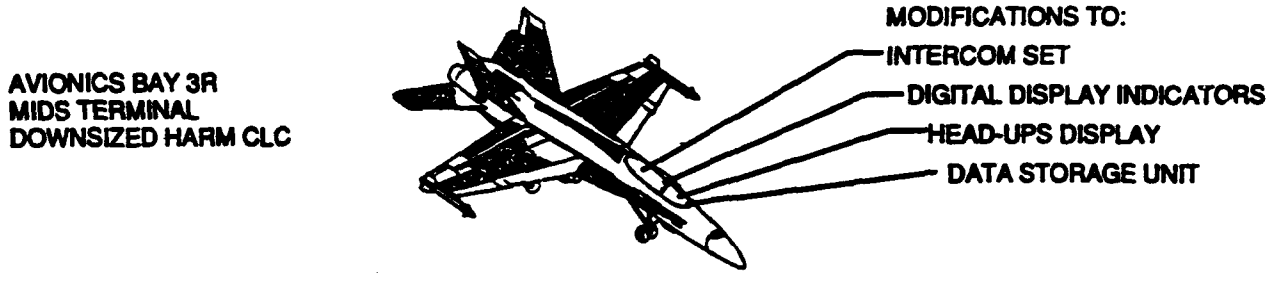
J. (U) TEST AND EVALUATION DATA:

1. (U) FY 1992: T&E milestones DT-IIE, DT-IIA, DT-IIC-2, and OT-IIB were test phases required to support the NPDM IIIB (4QTR/92).

2. (U) FY 1993: OT-IIC and T&E milestones TECHEVAL/OPEVAL are test phases required to support the NPDM IIIC (2QTR/94).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P2126 PROJECT TITLE: Multifunctional Information Distribution Systems



POPULAR NAME: Link 16 Multifunctional Information Distribution System (MIDS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		DAB II 4/93		DAB III 2QTR/01	
ENGINEERING MILESTONES					
T&E MILESTONES				TECHEVAL 3QTR/00 OPEVAL 4QTR/00	
CONTRACT MILESTONES			F/A-18 INTEG. Contract Award 2/94		
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7.895	9.969	19.622	CONT.	CONT.
SUPPORT CONTRACT	337	136	143	CONT.	CONT.
IN-HOUSE SUPPORT	1.130	1.695	2.409	CONT.	CONT.
GFE/ OTHER	658	1.805	1.040	CONT.	CONT.
TOTAL	10.020	13.605	23.214	CONT.	CONT.

B. (U) DESCRIPTION: The Multifunctional Information Distribution System (MIDS) is a multinational (U.S., France, Germany, Italy, and Spain) cooperative development program established to design, develop, and deliver low-volume (LV), lightweight tactical information system terminals for U.S. fighter aircraft as well as foreign fighter aircraft, helicopters, ships and ground sites. The terminals will be designed as a Pre-Planned Product Improvement (P3I) of the Joint Tactical Information Distribution System (JTIDS) Time Division Multiple Access (TDMA) Class 2 terminals. The goal of the MIDS program is to produce a terminal that is smaller, lighter, fully compatible with, and as capable as the JTIDS TDMA Class 2 terminals but suitable for use on platforms that cannot accommodate the bulkier, heavier JTIDS TDMA Class 2 terminals. The first U.S. Navy planned application of a MIDS terminal is on the F/A-18. This program element will fund the costs to integrate and test MIDS on the F/A-18. Terminal development costs are funded in program element 0604771D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued MIDS F/A-18 integration design study.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P2126 PROJECT TITLE: Multifunctional Information Distribution Systems

b. (U) Continued downsizing of the High Speed Anti-Radiation Missile Command Launch Computer (HARM CLC).

2. (U) FY 1993 PROGRAM:

a. (U) Continue MIDS F/A-18 integration design study.
b. (U) Release RFP for MIDS F/A-18 Integration contract.
c. (U) Complete downsizing of HARM CLC.
d. (U) Start development of initial MIDS software for incorporation into Operational Flight Program (OFP) 95.

3. (U) FY 1994 PLANS:

a. (U) Complete MIDS F/A-18 integration design study.
b. (U) Award contract for MIDS F/A-18 integration.
c. (U) Continue development of initial MIDS software build for incorporation into OFP 95.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV DET, Warminster, PA; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: McDonnell Douglas, St. Louis, MO; Texas Instruments, Dallas, TX; GEC-Marconi Electronics System Co., Wayne, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technical Changes: Not applicable.

2. (U) Schedule Changes: DAB moved to 4/93 based on slip in terminal program.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

NATO:	Military Operational Requirement (MOR) MC 306	3/87
US:	JTIDS-Multiple Required Operational Capability (MROC) MJCS-194-89	8/89
	MIDS-Mission Needs Statement (MNS) for MIDS F/A-18	4/90

G. (U) RELATED ACTIVITIES:

1. (U) PE 0205604N, JTIDS: Funds Integration and test costs for JTIDS on the following Navy platforms: E-2C, F-14D, CV, CG/CGN, and DDG.

2. (U) PE 0604771D, Common JTIDS: Funding develops and procures the Navy's JTIDS and MIDS Full-scale development terminals.

3. (U) PE 0604771D, OSD MIDS - Terminal development

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

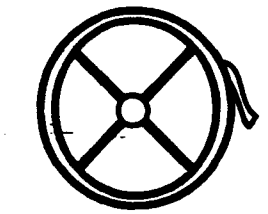
1. (U) Terminal Project Definition Memorandum of Understanding (MOU) with NATO Nations, 14 Nov 86.

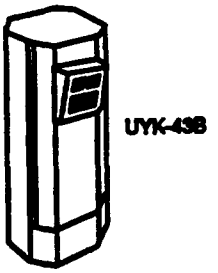
2. (U) Terminal Program MOU and Pre-EMD Phase Supplement, 4 Oct 91.

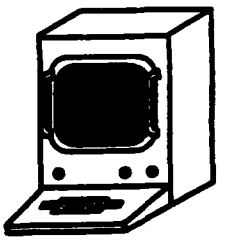
J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1743 PROJECT TITLE: C2 Processor Program


C2P COMPUTER PROGRAM




USQ-69

POPULAR NAME: Command and Control Processor (C2P)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	LRIP NPDM 9/92	AFP	AFP NPDM 4/94 RTF (V0) 1/94	RTF (V1)4QTR/97
ENGINEERING MILESTONES				
T&E MILESTONES	OT-IIB 3/92 GAT 3/92, 8/92	TECHEVAL(V0) 4/93 OPEVAL (V0) 7/93		ACDS BK1 OPEVAL 3QTR/96 OT-IIIA 4QTR/95
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4.924	2.958	761	0	62.386
SUPPORT CONTRACT	306	317	327	619	3.128
IN-HOUSE SUPPORT	1.187	1.180	1.218	2.047	13.795
GFE/ OTHER	1.329	444	458	457	11.320
TOTAL	7.746*	4.899*	2.764	3.123	90.629

* FY 92 and FY 93 funded in P.E. 0603717N.

B. (U) DESCRIPTION: The Command and Control Processor (C2P) will remove link translation and processing duties from the tactical data processor, thereby increasing track capacity and target insertion rates for the combat direction system. The C2P will be a newly developed computer program hosted on Navy standard computers (AN/UYK-43) that will serve as the interface between tactical digital communication systems and selected shipboard processors, providing a rapid and flexible capability for exchanging tactical information. Where installed, the C2P will isolate all tactical data link equipment, message standards and protocols from tactical information processors. The C2P provides the interface between Links 4A, 11, Improved Link 11, 16, the Advanced Combat Direction System (ACDS), and AEGIS Command and Decision (C&D). The C2P will extract information from Tactical Digital Information Links (TADILs), translate between TADILs, forward data between specific TADILs and provide the information derived from those links to on-board processors. Information received from shipboard processors will be formatted and provided to the appropriate link equipment for transmission. The C2P program is being developed in two versions. Version 0 (V0) will support ACDS Block 0 and AEGIS Model 4 C&D ships. Version 1 (V1) will support ACDS Block 1 and AEGIS Model 5 C&D ships.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1743 PROJECT TITLE: C2 Processor Program

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed C2P V0/V1 Software Coding.

b. (U) Conducted C2P V0/V1 Government Acceptance Testing (GAT).

c. (U) Conducted C2P V0 land based/ship integration testing.

d. (U) Conducted C2P V0 shipboard Operational Testing (OT).

2. (U) FY 1993 PROGRAM:

a. (U) Conduct C2P V0 Technical Evaluation (TECHEVAL).

b. (U) Conduct C2P V0 Operational Evaluation (OPEVAL).

c. (U) Correct C2P deficiencies/Trouble Reports (TRs) identified during testing.

d. (U) Conduct C2P V1 development and testing with the ACDS Block 1.

3. (U) FY 1994 PLANS:

a. (U) C2P V0 Release to Fleet (RTF).

b. (U) Continue C2P V1 development and testing with ACDS Block 1.

c. (U) Correct C2P deficiencies/TRs identified during testing.

4. (U) PROGRAM TO COMPLETION:

a. (U) Conduct DT-IIIA to verify fixes to C2P V0 identified in TECHEVAL/OPEVAL.

b. (U) Complete C2P V1/ACDS Block 1 Development Testing

c. (U) Conduct C2P V1/ACDS Block 1 Operational Testing

d. (U) Correct C2P deficiencies/TRs identified during testing.

D. (U) WORK PERFORMED BY: IN-HOUSE: PCDSSA, San Diego, CA; NCCOSC RDTE DIV, San Diego, CA; FLTCOMBATDIRSSACT, Dam Neck, VA. CONTRACTORS: Hughes Aircraft Company, Fullerton, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 AMENDED PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR, 12/85.
NDCP, 2/88 (Revised 11/89).
TEMP 357-02, 2/92.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1743 PROJECT TITLE: C2 Processor Program

G. (U) RELATED ACTIVITIES: PE 0205604N, Tactical Information System: LINK 16 is one of the tactical data links currently under development that interfaces with C2P.

(U) PE 0604518N, CIC Conversion: ACDS is a shipboard processor currently under development that interfaces with C2P.

H. (U) OTHER APPROPRIATION FUNDS: (Quantity/Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN (BA2) (P-1 #83)	10/9,717	10/11,155	4/4,699	CONT.	CONT.
SCN	5/5,685	6/5,346	3/2,760	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) FY 1992:

a. (U) Complete C2P GAT 8/92.

b. (U) C2P Land based integration testing, 3/92-9/92.

c. (U) C2P Initial shipboard OT, 3/92.

2. (U) FY 1993:

a. (U) C2P V0 TECHEVAL, 4/93-5/93.

b. (U) Start C2P V1/ACDS Blk 1 integration testing, 6/93.

c. (U) C2P V0 OPEVAL, 7/93-8/93.

3. (U) FY 1994: Continue C2P V1/ACDS Blk 1 integration testing.

4. (U) FY 1995::

a. (U) Continue C2P V1/ACDS Blk 1 integration testing.

b. (U) Conduct OT-IIIA to verify fixed to C2P V0 deficiencies identified in TECHEVAL/OPEVAL.

5. (U) FY 1996 to FY 1997: Complete C2P V1/ACDS Block 1 DT/OT

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1753 PROJECT TITLE: Link Eleven Improvements

PICTURE NOT AVAILABLE

POPULAR NAME: Link Eleven Improvement Program (LEIP)

A (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	LEDS SPEC 5/92		NILE SPEC VAL 4/94	
T&E MILESTONES		NILE SIMULATION/ EMULATION & MODELING 5/93		
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	176	0	0	CONT.	CONT.
SUPPORT CONTRACT	101	50	50	CONT.	CONT.
IN-HOUSE SUPPORT	480	546	1,303	CONT.	CONT.
GFE/ OTHER	973	337	519	CONT.	CONT.
TOTAL	1,730*	933*	1,872	CONT.	CONT.

* FY 92 and FY 93 funded in P.E. 0603717N.

B. (U) DESCRIPTION: LEIP improves existing computer-to-computer digital radio communications in the High Frequency and Ultra-High Frequency radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. In prior years the Link-11 Improvement Program (LEIP) was made up of several efforts. These included near term improvements to existing Link-11, technical support of the NATO efforts to develop an improved Link-11 system, development of a data link for use with non-Link-11 equipped foreign navies, development of a Mobile Universal Link Translator System (MULTS), and a Critical System Demonstration (CSD) of technologies to improve the performance of current Link-11. These data link improvements allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the lead technical nation to the NATO Improved Link Eleven (NILE) office. Of these efforts only the NILE effort continues in RDT&E beyond FY 1993. The NILE development will occur in two design and development subphases. Subphase I will validate specification using simulation, emulation and modeling and a test bed developed during this subphase. Subphase II involves the acquisition, integration and testing of the NILE Reference System.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1753 PROJECT TITLE: Link Eleven Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Link Eleven Display Systems (LEDS) data forwarding and link diagnostic capabilities.

b. (U) Conducted certification of MULTS baseline.

c. (U) Conducted Critical Design Review for LEDS.

d. (U) Continued fielding LEDS upgrades.

e. (U) Commenced preparation of NILE simulation plan.

f. (U) Acquired NILE simulation/emulation hardware and software.

g. (U) Commenced development and validation of NILE system specifications using simulation, emulation and modeling.

h. (U) Initiated early operational capability for TDMA Network and Multi-Media Network Protocols, Single Tone Modem and Mission Area Subnets.

2. (U) FY 1993 PROGRAM:

a. (U) Complete fielding LEDS upgrades.

b. (U) Complete preparation of NILE simulation plan.

c. (U) Commence development of NILE test procedures.

d. (U) Install NILE simulation equipment and integration of software.

e. (U) Continue development and validation of NILE system specifications using simulation, emulation and modeling.

f. (U) Continue early operational capability efforts as first portion of U.S. Companion Program to NILE.

g. (U) Continue CSD of TDMA Network Protocols, Mission Area Subnet and Multi-Media Protocols.

3. (U) FY 1994 PLANS:

a. (U) Complete development and validation of NILE system specifications using simulation, emulation and modeling.

b. (U) Complete development of NILE test procedures.

c. (U) Complete installation of NILE simulation equipment and integration of software.

d. (U) Conduct NILE system testing using test bed, aircraft and ship services.

e. (U) Commence preparation of NILE reference system acquisition Request for Proposal (RFP).

f. (U) Perform at sea operation of early operational capability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Data Links
PROJECT NUMBER: P1753 PROJECT TITLE: Link Eleven Improvements

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Portsmouth, VA; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, D.C.; NCTSI, San Diego, CA; NAVELEXACT, St. Inigoes, MD; FLTCOMBATDIRSSACT, Dam Neck, VA. CONTRACTORS: SAIC, San Diego, CA; Rockwell International, Dallas, TX.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR X1327 (LEIP)	2/82
DCP High Frequency Anti-Jam (HFAJ/LEIP)	1/87
TEMP (HFAJ/LEIP)	1/86

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN BA2 (P-1 #89)	2,142	1,343			

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: The NATO Improved Link Eleven (NILE) program is in design and development Subphase I under the Memorandum of Understanding effective July 1992. Participating nations include: Canada, France, Italy, Germany, Netherlands, the United Kingdom and the United States.

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0896	ASWCSI	19,018	16,910	7,176	3,557	218,929
V1916	SURF IMP	56,033*	0	17,729	CONT.	CONT.
	TOTAL	75,051	16,910	24,905	CONT.	CONT.

B. (U) DESCRIPTION: The objective of the Surface Anti-Submarine Warfare (ASW) Combat System program element is to develop replacements for Contractor Furnished Equipment/Government Furnished Equipment (CFE/GFE), to develop a contact management system (CMS) and to improve the AN/SQQ-89(V) ASW Combat System. These efforts include incorporation of an Advanced Integrated Display Station (AIDS) and Enhanced Modular Signal Processor (EMSP), development of a bi-directional interface between ASWCS and CMS, incorporation of fleet requested operability improvements, reduction of the number of variants associated with the AN/SQQ-89(V) and integration of the MK50 Torpedo. This program will provide new architecture elements and capacity for moderate growth to the AN/SQQ-89 systems which are installed on CG-47, DD-963 and DDG-51 class ships.

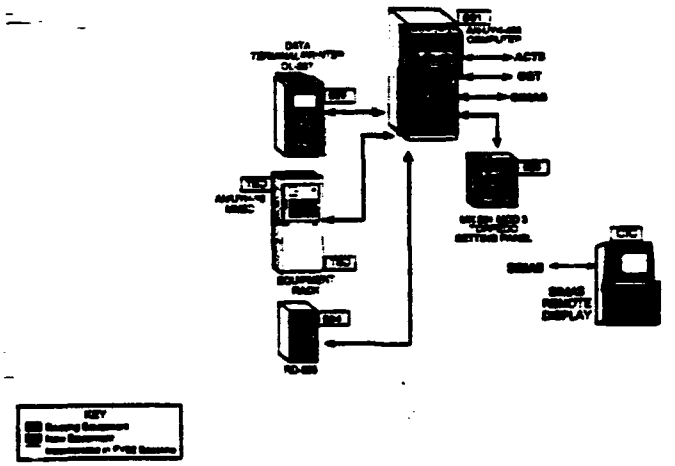
* Surface ASW System Improvement (V1916) efforts were previously supported under PE 0604713N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration
PROJECT NUMBER: V0896 PROJECT TITLE: ASW Combat System Integration

ASW COMBAT SYSTEM INTEGRATION (ASWCSI)

MK116 MOD7



POPULAR NAME: ASWCSI

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES				CONT.	
ENGINEERING MILESTONES		MK50 PDR 3/93 MK50 CDR 6/93	CMS/ASWCS PDR 12/93	CONT.	
T&E MILESTONES		SYSTEM INTEG TEST 3/93		CONT.	
CONTRACT MILESTONES					
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	12.200	3.283	3.939	1.807	109.444
SUPPORT CONTRACT	1.019	1.013	400	200	9.793
IN-HOUSE SUPPORT	5.549	12.415	2.637	1.350	93.875
GFE/ OTHER	250	199	200	200	5.817
TOTAL	19.018	16.910	7.176	3.557	218.929

B. (U) DESCRIPTION: Development efforts are on-going to prototype and develop a contract management system (CMS) to support the ASW plotting team and the ASWCS operator, the ASW evaluator, and the sonar supervisor. Efforts include developing a bi-directional interface between ASWCS and CMS, reduce the number of variants associated with the AN/SQQ-89(V) and to integrate MK50 Torpedo into the AN/SQQ-89. This project develops and integrates software applicable to DD963, DDG 51 and CG47 class ships.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration
PROJECT NUMBER: V0896 PROJECT TITLE: ASW Combat System Integration

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed design of MOD 8/9 with full utilization of OPSPEC 411.2 data.
b. (U) Continued MOD 7/SIMAS (Desktop interface development and changes required for MK-50 Torpedo introduction.
c. (U) Coordinated ASWCS development with all AN/SQQ-89 elements.

2. (U) FY 1993 PROGRAM:
a. (U) Evaluate results of at-sea test of stand alone prototype CMS and develop functional allocation of requirement between CMS & ASWCS MK 116 MOD 7.
b. (U) Complete MOD 7/SIMAS (Desktop) interface development and conduct integration tests.
c. (U) Continue MOD 7 changes required for MK-50 Torpedo introduction.
d. (U) Initiate bi-directional interface between CMS and ASWCS MK 116.
e. (U) Coordinate ASWCS development with all AN/SQQ-89 elements.

3. (U) FY 1994 PLANS:
a. (U) Complete development of CMS/ASWCS functional allocation of requirements.
b. (U) Continue MOD 7 changes required for MK-50 Torpedo introduction.
c. (U) Conduct Preliminary Design Review and initiate integration of CMS and ASWCS.
d. (U) Continue development of bi-directional interface with CMS and ASWCS MK 116.

4. (U) PROGRAM TO COMPLETION: FY-95 plans consist of completion of the MOD 7 changes for MK-50 torpedo introduction, completing development and integration of the CMS and ASWCS MK 116BI - directional interfaces, and coordinating ASWCS development with all AN/SQQ-89 elements. Efforts in this project will continue under PE 0205620N, project V1916, Surface ASW Systems Improvements after FY-95.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET, New London, CT; NCCOSC RDTE Div, San Diego, CA; NAVSURFWAR WHITE OAK DET, Silver Spring, MD; NRL SSC, Washington, DC. CONTRACTORS: Matrix, Inc., Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Integration of MK-50 Over-The-Side Launch Capability into AN/SQQ-89.

3. (U) COST CHANGES: Not applicable for this submission.

F. PROGRAM DOCUMENTATION:
NDCP V0896-AS 5/81

G. (U) RELATED ACTIVITIES: Program Element 0604212N, Project H1707 (LAMPS III IMP); and PE 0205620N, Project V1916, (Surface ASW System Improvement).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN LINE #51	241,499	149,610	88,110	CONT.	CONT.

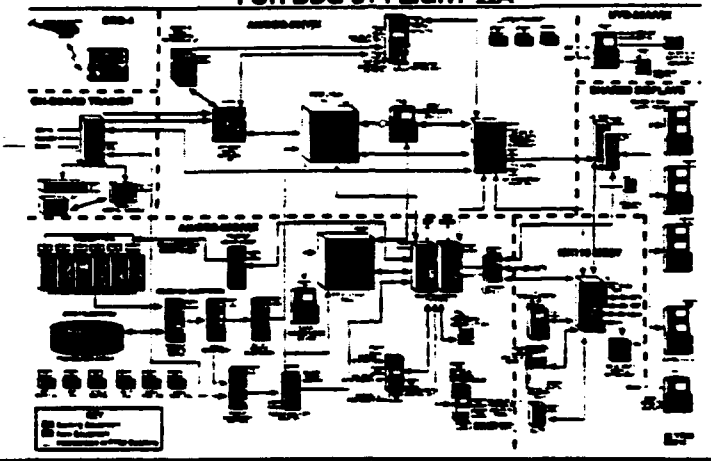
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Test and Evaluation consists of production acceptance test and AN/SQQ-89 integration test of Set IV, V and VII software baselines.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration
PROJECT NUMBER: V1916 PROJECT TITLE: Surface ASW System Improvements

AN/SQQ-89(V)10 SURFACE ASW COMBAT SYSTEM FOR DDG-51 FLIGHT-IIA



POPULAR NAME: AN/SQQ-89 Modernization

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992*	FY 1993*	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES		EMSP SSR 6/93 AIDS SSR 3/93 AIDS SDR 7/93	EMSP PDR 10/93 AIDS PDR/CDR 12/93 EDM 6/94	
T&E MILESTONES				
CONTRACT MILESTONES	ADVANCED INTEGRATED DISPLAY STATION (AIDS) 6/92 EMSP 8/92			

BUDGET	FY 1992*	FY 1993*	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	27.771	0	9.534	CONT.	CONT.
SUPPORT CONTRACT	4.587	0	1.054	CONT.	CONT.
IN-HOUSE SUPPORT	23.675	0	7.141	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	56.033	0	17.729	CONT.	CONT.

B. (U) DESCRIPTION: The objective of Surface Anti-Submarine Warfare (ASW) System Improvements Project is to develop replacements for Contractor Furnished Equipment (CFE)/Government Furnished Equipment (GFE) and to improve the AN/SQQ-89(V) Anti-Submarine Warfare System. This effort includes incorporation of an Advanced Integrated Display Station (AIDS) and Enhanced Modular Signal Processor (EMSP). This program will provide new architecture elements and capacity for moderate growth to the AN/SQQ-89 for interoperability with LAMPS MK III Block II Upgrade and battle force integrated ASW training.

* FY 1992/93 efforts were previously under PE 0604713N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration
PROJECT NUMBER: V1916 PROJECT TITLE: Surface ASW System Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Awarded AIDS contract and began design development.
b. (U) Awarded EMSP coding contract and began development.
c. (U) Began Sonar In-STU Mode Assessment System (SIMAS) incorporation into AIDS.

2. (U) FY 1993 PROGRAM: (Supported with FY-92 dollars)
a. (U) Conduct AIDS System Requirements Review/System Design Review (SRR/SDR).
b. (U) Conduct EMSP System Software Review (SSR).
c. (U) Perform Operability Analyses.
d. (U) Begin development of Operability Improvements with associated documentation and analysis.
e. (U) Continue AIDS design/development.
f. (U) Continue SIMAS incorporation into AIDS.

3. (U) FY 1994 PLANS:
a. (U) Conduct EMSP Preliminary Design Review/Critical Design Review (CDR/PDR).
b. (U) Conduct AIDS Preliminary Design Review/Critical Design Review (CDR/PDR).
c. (U) Complete AIDS Engineering Development Models.
d. (U) Complete SIMAS incorporation into AIDS.
e. (U) Continue development of AN/SQQ-89 EMSP code.
f. (U) Commence system test of EMSP in AN/SQQ-89.
g. (U) Continue Operability Improvement development and analysis.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: NCCOSC RDTE DIV, San Diego, CA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCEN, Crane, IN; NAVUNSEAWARCEN DET, New London, CT; NSCSES, Norfolk, VA; CONTRACTORS: TRACOR, Arlington, VA; AT&T, Greensboro, NC; Diagnostic Retrieval System (DRS), Oakland, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technical changes: The program has been restructured to include the integration of EMSP and AIDS as Engineering Change Proposals (ECPs) to the existing AN/SQQ-89 system versus a major upgrade.

2. (U) Schedule changes: Due to the program restructure, the integration of AIDS and EMSP will be done as ECP's to the AN/SQQ-89 system versus a major upgrade. Therefore, the design definition contract milestone date in March 1992 was deleted.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
Acquisition Program Baseline (In Process)
Test and Evaluation Master Plan (TEMP (802-2)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface ASW Combat System Integration
PROJECT NUMBER: V1916 PROJECT TITLE: Surface ASW System Improvements

G. (U) RELATED ACTIVITIES:
PE 0604507N, Enhanced Modular Signal Processors (Development of Navy Standard Processors)
PE 0604574N, Navy Tactical Computer Resources (Development of Navy Standard Displays)
PE 0603553N, Surface Anti-Submarine Warfare (Advanced ASW Development)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN LINE 51	241,499	149,610	88,110	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
1/ W0601	Common Ground Equipment	4,350	5,151	2,924	CONT.	CONT.
W0852	Consolidated Automated Support System	433	8,837	6,219	CONT.	CONT.
W1041	Aircraft Equipment Reliability & Maintainability Program (AERMP)	2,236	1,840	1,979	CONT.	CONT.
2/ W1355	Aircraft Engine Component Improvement Program (CIP)	49,224	62,829	63,854	CONT.	CONT.
TOTAL		56,243	78,657	74,976	Cont.	Cont.

1/ Previously funded under PE 0604215N.
2/ Previously funded under PE 0604268N.

B. (U) DESCRIPTION: Common Ground Equipment is a Naval Aviation program to apply new technology to common support equipment necessary to support all aircraft. Consolidated Automated Support System (CASS) develops standardized Automated Test Equipment (ATE) with computer assisted, multi-function capabilities to support testing of aircraft subsystems and missiles. Aircraft Equipment Reliability & Maintainability Improvement Program is the only Navy program that provides engineering support for in-service out-of-production aircraft equipment and provides increased readiness at reduced operational and support cost. Aircraft Engine Component Improvement Program provides critical sustaining engineering support for in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W0601 PROJECT TITLE: Common Ground Equipment

C. (U) DESCRIPTION: Improve Support Equipment (SE) systems supportability through the new technology application to improve aircraft readiness via effective, efficient, and cost saving Fleet equipment introductions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Delivered Standard Engine Test System (SETS) first prototype.

b. (U) Initiated development/construction of Generator Test Stand (GTS) and Carbon Dioxide Blasting Unit (CDBU) prototypes.

c. (U) Provided joint services weapons boresight technical support.

d. (U) Completed Universal Engine Trailer drawing package.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver second SETS prototype.

b. (U) Test and evaluate SETS, GTS, and CDBU.

c. (U) Initiate Automatic Test Equipment (ATE) interface and test program set (TPS) software language constructs for standard structured environment for test (SSET).

d. (U) Develop Universal Engine Trailer prototype.

e. (U) Commence Electronic Shaft Alignment System (ESAS), non-autoclave repair unit, fiber optic repair, and Dynamic Line Drop Compensator (DLDC) plans.

3. (U) FY 1994 PLANS:

a. (U) Complete SETS test and evaluation.

b. (U) Prototype TPS software constructs and SSET for ATE interface.

c. (U) Continue ESAS, fiber optic repair, non-autoclave repair unit, Universal Engine Trailer, and DLDC development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRWARCENACDIV Lakehurst, NJ and Patuxent River, MD; NADEPs Cherry Point, NC and Jacksonville, FL; CONTRACTORS: Hilton Systems Inc., Jackson MS (SETS); ARL, Inc., Arlington, VA (GTS); SAIC, Teaneck, NJ (ATE).

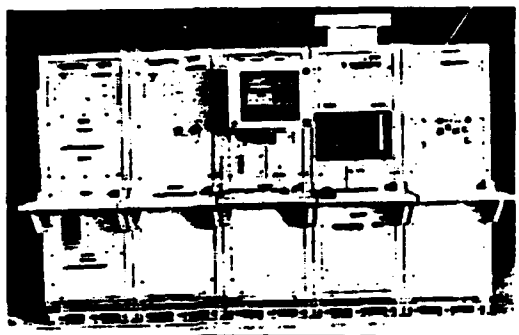
F. (U) RELATED ACTIVITIES: The Advanced Boresighting program is a part of coordinated Tri-Service effort endorsed, supported, and directed by the Joint Logistics Commanders. There are no known duplications of efforts within the Navy or DOD. Related Program Element: 0603801A (Advanced Maintenance Concepts).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W0852 PROJECT TITLE: Consolidated Automated Support System



POPULAR NAME: CASS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	IOC 8/92 IIA2 7/92	IIA3 5/93	III 12/93	
ENGINEERING MILESTONES			PCA 12/93	
T&E MILESTONES	OT-IIB 2/92	DT-IIC3 10/92 OT-IIC 5/93		
CONTRACT MILESTONES	LRIP 7/92	LRIP 5/93	FRP 1/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT					
SUPPORT CONTRACT					
IN-HOUSE SUPPORT		8.837	6.219	CONT.	CONT.
GFE/ OTHER	433			CONT.	CONT.
TOTAL	433	8.837	6.219	CONT.	CONT.

B. (U) DESCRIPTION: This project will design and develop modularly constructed automated test equipment with computer-assisted, multi-functional capability based on standardized hardware and software elements. CASS responds to Fleet Commanders' expressed requirements to correct serious deficiencies in existing automatic test equipment and the recommendations of 1976 SECNAV study report on test equipment. Program objectives are: (1) increase material readiness; (2) reduce life cycle costs through standardization; (3) improve tester sustainability at depot and intermediate maintenance levels; (4) reduce proliferation of unique test equipment; and (5) provide test capability for existing and future avionics/electronics systems. With stations that can be easily configured to satisfy different test requirements (e.g., electro-optical, radio frequency, inertial navigation, etc.) and design provisions which permit modification to meet the demands of future technology, this tester system will increase repair facility throughput capacity, reduce spare parts and personnel training requirements, and significantly reduce tester footprint on space critical Aircraft Carriers. Current R&D effort addresses development of a CASS all-up-round missile test capability for the following missiles: AIWS, AMRAAM, HARPOON, PHOENIX, SPARROW, SIDEWINDER, AND HARM.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W0852 PROJECT TITLE: Consolidated Automated Support System

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed and demonstrated the effectiveness of software changes.

b. (U) Completed OPEVAL (OT-IIB).

c. (U) Obtained approval (MS IIA-2) for and continued limited rate production, (LRIP-II), (Jul 92).

2. (U) FY 1993 PROGRAM:

a. (U) Obtain approval (MS IIA-3) for and continue limited rate production, (LRP), (May 93).

b. (U) Successfully complete TECHEVAL/OPEVAL testing (DT-IIC3) (OT-IIC).

c. (U) Complete certification of a second manufacturing source.

d. (U) Initiate the Phase II development effort for a missile test capability.

3. (U) FY 1994 PLANS:

a. (U) Continue the Phase II development effort for a missile test capability.

b. (U) Obtain CASS approval (MSIII) and commence Full Rate Production (FRP), (Dec 93).

c. (U) Complete Physical Configuration Audit (PCA), (Dec 93).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Lakehurst, NJ and Patuxent River, MD; NAVAIRWARCENWPNDIV, Pt. Mugu, CA. CONTRACTORS: General Electric Aerospace Corp., Daytona Beach, FL; Martin-Marietta Technical Services Inc., Americus, GA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	Current
ORD	2/93
IPS	7/92
TEMP	1/92

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W0852 PROJECT TITLE: Consolidated Automated Support System

G. (U) RELATED ACTIVITIES: A Memorandum of Agreement was executed between Naval Air Systems Command (NAVAIR) and the Air Force Systems Command (AFSC) (October 1988) in which the Navy will provide complete depot level repair for AMRAAM on CASS. A Memorandum of Understanding (MOU) has also been executed between the U.S. Army and NAVAIR (March 1991) for technical support and procurement of the CASS Electro-Optical subsystem for integration with the Army's Integrated Family of Test Equipment (IFTE) program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN-7	143,281	169,253	143,381	1,460,085	1,916,000
APN-6	11,400	0	0	0	19,500
MILCON					
P-350	2,200	0	0	0	2,200
P-451	0	1,560	0	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: OPEVAL was completed in April 1992 and demonstrated operational effectiveness and potential operational suitability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W1041 PROJECT TITLE: Aircraft Equipment Reliability & Maintainability Program

C. (U) DESCRIPTION: The AERMP is the only Navy program which provides RDT&E engineering support specifically for in-service, out-of-production aircraft equipment. AERMP increases readiness through reliability and maintainability (R&M) and safety improvements to existing systems and equipments installed in Naval aircraft. It provides a cost effective solution to obsolescence problems encountered when service lives are extended, and promotes commonality and standardization across aircraft platform lines and among the services through both extension of application and use of Non-Development Items. AERMP also decreases life cycle costs through reduced operation and support costs. AERMP facilitates the Operational, Safety, and Improvement Program (OSIP) by applying proven, low-risk solutions to current Fleet problems. AERMP also funds high priority flight testing which is not associated with any acquisition or development programs under the Flight Test General (FTG) task.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Concluded S-3 Flight Control System Gyroscope task.
   b. (U) Flight tested prototype improved Common Altimeter Solid State Barometer Altimeter (SSBA)
   c. (U) Conducted helicopter/shi dynamic interface FTG testing and simulation improvement.
   d. (U) Conducted common Heads-Up l play (HUD) Symbology Testing (FTG).
   e. (U) Initiated S-3 Brake R&M impr vement task.

2. (U) FY 1993 PROGRAM:
   a. (U) Conclude Common Altimeter and S-3 Flight Control Bearing R&M improvement tasks.
   b. (U) Perform KC-130 Main landing brake, T-2 spins evaluation, and Formulation airwake analysis under the FTG project.
   c. (U) Continue S-3 Brake Reliability and Maintainability Improvement.
   d. (U) Conclude helicopter/ship dynamic interface simulation improvement.
   e. (U) Initiate common aircraft data device, S-3 Bleed Air selector valve, wiring harness, and anti-collision light R&M improvement tasks.
3. (U) FY 1994 PLANS:
   a. (U) Conclude S-3 Brake R&M improvement tasks.
   b. (U) Initiate standard compass R&M improvement task.
   c. (U) Initiate S-3/E-2 Carrier Aircraft Inertial Navigation System (CAINS) R&M improvement tasks.
   d. (U) Perform high priority FTG tasks as directed.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD, Lakehurst, NJ and Indianapolis, IN. CONTRACTS: Lockheed, Burbank, CA; IS&S, Malvern, PA.

F. (U) RELATED ACTIVITIES: Program Element 0708026F, Producibility, Reliability, Availability and Maintainability (PRAM); a similar USAF program sharing development cost on the Common Altimeter improvement task. A Memorandum of Understanding will facilitate future joint efforts with the PRAM Program.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W1355 PROJECT TITLE: A/C Engine Component Imp Program (CIP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1355	Aircraft Engine Component Improvement Program (CIP)	49,224	62,829	63,854	CONT.	CONT.

B. (U) DESCRIPTION: CIP provides the only source of critical sustaining engineering support for in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants. CIP addresses all safety-of-flight issues (highest priority), corrects service-revealed deficiencies, improves operational readiness (OR) and Reliability and Maintainability (R&M), reduces engine Life Cycle Cost (LCC), maintains specification performance, and conducts testing to qualify engineering changes and verify life limits. Historically, the missions, tactics, and environmental exposure of military aircraft systems keep changing to meet new threats or operational demands, and often results in unforeseen problems which, if not corrected, can cause critical safety/readiness degradation, such as that experienced during DESERT SHIELD/DESERT STORM operations due to sand erosion. In addition, numerous new problems arise through actual use during deployment, production and service. Development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables. Therefore, it is essential to maintain a CIP that can provide an immediate engineering response to these flight-critical problems. CIP starts after engine development and Navy acceptance of the first production engine. CIP continues over the engine's life, gradually decreasing to a minimum level sufficient to keep older inventory operational. CIP addresses usage and life problems not covered by engine warranties or development contracts. CIP is a tri-service program with Foreign Military Sales participation. CIP efforts significantly reduce Operations and Maintenance (O&M) and spares costs, providing an average return on investment of 16 to 1.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted approximately 3,325 ground test hours (3,225 sea level test hours, 100 altitude test hours) and 150 flight test hours to analyze, verify, and approve 206 CIP tasks (186 redesign/ analysis tasks, 20 repair tasks), which will result in $700M LCC savings.

b. (U) F110 Engine (F-14B TOMCAT and F-16N FALCON) - Qualified redesign to eliminate F-14B flight safety problem (afterburner liner burn through) that has occurred 75 times to date and requires recurring fleet inspection at 10-hour intervals.

c. (U) F404 Engine (F/A-18 HORNET) - Validated life limits for several flight critical components. Completed redesign of High Pressure Turbine forward cooling plate to provide enhanced safety, reliability, durability, and increased life capability.

d. (U) F402 Engine (AV-8B HARRIER) - Qualified package of hot section improvements to extend the hot section inspection interval from 500 hours to 750 hours. This will result in 1/3 fewer hot section repairs performed per year. Qualified new software for digital engine control to improve reliability and prevent in-flight aborts.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W1355 PROJECT TITLE: A/C Engine Component Imp Program (CIP)

e. (U) J52 Engine (A-4, A-6) - Developed gearbox drive shaft self-locking nuts to resolve a problem which caused loss of two aircraft. Developed a main fuel pump interstage screen to prevent foreign object damage to drive shafts which has caused loss of fuel flow and aircraft.

f. (U) PROPELLERS - Developed repair procedure for the E-2/C-2 propeller which increases aircraft readiness and reduces maintenance, extending the blade life from 6,000 to 20,000 hours. This is especially critical because the manufacturer will no longer be producing these blades.

2. (U) FY 1993 PROGRAM:

a. (U) Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

b. (U) Effort includes 5,775 ground test hours (5,525 sea level test hours, 250 altitude test hours) and 350 flight test hours to analyze, verify and approve 291 CIP tasks (246 redesign/analysis tasks, 45 repair tasks).

c. (U) Begin CIP effort on the F405 engine for the T-45 aircraft and enhanced performance versions of engines for the F/A-18 and AV-8B aircraft which are entering the inventory for the first time and require increased CIP effort to resolve service-revealed deficiencies.

d. (U) Other major tasks include lead-the-fleet testing on the F402 (AV-8B), F404 (F/A-18), F110 (F-14B) and J52 (A-4/A-6) engines to verify life limits and detect failure modes in advance of fleet operations, and resolving major engine safety problems on the AV-8B, F/A-18, and SH-60 aircraft.

e. (U) T58 Engine (H-2, H-3, H-46) - Qualifying new manifold design to increase engine safety (79 failures and potential uncontained fire/catastrophe mishaps.)

f. (U) T400 Engine (H-1) - Redesigning/improving chip detector to prevent previously undetected catastrophic bearing failures (three to date). Developing UH-1N main drive shaft coupling that addresses higher loads to combining gearbox and corrects field flight safety problem.

g. (U) TF34 Engine (S-3 Viking) - Eliminating silver from the high pressure turbine to eliminate a failure mode with potential flight safety impact. Developing an improved T5 amplifier check/test and depot processing to resolve the number one cause of TF34 aborts.

h. (U) J52 Engine (A-4, A-6) - Redesigning sixth stage compressor stator to prevent further aircraft losses and to eliminate recurring fleet inspections.

3. (U) FY 1994 PLANS:

a. (U) Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

b. (U) Effort will include 5,200 ground test hours (6,000 sea level test hours, 200 altitude test hours) and 375 flight test hours to analyze, verify and approve 300 CIP tasks (240 redesign/analysis tasks, 60 repair tasks).

c. (U) Begin CIP effort on the enhanced performance version of the J52 engine for the EA-6B which is entering the inventory for the first time and will require increased CIP effort to resolve service-revealed deficiencies.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Improvements
PROJECT NUMBER: W1355 PROJECT TITLE: A/C Engine Component Imp Program (CIP)

d. (U) Continue CIP effort on the F405 engine for the T-45 aircraft and enhanced performance versions of engines for the F/A-18 and AV-8B aircraft which entered the inventory in FY 93 and requires increased CIP effort to resolve service-revealed deficiencies, develop cost-effective repairs, and validate operational life limits.

e. (U) F404 Engine (F/A-18) - Complete redesign of high pressure compressor variable geometry lever arms to preclude in-flight failure and possibility of titanium fire.

f. (U) TF34 Engine (S-3) - Complete development of oil system improvements to reduce engine removals by 20 percent (oil system problems are the biggest contributor to TF34's unscheduled maintenance).

g. (U) T64 Engine (H-53) - Complete field service evaluation of tin-coated compressor blades and vanes which will double erosion resistance and enhance operability. This problem was identified during DESERT SHIELD/DESERT STORM.

h. (U) J52 Engine (A-4, A-6) - Complete redesign effort on secondary fuel manifold (failure has caused aircraft loss).

i. (U) PROPELLERS - Complete service evaluation on a modified dome shell/cap seal expected to increase replacement interval from the current requirement of 1,500 hours to 7,500 hours.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Trenton, NJ; and NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Allison Gas Turbine Division, Indianapolis, IN; General Electric Company, Lynn, MA and Evendale, OH; Pratt and Whitney Aircraft Group, West Palm Beach, FL; and Rolls-Royce, Bristol, England.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Acquisition Plan No. AIR-91-06 approved 21 March 1991.

G. (U) RELATED ACTIVITIES: PE 0604268F and 0203752A (Air Force and Army CIP). CIP is a tri-service program which includes cost sharing with commercial and foreign users, where applicable. Each service administers the engine contract for engines they developed with the other services as members, therefore, eliminating unnecessary duplication of effort.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:
- Description: Component Improvement Program for F402 Engines.
- Participants: United Kingdom Ministry of Defence and the United States Navy
- Financial Commitments: USN and the UK each pays 50% on common engine work and 100% for unique work.
- Effective date: 22 October 1969
- DOD funding: Estimated USN F402 CIP funding for FY 94 is $10.3M.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205658N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Science Assistance Program
PROJECT NUMBER: S0834 PROJECT TITLE: Navy Science Assistance Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0834	Navy Science Assistance Program (NSAP)	4,723*	7,464*	6,668	CONT.	CONT.

*Funded under project X0834 in FY-92 & FY-93

B. (U) DESCRIPTION: Provides assistance to the Fleet by on-site support of scientists and engineers from the Navy RDT&E Centers and labs. Program ensures communications between technology producer (Navy RDT&E community) and technology customer (Navy/Marine Corps operating forces). Provide technological support initiatives evolved from user needs and requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1992 Accomplishments (Customer/Producer):
a. (U) NSAP fielded 26 advisors in support of 20 operational commands.
b. (U) Made recommendations for improvement in TFCC man/machine interface enhancements (COMSEVENTHFLT/NCCOSC).
c. (U) Modified AN/WLR-9 Sonar Suite (COMNAVSURFLANT/NUWC).
d.
2. (U) FY 1993 Program:
a. (U) Field 29 advisors in support of 20 operational commands.
b. (U) Demonstrate NEURAL Network for communications and DATA transfer for COMNAVSURFPAC.
c. (U) Demonstrate near vertical incidence HF Ship-to-Shore/Ship-to-Ship communications for COMSECONDFLT.
d. (U) Evaluate Blue-on-Blue/Blue-on-White identification system for COMSECONDFLT.
e. (U) Develop software to show probability of detection for COMINEWARCOM.
f. (U) Apply Sports Medicine technique to expedite SPECWAR personnel injury/rehab improvements for COMNAVSPECWAR.
g. (U) Evaluate Desiccant Dehumidification Wheel technology for at sea based surface ship air craft to reduce corrosion induced maintenance/reliability problems in avionics for CINCLANTFLT.
h. (U) Evaluate cross community ASW operator training and training system enhancements to improve ASW operator performance for COMNAVSURFLANT.
3. (U) FY 1994 PLANS:
a. (U) Field 29 advisors in support of 20 operational commands.
b. (U) Identify science and technology issues based on priority operational readiness deficiencies.
c. (U) Serve as primary science and technology advisors to the operational Navy and Marine Corps commands. Liaison with RDT&E and acquisition communities to better inform these communities of readiness shortfalls.
4. (U) Program to Completion: This is a continuing program.

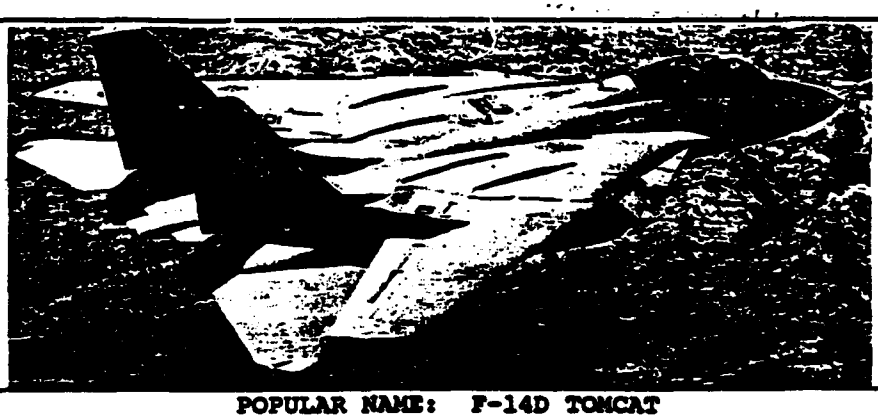
D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENACDIV, Indianapolis, IN; NCCOSC RDT&E DIV, San Diego, CA; NMRC, San Diego, CA; NAVUNSEAWARCENDIV, Newport, RI; Contractor: ARL-UT, Austin, TX.
E. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology.
F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program although major acquisition programs are impacted as fleet customer identifies needs.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: E1408

BUDGET ACTIVITY: 4
PROJECT TITLE: F-14 Upgrade



POPULAR NAME: F-14D TOMCAT

A. SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	III-A3 12/91			
ENGINEERING MILESTONES				
T&E MILESTONES		OTIID 6/93		
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	46.632	35.343	51.484	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	62.270	73.979	17.196	CONT.	CONT.
GFE/ OTHER	6.166	20.742	3.315	CONT.	CONT.
TOTAL	115.068	120.064	71.995	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides for operational improvement of the Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D has increased capability in three major areas: new engine, new digital avionics, and upgraded radar. These changes yield significant improvements in capability and performance, as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Joint Tactical Information Distribution System (JTIDS), Airborne Self-Protection Jammer (ASPJ) and Infrared Search and Track System (IRST). A Pre-deployment Update (PDU) program (primarily software) includes Advanced Medium Range Air-to-Air Missile (AMRAAM), Global Positioning System (GPS), fighter-to-fighter data link, and radar/Electronic Counter-Countermeasures (ECCM) improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implements the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14D weapons integration supports integration of electronic warfare improvements, common mission recorder, correction of OPEVAL deficiencies, incorporation of digital flight controls, and various software upgrades. Beginning in FY 1994, the Block I Strike Upgrade will

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: E1408 PROJECT TITLE: F-14 Upgrade

include the development and integration of weapons and systems to enhance the air-to-ground capability of the F-14A/B/D. The F-14 Block I Strike Upgrade includes a Forward Looking InfraRed/Laser Designator (FLIR/LD), night vision compatible cockpit lighting, improved Defensive Electronic Countermeasures (DECM), full integration of the Global Positioning System (GPS), an improved Heads Up Display (HUD) into the F-14A/B, improved air-to-ground radar modes in the F-14D (software only), and integration of selected air-to-ground weapons (laser guided bombs). The Block I Strike upgrade effort is a new start.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Approval for limited production for final procurement of F-14D Remanufacture aircraft granted in December 1991.
b. (U) Continued PDU hardware/software integration.
c. (U) Continued PDU flight test.
d. (U) Began preliminary design for weapons integration.
e. (U) Conducted IV&V on the first PDU tape.
f. (U) Delivered final 3 FSD longwave IRST systems.
g. (U) Approval for limited production of 40 longwave IRST systems was granted in September 1992.
h. (U) Initiated DT-IIC (TECHEVAL) on longwave IRST systems.
i. (U) Contracted for delivery of Digital Flight Control System hardware and integration support.
j. (U) Continued correction of F-14D OPEVAL deficiencies.

2. (U) FY 1993 PROGRAM:

a. (U) Continue PDU hardware/software integration and testing.
b. (U) Continue PDU flight test.
c. (U) Release first PDU tape.
d. (U) Continue development and test of second PDU tape.
e. (U) Complete DT IIC (TECHEVAL) on Longwave IRST systems.
f. (U) Conduct OT-IID (OPEVAL Phase II) on F-14D concurrent with OT-IIC (OPEVAL) on Longwave IRST systems.
g. (U) Commence testing and integration of the Digital Flight Control System.
h. (U) Begin development of third PDU tape.

3. (U) FY 1994 PLANS:

a. (U) Continue PDU hardware/software integration and testing.
b. (U) Commence DT/OT on second PDU tape.
c. (U) Continue testing and integration of the Digital Flight Control System.
d. (U) Commence flight testing of the Digital Flight Control System.
e. (U) Continue development and test of third PDU tape.
f. (U) Commence Block I Strike Upgrade efforts.

4. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Trenton, NJ; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWPNSTA, Pt Mugu, CA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Indianapolis, IN; NAVAIRWARCENACDIV, Lakehurst, NJ; NADOC, Patuxent River, MD; NADS, Norfolk, VA; NADS, North Island, CA; NTSC, Orlando, FL. CONTRACTORS: Grumman Aerospace Corporation, Long Island, NY; General Electric, Evandale, OH; General Electric, Utica NY; and Hughes Aircraft Company, El Segundo, CA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: E1408 PROJECT TITLE: F-14 Upgrade

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: OTIID (OPEVAL Phase II) on F-14D concurrent with PDU software tape release (F14D01) and OT-IIC (OPEVAL) on Longwave IRST has slipped from October 1992 to June 1993. Consequently DT/OT on the second PDU tape (F14D0Z) has slipped to FY 94.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: OR 05/84; NDCP Updated 12/89; TEMP Updated 06/90.

G. (U) RELATED ACTIVITIES:
PE 0205604N, Tactical Data Links and 0604771D, Joint Tactical Information Distribution System (JTIDS)
PE 0604270N, EW Development
PE 0604314N, Advanced Medium Range Air-to-Air Missiles

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN-LINE 5	175,501	141,116	0	0	4,623,621

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: OT-IID (OPEVAL Phase II) in June 1993.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Operational Reactor Development
PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1303	Operational Reactor Development	60,986	59,274	57,784	CONT.	CONT.

B. (U) DESCRIPTION: The objective is to ensure continued safe nuclear propulsion plant operation and improve the operability of plants. This program designs, develops, and tests improvements to systems and evaluates means to increase component reliability; conducts testing of existing structural materials to resolve emergent defects; develops equipment and methods needed for servicing, inspections and evaluations; and develops methods to reduce component and servicing inspections.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued to develop procedures to improve steam generator inspections and cleanings, and develop, inspection and repair equipment to minimize personnel radiation exposure. Began evaluation of expanding use as an alternate water chemistry for S8G plants to

b. (U) Continued to develop non-destructive examination methods for in-service inspection of propulsion plant components; continued work on

c. (U) Continued to design, develop, and evaluate reactor servicing and refueling techniques and equipment for the first-of-a-kind servicing of LOS ANGELES Class submarines and NIMITZ Class carriers; continued to develop and qualify containers for shipping irradiated fuel and radioactive components.

d. (U) Continued to test prototypes of improved component designs. Continued to resolve concerns about the performance of components such as pressurizers, develop procedures and designs to minimize component and develop simpler, more reliable circuit breakers and control equipment to , and maintenance problems in existing propulsion plants.

e. (U) Continued thermal, hydraulic, and structural testing and analyses to confirm plant operating limits and resolve performance concerns.

f. (U) Continued to design, develop, and test equipment to improve maintainability and accuracy of equipment installed in operating plants. Continued to evaluate alternative methods. Continued to design systems to model plant operations.

2. (U) FY 1993 PROGRAM:

a. (U) Continue for use in S5W and S8G plants. Develop specialized tools needed to maintain steam generators. Enhance inspection and steam generator cleaning equipment. Develop non-destructive testing techniques to increase inspection efficiency.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Operational Reactor Development
PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development

b. (U) Develop improved processes for testing and analyzing performance data and predicting Continue to develop systems to model plant operations.

c. (U) Continue developing methods to confirm propulsion plant operating limits to resolve concerns about the performance of components such as Continue prototypic testing of improved component designs.

d. (U) Continue to design, develop, and test equipment, such as to improve maintainability and accuracy of equipment installed in operating plants.

e. (U) Continue efforts to while minimizing maintenance requirements. Develop/test new solid-state electronic equipment to be installed in existing plants. Develop improved power conditioning and distribution equipment for integration into existing propulsion plants. of applicable equipment.

f. (U) Continue to design, develop and evaluate reactor servicing and refueling methods and equipment for NIMITZ Class carriers; conduct equipment and procedural testing necessary to replace the propulsion plant of LOS ANGELES Class submarines. Test and certify containers for shipping irradiated fuel and radioactive components.

3. (U) FY 1994 PLANS:

a. (U) Continue to develop improved processes for testing and analyzing performance data and predicting Continue to develop systems and computer codes modeling evolutions and continuous operations over life to better understand plant behavior.

b. (U) Test different combinations of materials and water chemistries, such as a chemistry to reduce corrosion of Conduct testing to Design improvements for inspection and steam generator cleaning equipment. Develop non-destructive examination techniques, less dependent on the operator, to increase inspection efficiency and reduce radiation exposure to workers.

c. (U) Continue to design, develop, and test equipment using the latest technology to increase reliability and performance of operational plants.

d. (U) Continue to pursue low maintenance designs and improved methods to limit component and system noise.

Develop improved power conditioning equipment for integration into existing propulsion plants to improve operating efficiency, reliability, and maintainability. Design and develop power converters for operating plants.

e. (U) Continue to design, develop and evaluate reactor servicing and refueling methods and equipment for the first-of-a-kind servicing of NIMITZ Class carriers; test and certify containers for shipping irradiated fuel and radioactive components.

f. (U) Conduct testing of existing structural materials to resolve emergent defects, increase reliability, and ensure continued plant safety. Continue development, prototypic testing, and thermal hydraulic analysis of improved component designs, such as valves and pumps. Continue to conduct tests and develop methods to confirm plant operating limits and resolve concerns about the performance of components.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV BETHESDA MD. CONTRACTORS: Westinghouse Electric Corp., Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Co., Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Operational Reactor Development
PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development

E. (U) COMPARISON WITH FY 1993 AMENDED PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0603570N, Advanced Nuclear Power Systems. There is no duplication of effort.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0048	Communications Terminal Improvement	685	429	808	CONT.	CONT.
C0049	Unit Level Switches[1]	375	319	3,331	CONT.	CONT.
C0065	Marine Corps Unilateral TRI-TAC Test and Evaluation (TTT&E)	461	488	588	CONT.	CONT.
C1931	Communications Ancillary Equipment	2,045	2,922	4,376	CONT.	CONT.
C1975	Digital Communication Terminal Product Improvement Program	879	636	48	CONT.	CONT.
	TOTAL	4,445	4,794	9,151	CONT.	CONT.

1 The Unit Level Switches (ULS) and Communications Control (COMM CON) programs were funded in program element (PE) 0208010M, Joint Tactical Communications Program (TRI-TAC) in FY 1992 and FY 1993.

B. (U) DESCRIPTION: This PE provides for development of the Joint ULS and supporting equipment, as well as Marine Corps ground telecommunications items which are not being developed within the chartered responsibilities of the Joint Tactical Communications Agency. Equipments developed within this program element support the mission area of command and control and switching requirements of the various sub-systems within the Marine Corps Tactical Communications Architecture. The Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD C3I) has designated the Marine Corps as the developing service for the ULS and the ASD provides oversight for the Marine Corps' testing of Joint Tactical C3 program equipments. The ULS project consists of product improvements to the Unit Level Circuit Switch, Unit Level Tactical Data Switch, and peripheral equipment. The COMM CON project involves development in the areas of systems planning and engineering, operational systems control, and technical control required to deploy, operate, and refurbish and retrofit the Marine Corps tactical communications systems. The program also includes support for Marine Joint Tactical Communications Program Testing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications
PROJECT NUMBER: C0048 PROJECT TITLE: Communications Terminal Improvement

C. (U) DESCRIPTION: This project develops enhanced technical software and hardware interoperability for High Frequency (HF), Very High Frequency (VHF) and Ultra High Frequency (UHF) radios.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued development of joint application software for Data Transfer Device (DTD) in support of VHF/UHF radios. Performed Operational Test on AN/TSC-120 HF radio prototypes. Developed software training packages and maintenance manuals for the AN/TSC-120 pre-planned product improvement (P3I) radio. Developed Single Channel Ground Air Radio System (SINCGARS) vehicular installation kits. Developed Manpower and Training Plan for the AN/GRC-171B(V)4 Radio Set. Finalized documentation for the Near Vertical Incidence System (NVIS) antenna adapters. Tested and evaluated cosite mitigation hardware to improve performance of multiple SINCGARS radios that are co-located and operated in the frequency-hopping mode. Tested and evaluated a Survivable Low Profile Antenna to improve blast/shrapnel survivability on armored vehicles.

2. (U) FY 1993 PROGRAM: Continue development of DTD software for support of SINCGARS and UHF Have Quick operations. Continue development of P3I enhancements to AN/TSC-120. Continue development of cosite mitigation hardware solutions to enhance performance of multiple co-located, frequency-hopping SINCGARS radios. Start development of Have Quick Time of Day reception system and NVIS Manpack radio antenna adapter.

3. (U) FY 1994 PLANS: Start certification of UHF tactical satellite upgrade to AN/TSC-120 HF radio. Start development of Manpack HF NVIS antenna. Continue development of cosite mitigation hardware solutions to enhance performance of multiple co-located, frequency-hopping SINCGARS radios. Finalize Have Quick timing system for UHF radios. Test and evaluate man-packable antenna to replace the RC-292 antenna in SINCGARS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; MCTSSA, Camp Pendleton, CA; MESEA, St. Inigoes, MD; ECAC, Annapolis, MD. CONTRACTORS: ITT, Ft Wayne, IN; Hughes Aircraft, Fullerton, CA; General Dynamics, San Diego, CA; Rockwell, El Paso, TX; Magnavox, Ft. Wayne, IN; MITRE, Boston, MA.

E. (U) RELATED ACTIVITIES: PE 0303140N, Information Systems Security Plan, Project X0734, Communications Security R&D.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 50	1,357	0	0	0	1,357
(U) PMC Line 52	30,720	5,170	100	0	35,990
(U) PMC Line 53	0	19,090	0	0	19,090
(U) PMC Line 62	52,398	58,837	46,122	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications
PROJECT NUMBER: C0049 PROJECT TITLE: Unit Level Switches

C. (U) DESCRIPTION: The Unit Level Circuit Switch (ULCS) and Unit Level Tactical Data Switch (ULTDS) provide the backbone of the digital communications architecture within the Marine Corps. This project provides software improvements to support incorporation of ULTDS into the ULCS.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued software improvements to integrate Packet Switch and Circuit Switch software into a single package for each of the ULCS (TTC-42 and SB-3865).

2. (U) FY 1993 PROGRAM:

a. (U) Continue software improvements to integrate Packet Switch and Circuit Switch software into a single package for each of the ULCS.

b. (U) Continue integration of ULTDS and ULCS software packages with emphasis on fully documenting software improvements completed to date.

c. (U) Support Marine Tactical Command and Control System (MTACCS) development with continued maintenance of AN/GYC-7 packet switch engineering design models.

3. (U) FY 1994 PLANS:

a. (U) Develop software improvements to make ULTDS packet switches compatible with the Government Open System Protocol (GOSP) and make other software changes necessary to allow the ULTDS to interoperate with the Integrated Tactical and Strategic Data Network.

b. (U) Continue support of MTACCS development with continued maintenance of AN/GYC-7 packet switch engineering design models.

c. (U) Develop software upgrade to the AN/MSC-63A Tactical Communications Center.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA. CONTRACTORS: Atlantic Research Corporation, Rockville, MD; ITT Aerospace/Defense Communications Division, Nutley, NJ.

F. (U) RELATED ACTIVITIES: PEs: 0208010A and 0208010F, both titled Tri-Service Joint Tactical Communications Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 50	0	0	2,914	0	18,014
(U) PMC Line 55	12,582	7,088	11,956	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications
PROJECT NUMBER: C0065 PROJECT TITLE: MC Unilateral TTT&E

C. (U) DESCRIPTION: The Systems Planning Engineering and Evaluation Device (SPEED) is a combination of hardware and software that together supports the Marine Corps' tactical communications systems planning, engineering, and evaluation process. SPEED also maximizes the utility of tactical communications systems by providing the communicator with a means to evaluate system performance prior to installation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Incorporated the capability to perform Switched Network Automated Planning (SNAP) for the AN/TTC-42 and SB-3865 switches into the SPEED software suite. Three stand-alone DOS based software modules were added to enhance the SPEED software suite. These modules provided the capability to generate; naval messages (MTF Editor), automated Communications-Electronics Operating Intructions and Single Channel Ground Air Radio System (SINCGARS) hopsets/loadsets through the Revised Battlefield Electronic Communications-Electronics Operating Instruction System (REECS); and access the standard Marine Corps bundled software package (ENABLE 4.5).

2. (U) FY 1993 PROGRAM: A Satellite Planning (SATPLAN) module is being developed and will be incorporated in the July software release. A Position Location Reporting System (PLRS) manager module is being developed and is included in the SPEED software suite. Multi-channel radio frequency planning and profiling will be enhanced. The software suite is migrating into the Windows environment and graphical user interface (GUI) to ease operation of the system by providing the same "look and feel" for all the applications.

3. (U) FY 1994 PLANS: Continue the Pre-Planned Product Improvement (P3I) program in accordance with the Project Plan and the Revised Operational Capabilities (ROC). Develop a frequency deconfliction (co-site analysis) module to predict potential interference between/among transmitters located within close proximity. Develop an enhanced High Frequency Communications Planner (HFCP) to better aid the communicator in planning and profiling High Frequency (HF) communications. Develop a radar coverage software module to aid the air defense community in placing radars to achieve maximum effectiveness and efficiency. Address the evolution of SPEED into the functional areas of systems control and network management.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: ECAC, Annapolis, MD; Tobyhanna Army Depot, Tobyhanna, PA. CONTRACTORS: Atlantic Research Corporation, Rockville, MD; Eagle Technology, Orlando, FL; ITAC, Reston, VA.

F. (U) RELATED ACTIVITIES: PEs: 0208010A and 0208010F, both titled Tri-Service Joint Tactical Communications Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	0	1,304	0	0	1,304

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications
PROJECT NUMBER: C1931 PROJECT TITLE: Communications Ancillary Equipment

C. (U) DESCRIPTION: Monitor development of tactical Ultra High Frequency (UHF), Super High Frequency (SHF), and Extremely High Frequency Satellite Communications (SATCOM) terminals. Develop modifications to the AN/TSC-96 SATCOM System to maintain interoperability with Navy SATCOM networks. Evaluate military application of commercial SATCOM. Develop improvements to multi-channel radio systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Designed and built the Engineering Development Model (EDM) for the AN/TSC-96(V). Continued participation with Army on the AN/PSC-3 UHF upgrade. Fielded for evaluation, two LST-8000 SHF terminals. Monitored Army Military Satellite (MILSTAR) development. Procured for emulation, four PSC-3 UHF surrogate satellite relay systems.

2. (U) FY 1993 PROGRAM: Perform test and evaluation on AN/TSC-96A EDM and UHF Surrogate Satellite Relay Systems. Commence participation with Army on AN/PSC-3 Demand Assign Multiple Access (DAMA) replacement for AN/PSC-3. Monitor development of MILSTAR terminals. Evaluate Marine Corps uses of Commercial Satellites. Develop uninterruptable power supply (UPS) for the AN/MRC-142. Develop MRC-142 for Shipboard operations.

3. (U) FY 1994 PLANS: Develop addition of High Speed Fleet Broadcast to AN/TSC-96A(V). Participate with Army on AN/PSC-3 and LST-5C DAMA upgrades. Monitor Army development of MILSTAR terminals. Test and evaluate new applications for fiber optic multi-plexer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NESEC, St. Inigoes, MD; Program Manager, Satellite Communications, Ft. Monmouth, NJ; MARCORSYSCOM, Quantico, VA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) BLI# 50 Manpack Radios and Equipment (AN/VRC-83 and UHF SATCOM)	1,357	0	0	0	1,357
(U) BLI# 50 Manpack Radios and Equipment (MILSTAR and AN/PSC-5)	0	0	0	38,000	38,000
(U) BLI# 54 AN/TSC-96 PIP Fleet Satellite Communication Terminal	0	1,957	1,643	528	4,128
(U) BLI# 63 Modification Kits (Tel) (AN/TSC-85A/93A Modification)	0	380	0	0	1,999
(U) BLI# 52 Vehicle Mounted Radios and Equipment (AN/TRC-170(V3)	11,534	0	0	0	77,296
(U) BLI# 52 Vehicle Mounted Radios and Equipment (AN/MRC-142)	18,956	0	0	0	38,448
(U) MK-2678	0	0	0	0	500
(U) Anti-Jam Control Modem	0	0	0	0	246

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Communications
PROJECT NUMBER: C1975 PROJECT TITLE: Digital Communication Terminal Product Improvement Program

C. (U) DESCRIPTION: Initial development of the Expanded Memory DCT (EMDCT) was completed in FY 1990. The EMDCT is a lightweight, handheld, programmable message processor providing the user with a capability of burst transmitting and receiving formatted and free text messages. This project will develop application programs to meet operational requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed software application programs to support operational requirements of Marine Corps commands.

b. (U) Continued to examine advanced technology for Product Improvement Program (PIP).

c. (U) Reviewed and monitored industry advancements in random access memory (RAM) micro-circuits and screen displays to incorporate into current telecommunications capabilities.

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of software application programs to support operational requirements of Marine Corps commands.

b. (U) Review and monitor industry advancements in RAM micro-circuits and screen displays to incorporate into current telecommunications capabilities.

c. (U) Review, test, and develop plan for implementation of Variable Message Format (VMF) Protocol and messages to meet Office of the Secretary of Defense (OSD) FY 1995 interoperability deadline.

3. (U) FY 1994 PLANS:

a. (U) Continue development of software application programs to support operational requirements of Marine Corps commands.

b. (U) Continue test and develop plan for implementation of VMF Protocol and messages to meet OSD FY 1995 interoperability deadline.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCTSSA, Camp Pendleton, CA; NAVAIRWARCENACDIV, Indianapolis, IN. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 56	0	0	2,914	0	2,914
(U) PMC Line 63	5,172	3,930	3,599	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
B0021	Assault Amphibious Vehicle 7A1[1]	3,988	3,533	0	0	59,935
C0010	Shoulder Launch Assault Weapon (SMAW)	1,677	757	0	0	31,908
C1120	Air Defense Missile System	3,755	3,711	2,098	CONT.	CONT.
C1555	Light Armored Vehicle Program	1,716	1,602	2,706	CONT.	CONT.
C1763	Amphibious Armor System[2]	1,112	501	0	0	7,962
C1901	Ground Weaponry Product Improvement	2,849	6,516	9,315	CONT.	CONT.
C1960	Light Armored Vehicle-Air Defense	12,187	11,820	3,272	0	98,919
C2086	Soldier/Marine Enhancement	12,000	5,729	6,868	CONT.	CONT.
	TOTAL	39,284	34,169	24,259	CONT.	CONT.

1. The AAV7A1 Project terminates at the end of FY 1993. Any new Research and Development (R&D) efforts to maintain current assault amphibian fleet, until AAV7A1 is upgraded or replacement capability is fielded, transfers to Program Element 0603611M, Marine Corps Assault Vehicles, Project B0020, Advanced Amphibious Assault (AAA) Program beginning in FY 1994.

2. FY 1994 through FY 1999 funding transferred to Project C1901, under this program element.

B. (U) DESCRIPTION: This program element provides modification to Marine Corps Expeditionary Ground Force Weapons Systems to increase lethality, range, survivability, and operational effectiveness. It also provides for the block upgrades of the AAV7A1, improvements in command and control in the Air Defense Missile System, product improvements to the family of the Light Armored Vehicles (LAV), and the development effort for the LAV-Air Defense (LAV-AD) variant.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: B0021 PROJECT TITLE: Assault Amphibious Vehicle 7A1

C. (U) DESCRIPTION: The AAV7A1 Product Improvement Program sustains the capability to conduct surface-borne amphibious assaults by improving the present amphibious vehicle in accordance with the approved Required Operational Capabilities document, to extend its effectiveness until a successor vehicle is fully fielded by FY 2010.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed engineering design and fabrication of Improved Transmission and Improved Suspension. Constructed prototype and began testing Advanced Propulsion System.

2. (U) FY 1993 PROGRAM: Award improved suspension contract. Continue testing of the Advanced Propulsion System. Initiate development and testing of modification kits including overboard exhaust, Single Channel Ground Air Radio System radio installations, smoke generation and other kits. All new R&D efforts to maintain current assault amphibian fleet until AAV7A1 is upgraded or replacement capability is fielded. Transfers to Program Element 0603611M, Marine Corps Assault Vehicles, Project B0020, Advanced Amphibious Assault Program beginning in FY 1994.

3. (U) FY 1994 PLANS: Not applicable.

4. (U) FY 1995 PLANS: Not applicable.

5. (U) PROGRAM TO COMPLETION: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: Program Element 0603611M, Marine Corps Assault Vehicles.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	FY 1995 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 202100	15,928	16,610	21,781	22,559	CONT.	CONT.
(U) O&M,MC	3,945	3,972	4,073	4,108	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) The government of Brazil signed two Letters of Acceptance, one on 22 October 1991 for twelve AAV7A1s, the second on 10 June 1992 for two additional AAV7A1s. The estimated total cost is $38 million. This procurement of fourteen AAV7A1s, will result in start-up of a production line in FY 1994.

2. (U) On 14 February 1992, FMC signed a Memorandum of Understanding with Korea for the capture/implementation of two programs:
   a. (U) New production of 83 AAV7A1 vehicles
   b. (U) Upgrade/conversion of 103 AAV7A1 vehicles

3. (U) Korea is looking for a co-production venture to achieve program goals. The United States Government must approve data transfer to Korea and third parties prior to co-production.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C0010 PROJECT TITLE: Assault & Amphibious Vehicle 7A1

C. (U) DESCRIPTION: The SMAW is a lightweight, man-portable assault weapon with a dual-mode round capable of defeating field/urban fortifications and light armored vehicles. The follow-on High Explosive Anti-Armor projectile warhead is presently in Low Rate Initial Production. The launcher is a smooth-bore, fiberglass and epoxy tube equipped with a spotting rifle and optical sight. The Modification 1 launcher effort is a block upgrade that will correct deficiencies and improve reliability and maintainability.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued engineering design and analysis.

b. (U) Fabricated Engineering Development Models.

c. (U) Continued integrated logistics support and safety tasks.

2. (U) FY 1993 PROGRAM:

a. (U) Develop sustainment alternatives.

b. (U) This program completes at the end of FY 1993.

3. (U) FY 1994 PLANS: Not applicable.

4. (U) FY 1995 PLANS: Not applicable.

5. (U) PROGRAM TO COMPLETION: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Radian, Dumfries, VA; and Dupont, Newark, DE.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands) (Procurement, Marine Corps)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	FY 1995 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 220900 Modification Kits (Artillery and Other)	600	5,826	2,079	500	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1120 PROJECT TITLE: Air Defense Missile System (ADMS)

C. (U) DESCRIPTION: The Air Defense Missile System (ADMS) encompasses three sub-element programs which are part of the Integrated Air Defense System for the USMC. (1) The HAWK system is the Marine Corps' Low-to-Medium altitude ground based air defense system. Upgrades include mobility enhancements, expeditionary air defense improvements, and Tactical Ballistic Missile (TBM) defense modifications which are in keeping with the Marine Corps' plan to keep HAWK viable until the year 2010. (2) The Air Defense Communications Platform (ADCP) provides a single-configuration shelter which will be capable of receiving/transmitting data link information to and from various platforms. The ADCP will also serve as an adjunct to the HAWK Battery Command Post (BCP) to provide a TBM defense interface as well as providing cuing information to Air Defense units. (3) The Avenger provides low altitude air defense, day-night, adverse weather, shoot-on-the-move capability with gun/missile mix. Its eight ready-to-fire Stinger missiles and .50 caliber machine gun provide the Marine Air-Ground Task Force (MAGTF) with an enhanced air defense capability beyond the year 2005.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: ADCP System "A" Specification incorporated existing data link technology with developmental improvements. Commenced a software exploration and fabrication of two Engineering Development Models. Completed development of the HAWK Mobility Launcher. Completed testing in April 1992. Milestone III approved during third quarter FY 1992. Upgraded VIDICON tubes to charged coupler device on Tracking Adjunct System (TAS) camera on High Power Illuminator Radar. Initiated the exploration of Identification Friend or Foe (IFF) replacement for HAWK System. Avenger completed amphibious and helicopter certification. Began .50 caliber machine gun integration.

2. (U) FY 1993 PROGRAM: Define TBM defense capability software, interfaces, air picture generation, and correlation for ADCP. HAWK continuing exploration of IFF replacement. Avenger completes laser certification. Complete mount/software redesign for the .50 caliber machine gun.

3. (U) FY 1994 PLANS: ADCP finish TBM defense capable system, perform system test. Continue exploration of IFF replacement and 3-dimensional sensor for HAWK. Engineering change proposal approval of software upgrades in BCP for TBM defense effort. Upgrade Day/Night capability for TAS camera on High Power Illuminator Radar. Avenger completes formal testing of system for MS III. Formal testing of Command, Control, and Communications (C3) data link and Passive Sensor Correlation and Fusion Phase I.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Dahlgren, VA; NISE WEST, Vallejo, CA; MCTSSA, Camp Pendleton, CA; MICOM, Huntsville, AL; CECOM, Ft Monmouth, NJ. CONTRACTORS: Raytheon, Bedford, MA; Northrop, Hawthorne, CA; Boeing, Huntsville, AL; Lockheed/Sanders, Nashua, NH; Magnavox, Ft Wayne, IN; General Electric, Burlington, VT; Paravant, Melbourne, FL.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Ln 44	2,509	23,974	2,182	CONT.	CONT.
(U) PMC Ln 45/46	12,900	28,113	19,201	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1555 PROJECT TITLE: Light Armored Vehicle Program



POPULAR NAME: LAV PIP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				CONT.
ENGINEERING MILESTONES				CONT.
T&E MILESTONES				CONT.
CONTRACT MILESTONES				CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	1,100	CONT.	CONT.
SUPPORT CONTRACT	340	300	359	CONT.	CONT.
IN-HOUSE SUPPORT	1,376	1,302	1,247	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	1,716	1,602	2,706	CONT.	CONT.

B. (U) DESCRIPTION: The family of Light Armored Vehicles (LAVs) consists of six fielded configurations with operational capabilities providing significant enhancement to the mobility and firepower of the Marine Air Ground Task Force. Since the original urgency of need dictated the fielding of essentially off-the-shelf vehicles, this project provides the resources to evaluate, develop, and test designated preplanned product improvements. This program has the single goal of ensuring the maximum reliability/capability for the fielded family of LAVs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1555 PROJECT TITLE: Light Armored Vehicle Program

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Evaluated driver night vision systems.

b. (U) Completed Thermal Sight Phase I Testing.

2. (U) FY 1993 PROGRAM: Conduct basic engineering support/planning for LAV family of vehicles.

3. (U) FY 1994 PLANS:

a. (U) Procure off-the-shelf LAV Armored Personnel Carrier (APC) from Diesel Division of General Motors, Canada.

b. (U) Conduct feasibility analysis of LAV-APC.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Program Manager, LAV, Tank Automotive Command, Warren, MI; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; Marine Corps Logistics Base, Albany, GA; MARCORSYSCOM, Quantico, VA. CONTRACTORS: Diesel Division of General Motors, London, Ontario, Canada.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Ln 34	0	0	6,914	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Continuing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1960 PROJECT TITLE: Light Armored Vehicle-Air Defense



POPULAR NAME: LAV-AD

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				Not Applicable
ENGINEERING MILESTONES				Not Applicable
T&E MILESTONES		DT IIA/OT II	MS III	Not Applicable
CONTRACT MILESTONES				Not Applicable

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	9,657	6,692	2,215	0	70,770
SUPPORT CONTRACT	599	294	100	0	3,146
IN-HOUSE SUPPORT	1,931	4,834	957	0	25,003
GFE/ OTHER	0	0	0	0	0
TOTAL	12,187	11,820	3,272	0	98,919

B. (U) DESCRIPTION: The Light Armored Vehicle-Air Defense (LAV-AD) develops a highly effective mobile air defense system on an LAV chassis to provide air defense for rapidly maneuvering ground combat elements in the Marine Air Ground Task Force. The weapons system consists of three stations: a STINGER Standard Vehicle Missile Launcher with four missiles mounted on the Outboard Station; the GAU-12U 25 millimeter (mm) Gatling Gun mounted on the Centerline Station; and the Multi-function Station which is capable of using several different weapons, currently mounts a second STINGER Standard Vehicle Missile Launcher (SVML) with four STINGER Missiles. The fire control system integrates a ballistic computer, laser range finder, Forward Looking Infrared Radar sight, multi-mode auto-tracker, video display, and optical sights. The system will have fire-on-the-move day/night capability and be capable of engaging ground targets. A vehicle navigation system is also provided.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted a Validation Test to confirm corrections of key Developmental Test II (DT II) disclosed deficiencies.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1960 PROJECT TITLE: Light Armored Vehicle-Air Defense

b. (U) Selected General Electric (GE), Burlington, Vermont, as the contractor to complete the development phase and production phase.

c. (U) Upgraded SVMLs to use STINGER missiles.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver contractor updated prototypes.

b. (U) Conduct DT IIA/Operational Test II.

c. (U) Prepare Milestone III documentation.

3. (U) FY 1994 PLANS:

a. (U) Conduct Physical Teardown and Logistics Demonstration.

b. (U) Achieve Milestone III decision.

c. (U) This program completes at the end of FY 1994.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: Program Manager, LAV, Tank Automotive Command, Warren, MI; NAVSURFWARCENDIV, Dahlgren, VA; Test and Evaluation Command, Aberdeen, MD; Marine Corps Combat Development Command, Quantico, VA; Marine Corps Logistics Base, Albany, GA; NAVAIRWARCENWPNDIV, China Lake. CONTRACTORS: (main weapon system and total system responsibility) General Electric, Burlington, VT; (chassis) Diesel Division of General Motors, London, Ontario, Canada.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Preparing Milestone III documentation in accordance with the Department of Defense 5000 series.

G. (U) RELATED ACTIVITIES: Project C1120, Air Defense Missile System under this PE.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 35	0	10,000	65,525	0	75,525

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Currently participating in Combined Developmental Test IIA/Operational Test. Achieve Milestone III decision.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1901 PROJECT TITLE: Ground Weaponry Product Improvement

C. (U) DESCRIPTION: This project develops joint and Marine Corps unique improvements to infantry weapons/artillery technology, and monitors national/international weapons developments. Beginning in FY 1994 funding for Marine Corps unique amphibious armor improvements for the M1A1 Main Battle Tank (MBT) and support systems is incorporated from the Amphibious Armor Systems (AAS) Program, Project C1763 under this program element.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed Special Applications Sniper Rifle. Initiated 7.62 millimeter (mm) Designated Marksman Weapons (DMW) and Lightweight Marine Laser Designator Rangefinder (LMLDR) Program. Continued Frangible Ammunition, improvements to M249 Squad Automatic Weapon, M240 Machine Gun, Improved Heavy machine gun Mount, joint Thermal Imaging System program, joint 25mm advanced multi-purpose (AMP) ammunition program, and Close Quarters Battle Weapon (CQBW)/ammunition development. Evaluated artillery technology. AAS: Continued Forward Observer/Forward Air Controller (FO/FAC) radio suite integration.

2. (U) FY 1993 PROGRAM: Continue modification kits for Infantry Weapons, Sniper Team Support Weapon (STSW, formerly 7.62mm DMW), thermal program, Frangible Ammunition, CQBW/ammunition developments, and LMLDR concept evaluation. Evaluate .50 caliber ammunition in use with the Special Application Scoped Rifle (SASR). Evaluate artillery technology including software development for Back Up Computer (BUCS) and users trial for Gun Laying and Positioning System (GLPS). Evaluate joint 25mm AMP ammunition. Complete FO/FAC integration.

3. (U) FY 1994 PLANS: Continue modification kits for infantry weapons, STSW M40A1 Sniper Rifle Improvements, CQBW/ammunition. Begin Joint Combat Shotgun, Enhanced Infantry Rifle Program and CQBW investigation. Type Classify and complete 5.56mm Frangible Ammunition program. Conduct LMLDR industry study, GLPS market Investigation, and validation testing for BUCS and continue artillery technology evaluation. Complete joint 25mm AMP ammunition program. AAS: Initiate Position-Navigation (POS/NAV) integration program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Dahlgren, VA; ARDEC, Dover, NJ; NVEOL, Ft. Belvoir, VA; NAVAIRWARCENWPNDIV, China Lake, CA; MARCORSYSCOM and MCCDC, Quantico, VA; Army Missile Command, Redstone Arsenal, AL; Los Alamos National Laboratories, Los Alamos, NM; TECOM, Aberdeen Proving Grounds, Aberdeen, MD. CONTRACTORS: General Dynamic Land Systems, Warren, MI; Radian, Dumfries, VA; Olin Ordnance, Marion, IL; and Strategic Financial Planning Systems (SFPS), Reston, VA. Other contractors to be determined.

F. (U) RELATED ACTIVITIES: All ground weapons and ground ammunition systems: Army, Navy, Air Force, Coast Guard, and Commander in Chief, Special Operations Command. Program Element 0203735A, Project Number D330.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 43	5,185	0	0	0	22,121
(U) PMC Line 39	51	5,826	2,001	CONT.	CONT.
(U) PMC Line 36	1,500	1,150	963	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C2086 PROJECT TITLE: Soldier/Marine Enhancement

C. (U) DESCRIPTION: The Marine Enhancement Program (MEP) is a Congressionally funded program started in FY 1990 which provides Research, Development, Test and Evaluation funding for low visibility, low cost items. It focuses on items of equipment which will benefit the individual Marine by: reducing the load, increasing survivability, enhancing safety and improving combat effectiveness. The emphasis of the program in on non-developmental/commercially available items which can be quickly evaluated and fielded. FY 1994 and beyond funding is budgeted by the MARCORSYSCOM. This program is coordinated with the Army's Soldier Enhancement Program and the Special Operations Command.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Since the beginning of the program, over 90 items of equipment have been evaluated under MEP from 6 different Program Management areas within the MARCORSYSCOM.

b. (U) Areas of interest include combat service support, intelligence, ground weapons, ammunition, obstacle breaching, communications and navigation systems.

2. (U) FY 1993 PROGRAM: 33 equipment items, to include combat service support, raids, reconnaissance, rifleman's breaching munition, 81 millimeter infrared mortar, communications, navigation and medical equipments are currently being investigated.

3. (U) FY 1994 PLANS: Continue to examine future non-developmental item technologies that show promise for rapid fielding in the areas of weapons, communications, navigation, obstacle breaching, individual clothing, amphibious raiding, special operations, ground reconnaissance, counter-narcotics, and ammunition.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; Naval Civil Engineering Laboratory, Port Hueneme, CA; MCB CAMPEN, Camp Pendleton, CA; MCCDC, Quantico, VA; MCRD, San Diego, CA; US Army Natick Laboratories, Natick, MA; NAVAIRWARCENACDIV, Warminster, PA; NESEC, San Diego, CA; APG, Aberdeen, MD. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 0604713A, Army, Soldier Enhancement Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line.96	206	208	208	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0076	Combat Service Support Product Improvement Program	632	408	7,103	CONT.	CONT.
C0079	Combat Clothing and Equipment[1]	604	240	95	CONT.	CONT.
C0085	Amphibious Reconnaisance Equipment	580	120	2,458	CONT.	CONT.
	TOTAL	1,816	768	9,656	CONT.	CONT.

1 The Combat Clothing and Equipment (CC&E) program previously funded in Program Element 0604717M, Marine Corps Combat Services Support.

B. (U) DESCRIPTION: This program element provides funding for Marine Air Ground Task Force requirements for combat service support equipment improvements and completes the developmental portion of field feeding systems and completes Research and Development efforts for fielding medical equipment. It also provides for evaluation of non-developmental items to support Marine Corps amphibious raid reconnaissance and special operations in low intensity conflicts in all climatic environments, as well as, improvements in Tactical Fuel Systems equipment, utilities systems items, and bridging.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support
PROJECT NUMBER: C0076 PROJECT TITLE: Combat Service Support Product Improvement Program

C. (U) DESCRIPTION: This project includes improvements for all areas of motor transport which will increase mobility, maintainability and reliability.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed testing of the air starter system in the Logistics Vehicle System (LVS). Initiated development/testing of the Contact Maintenance Vehicle and new suspension system for the LVS. Initiated development of new wrecker for the LVS. Completed integration and proof-of-concept testing jointly with Army lead for the Medium Tactical Vehicle Replacement (MTVR) Program. Completed the operational testing for a retrofitable Central Tire Inflation System (CTIS) in the Medium Truck Fleet. Tested CTIS of the High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), chassis mounted cranes for the 5-Ton, and various weapons platforms for the HMMWV and 5-Ton vehicles. Performed Developmental Test/Operational Test (DT/OT) on new 5-ton suspension system. Initiated testing of the vehicle track system for trailers, the Light Armored Vehicle (LAV) tire and rim on the HMMWV, and the six inch Light Weight (LW) Hose and packaging efforts. Procured prototype universal pre-treatment units for DT II.

2. (U) FY 1993 PROGRAM: Continue MTVR Advanced Technology Transition Demonstrator (ATTD) development/testing. This is an acquisition Phase O (Concept Exploration and Demonstration) joint service effort with the Army in order to identify a suitable replacement vehicle for the current Marine Corps Medium truck. Complete LVS stability testing. Complete Medium Truck CTIS evaluation. Complete evaluation/testing of LAV tire and CTIS for the HMMWV.

3. (U) FY 1994 PLANS: Continue MTVR effort into Acquisition Phase I (Demonstration/Validation) after Post Milestone I scheduled for fourth quarter FY 1993. Award contracts for production/testing of prototype vehicles, in joint effort with the Army. Initiate LVS MK-18 trailer - flat rack compatibility evaluation, LVS lifting device evaluations, and LVS (MK-15) wrecker product improvement testing. Continue HMMWV mobile contact team maintenance shelter evaluation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVCIVENGRLAB, Port Hueneme, CA; APG, Aberdeen, MD. CONTRACTORS: National Automotive Test Center, Carson City, NV; AAI Corporation, Cockeysville, MD; Teledyne, Muskegon, MI; Chrysler, Detroit, MI; Cummins Military Systems, Columbus, IN; Eaton Corporation, Kalamazoo, MI; Caterpillar Corporation, Peoria, IL.

F. (U) RELATED ACTIVITIES: Family of Medium Tactical Vehicles (Army) 0604604-H-07.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support
PROJECT NUMBER: C0079 PROJECT TITLE: Combat Clothing and Equipment

C. (U) DESCRIPTION: This program completes the developmental portion of field feeding systems and completes Research and Development (R&D) efforts for fielding medical equipment. Authorized Medical/Dental Allowance Lists (AMAL) Reviews are conducted on a 6 year cycle to review all 25 AMALs. This program keeps pace with the rapid changes in medical technology as applied to the combat field environment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Initiated development of prototype for the Multi-purpose Helmet (MPH). Environmental chamber testing, for the Navy Submarine Medical Research Laboratory (NSMRL), conducted for candidate equipment items for the Marine Corps Field Clinical Laboratory. Provided technical review at 3 major AMAL Reviews which covered the functional areas of: Laboratory; Blood Bank; Shock Surgical Team/Triage; Battalion Aid Station; Preventive Medicine; Operating Room; Acute Care Ward; and Mission Geographic Related Supplement. Delivered non-developmental item (NDI) Tactical Soft Shelters (TSS) for Field User Evaluation during Ocean Venture 1992. Provided technical and engineering support for the Tray Ration Heating System (TRHS) production units and reviewed, prepared, and revised product drawings.

2. (U) FY 1993 PROGRAM: Test and evaluate prototypes of the MPH. Perform NDI field evaluation on X-Ray machines, suction machines, pulse oximeters, and laboratory equipment. Serve as technical sponsor for AMAL Reviews involving the functional areas of Pharmacy, X-Ray, and Dental. Complete R&D efforts required for developmental test fielding of the TRHS. Continue test and evaluation of NDI TSS. Evaluate next generation of NDI camouflage screening.

3. (U) FY 1994 PLANS: Test and evaluate prototypes of the MPH. Perform AMAL Reviews on Laboratory and Blood Bank. Continue Field User Evaluation. Continue test and evaluation of NDI TSS. Begin test and continue evaluation of next generation of NDI camouflage screening.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; TECOM, Aberdeen, MD; MCOTEA, Quantico, VA; Army Troop Command Natick Research, Development and Evaluation Center, Natick, MA; NSMRL, Groton, CT; and the Medical Battalions and Medical Logistic Companies of the First, Second, Third and Fourth Force Service Support Group in Camp Pendleton, CA; Camp Lejeune, NC; Okinawa, Japan; and New Orleans, LA respectively. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	TRHS	0	0	0	5,833	5,833
(U) PMC Ln 105	Field Medical Equipment	0	0	3,454	8,438	11,892
(U) PMC Ln 107	Shelter Family	7,992	411	0	0	8,403

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support
PROJECT NUMBER: C0085 PROJECT TITLE: Amphibious Reconnaissance Equipment

C. (U) DESCRIPTION: This project provides the evaluation of Non-developmental Items (NDI) to support Marine Corps unique amphibious raid, ground reconnaissance, special operations and counter-narcotic/counter drug efforts during low and mid intensity conflicts in all environments. Principal requirements are for: Reconnaissance Patrolling, Insertion and Extraction Equipment; Diving Equipment Enhancement Program (DEEP); Airborne Capability Enhancement (ACE); Direct Action Equipment Enhancement (DAEE); Radio Reconnaissance Equipment (RREP) improvements; and the Light Strike Vehicle (LSV). Small boat programs are being pursued to standardize and improve Marine Corps capability in over-the-horizon raids and reconnaissance and riverine warfare. These include the Riverine Assault Craft, Combat Rubber Reconnaissance Craft with Pump Jet, and Improved Rigid Raid Craft (IRRC). These requirements enhance mission capability by reducing weight, eliminating equipment redundancies, ensuring compatibility of individual equipment items and increasing the utility of equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Initiated program to pursue NDI solutions for RREP requirements.
   b. (U) Continued evaluation of the IRRC.

2. (U) FY 1993 PROGRAM:
   a. (U) Continue evaluation of NDI items to satisfy remaining DEEP, R-PIE, ACE, LSV, and DAEE requirements.
   b. (U) Conduct Field User Evaluation of RREP items.
   c. (U) Continue evaluation of the IRRC.

3. (U) FY 1994 PLANS:
   a. (U) Initiate source selection and evaluation of LSV candidates.
   b. (U) LSV initiates non-developmental item testing.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; Naval Electronics Systems Engineering Activity, St. Inigoes, MD; NADEC, US ARMY, Nadec, MA; Lexington Army Depot, Lexington, PA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 653400 Amphibious Raid Equipment	616	5,536	1,803	CONT.	CONT.
(U) PMC Line 669200 Drug Interdiction	10,583	0	0	0	10,583

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0062	Intelligence Analysis System	4,878	4,885	5,975	CONT.	CONT.
C1296	Joint Service Imagery Processing System	14,374	9,051	8,708	6,673	103,902
C1297	Tactical Remote Sensor System	1,186	3,274	1,911	CONT.	CONT.
C1463	Counterintelligence and Security Equipment[1]	351	766	246	CONT.	CONT.
C1928	Tactical Electronic Reconnaissance Processing and Evaluation System	5,976	7,358	5,932	CONT.	CONT.
	TOTAL	26,765	25,334	22,772	CONT.	CONT.

1 The Counterintelligence and Security Equipment (CI&SE) program previously funded in Program Element 0604718M.

B. (U) DESCRIPTION: This program element funds the operational systems development of Marine Corps intelligence equipment that will complement current and future sensors and will provide systems for data evaluations required to support the operating forces into the next century. The CI&SE program funds purchasing and user evaluation of non-developmental item counterintelligence equipment and product improvement of the Counter-intelligence Communication System. The Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) provides an Electronic Intelligence fusion capability for the Marine Air Ground Intelligence System.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C0062 PROJECT TITLE: Intelligence Analysis System

C. (U) DESCRIPTION: The Intelligence Analysis System (IAS) program uses an evolutionary acquisition strategy and non-development item hardware and software to product improve the AN/TYQ-19 Intelligence Analysis Center (IAC), a fielded Marine Expeditionary Force (MEF) asset. The program will fulfill field requirements to provide automated intelligence capabilities to all echelons below the MEF level. It will also provide for an end-of-service-life replacement for the existing IAC. The program consists of overlapping sequential block upgrades. This will enable intelligence analysts to rapidly process and disseminate battlefield intelligence to all commanders of the Marine Air Ground Task Force (MAGTF) across the entire spectrum of conflict.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed Developmental Test (DT) of software.
b. (U) Identified prototype Secondary Imagery Dissemination Capability for evaluation.

2. (U) FY 1993 PROGRAM:
a. (U) Complete integration of National Data Bases.
b. (U) Integrate and test Defense Intelligence Agency (DIA) Collection Management Software.
c. (U) Identify other government or commercial software packages which will increase the functionality of the IAS.
d. (U) Design and test the interfaces between the IAS and the evolving systems of the Marine Tactical Command and Control System (MTACCS).
e. (U) Develop prototype of High Mobility Multi-purpose Wheeled Vehicle (HMMWV) shelter IAS for the MEF.
f. (U) Initiate Trojan Special Purpose Integrated Remote Intellignece Terminal (SPIRIT) II.

3. (U) FY 1994 PLANS:
a. (U) Complete design and initiate DT of HMMWV IAS.
b. (U) Initiate design of single workstation IAS software.
c. (U) Incorporate Multi-level security into the IAS.
d. (U) Conduct Operational Test (OT) of fielded IAS segments with other systems of MTACCS being fielded and with the digital communications backbone.
e. (U) Complete TROJAN Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) II integration with command, control, communications, computer, and intelligence systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Crane, IN; MCTSSA, Camp Pendleton, CA; TERPES Software Support Activity, Point Mugu, CA. CONTRACTORS: Atlantic Research Corporation, Dumfries, VA; Columbia Research Corporation, Dumfries, VA.

E. (U) RELATED ACTIVITIES: DIA Program Element: 0301301L (Department of Defense Intelligence System/Military Intelligence Integrated Data System/ Integrated Data Base I and II). Navy Tactical Flag Communication and Control System. Marine Corps Program Elements: 0206626M (Marine Common Operation Software System, Marine Corps Common Hardware System, and MTACCS); 0206625M (TERPES and Topographical Survey Equipment); and 0206313M (TRC-170 and Unit Level Switches).

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	4,021	5,396	15,330	27,555	52,569

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing System



POPULAR NAME: JSIPS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS III JUNE	NOT APPLICABLE
ENGINEERING MILESTONES			EDM	NOT APPLICABLE
T&E MILESTONES		DT&E MOT&E	MOT&E	NOT APPLICABLE
CONTRACT MILESTONES				2ND QTR FY 95 PMC CONTRACT

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	14,374	9,051	8,708	6,673	70,766
SUPPORT CONTRACT					
IN-HOUSE SUPPORT					
GFE/ OTHER					
TOTAL	14,374	9,051	8,708	6,673	70,766

B. (U) DESCRIPTION: The Joint Service Imagery Processing System (JSIPS) mission is to acquire and exploit multi-sensor digital imagery in near-real time from national, theater, and tactical platforms, in a softcopy format. JSIPS is not designed to counter a specific enemy threat. The JSIPS will replace the current Imagery Interpretation and Imagery Processing Sub-systems of the Marine Air Ground Intelligence System which only have the capability of analyzing visible spectrum hardcopy. The softcopy imagery, linked, digital data, exploitation capability of the JSIPS becomes a critical requirement with the replacement of the RF-4B aircraft with the F/A-18D reconnaissance aircraft and the mid-range Unmanned Aerial Vehicle (UAV).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) JSIPS passed Defense Intelligence Agencies Security Accreditation during the first quarter of FY 1992.

b. (U) JSIPS completed Environmental and Mobility testing at Aberdeen Proving Grounds during the first quarter of FY 1992.

c. (U) Shipped ten foot Engineering Development Model (EDM) to Eglin Air Force Base, Florida, for Developmental Testing and Evaluation (DT&E).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing System

2. (U) FY 1993 PROGRAM:

a. (U) Deliver Marine Corps ten foot shelter National Input Segment during the first quarter of FY 1993.
b. (U) Complete DT&E during the third quarter of FY 1993.
c. (U) Deliver Marine Corps ten foot Hardcopy Exploitation Shelter during the fourth quarter of FY 1993 and start Multi-Service Operational Testing and Evaluation (MOT&E).

3. (U) FY 1994 PLANS:
a. (U) Complete MOT&E and achieve Milestone III decision during the third quarter of FY 1994.
b. (U) Upgrade JSIPS software for Computer Aided Tactical Information System/Requirements Management System changes.
c. (U) Deliver EDM of downsized National Input Segment of JSIPS.
d. (U) Upgrade JSIPS software for softcopy Mapping, Charting and Geodesy capability.

4. (U) PROGRAM TO COMPLETION: Add Automated Target Recognition capability. This program is planned to complete at the end of FY 1996.

D. (U) WORK PERFORMED BY: IN-HOUSE: Electronic Systems Division, Hanscom Air Force Base, Hanscom, MA. CONTRACTORS: E-Systems, Garland, TX; GTE/Contel, West Lake Village, CA; PARAMAX, Salt Lake City, UT; CALSPAN, Alexandria, VA; AUTOMETRIC, Alexandria, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Milestone III has slipped 6 months due to problems involved with parallel development programs. The interface to the Tactical Input Segment is driven by the completion of the Advanced Tactical Airborne System Interface Control Document. Milestone III is now scheduled for the third quarter of FY 1994.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: This program has all required documentation associated with a Milestone II Program. These documents include: Integrated Program Summary, Acquisition Program Baseline, Independent Cost Estimate, Cost and Operational Effectiveness Analysis, Joint Operational Requirements Document, System Threat Assessment Report, Test and Evaluation Master Plan, Manpower Estimate Report, etc.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TESTING AND EVALUATION:

1. (U) Developmental Test I and II	FY 1990 - FY 1993
2. (U) Operational Testing I	FY 1993 - FY 1994

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1297 PROJECT TITLE: Tactical Remote Sensor System

C. (U) DESCRIPTION: The Tactical Remote Sensor System (TRSS) program develops replacement equipment and documentation for reprocurement of 1972 inventory items. The system is a remote unattended ground sensor set capable of detecting and providing essen-tial intelligence to the Marine Air Ground Intelligence System during tactical pre-assault, assault, post assault operations, and over-the-horizon assaults.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Performed initial Operational Capability of initial suite of basic sensors, monitors, and relays.
b. (U) Began development of Airborne Relay.
c. (U) Continued development of night capable discrimination classification device (Day/Night Imager).
d. (U) Continued development of Air Delivered Relay Unit (ADRU).
e. (U) Began certification of the Air Delivered Seismic Intrusion Detector (ADSID) on the AV-8B aircraft.
f. (U) Continued Integrated Logistics Support (ILS) documentation.

2. (U) FY 1993 PROGRAM:
a. (U) Complete development of Day/Night Imager.
b. (U) Begin air certification of the ADRU.
c. (U) Continue ILS documentation.
d. (U) Perform developmental upgrades to identified deficiencies in software.
e. (U) Complete air certification of ADSID.

3. (U) FY 1994 PLANS:
a. (U) Initiate development of Nuclear Weapons Detection Sensor.
b. (U) Initiate development of Airfield Activity Sensor.
c. (U) Certify the ADSID on the short range Unmanned Aerial Vehicle. d. (U) Complete air certification of the ADRU.
e. (U) Continue ILS documentation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN and NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: MiTech Incorporated, Quantico, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	17,052	17,934	25,037	CONT.	CONT.
(U) Counter Narcotics	5,325	0	0	0	5,325

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1463 PROJECT TITLE: Counterintelligence and Security Equipment

C. (U) DESCRIPTION: This project funds purchasing and user evaluation of non-developmental item (NDI) counterintelligence equipment and product improvement of the Counterintelligence Communication System (CCS). A continuing requirement exists to improve Marine Corps equipment which supports tactical counterintelligence special operations, human intelligence collection activities, and Technical Surveillance Countermeasures (TSCM).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Supported Navy Aviation Test Center systems design improvement.
   b. (U) Conducted lithium battery aircraft certification test.
   c. (U) Performed design analysis on improvements to CCS antenna.
   d. (U) Evaluated thermal imager for TSCM.

2. (U) FY 1993 PROGRAM:
   a. (U) Conduct and complete Developmental Test/Operational Test and Evaluation (DT/OT&E) of hardware-firmware for two-way communication in the CCS.
   b. (U) Test, integrate, and continue other antenna improvements.
   c. (U) Continue DT/OT&E of NDI hardware for TSCM equipment suite improvement.

3. (U) FY 1994 PLANS:
   a. (U) Complete CCS antenna improvements and support deployment of new CCS.
   b. (U) Continue research and development efforts with National TSCM community to identify state of the art additions to TSCM suite.
   c. (U) Complete Follow On Test and Evaluation of improved CCS antennas.
   d. (U) Support deployment of improved CCS system.
   e. (U) Conduct DT/OT of NDI, state of the art, portable, secure communications equipment needed to improve current suite.
   f. (U) Conduct DT/OT of Automated Data Processing Equipment hardware and software to support Counter Intelligence, Counter Intelligence Database compatibility with Intelligence Analysis System.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: (CCS) NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	410	0	0	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1928 PROJECT TITLE: Tactical Electronic Reconnaissance Processing and Evaluation System

C. (U) DESCRIPTION: Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) is designed to process, sort, analyze, display, and correlate digital Electronic Support Measures and Electronic Countermeasures data collected by the Marine Corps EA-6B aircraft. A tactical air intelligence database is maintained and electronic intelligence analysis support is provided to the Aviation Combat Element and the Command Element of a Marine Air Ground Task Force.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed testing and integration of communication software which allows General Service communications.
b. (U) Completed testing and integration of the EA-6B aircraft data link with TERPES.
c. (U) Completed integration of the Military Intelligence Integrated Data System/ Integrated Data Base in an open systems/X-windows environment. d. (U) Began fielding upgraded TERPES to the operational units.

2. (U) FY 1993 PROGRAM:
a. (U) Begin integration with the Tactical Information Broadcast Service.

b. (U) Begin testing and integration with the Advanced Tactical Air Command Central (ATACC) data link system and incorporating the Marine Tactical System format.
c. (U) Begin testing of Multi-Level security (MLS) and development of a System High capability.
d. (U) Begin development of a TERPES/Tactical Aircraft Mission Planning System (TAMPS)/Tactical EA-6B Aircraft Mission Support (TEAMS) automated interface.

3. (U) FY 1994 PLANS:
a. (U) Continue development of MLS and full Department of Defense Intelligence Information System compatibility.
b. (U) Continue integration and testing with the ATACC data link system.

c. (U) Continue development of the TERPES/TAMPS/TEAMS automated interface.
d. (U) Begin integration with Secondary Imagery Processing National Imagery Transmission Format products.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Point Mugu, CA. CONTRACTORS: Lockheed, Austin, TX; TRW, Fairfax, VA; ETA Technologies, Stafford, VA; Vitro Corporation, Oxnard, CA.

F. (U) RELATED ACTIVITIES: Project C0062, Intelligence Analysis System, and Project C1297, Tactical Remote Sensor System under this program element.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	1,292	241	5,940	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0045	Tactical Systems Inter/Intraoperability Program	4,407	2,886	3,559	CONT.	CONT.
C0103	Marine Air Command and Control Systems Operational Development	676	500	4,857	CONT.	CONT.
C1067	Aviation Radar Product Improvement Program	3,998	0	3,952	CONT.	CONT.
C1079	Joint Interoperability of Tactical Command and Control Systems[1]	3,695	944	1,361	CONT.	CONT.
C1443	Training Devices/Simulators (Engineering) Program	2,845	2,310	2,479	CONT.	CONT.
C2035	Position Location Reporting System/NAVSTAR/Global Positioning System	1,957	3,415	3,466	1,644	15,881
C2102	Improved Direct Air Support Center	1,188	955	1,453	CONT.	CONT.
C2122	Tactical Combat Operations	5,711	2,700	7,964	CONT.	CONT.
C2150	Marine Tactical Auto C2 System	0	0	7,644	CONT.	CONT.
	TOTAL	24,477	13,710	36,735	CONT.	CONT.

1 The Joint Interoperability of Tactical Command and Control Systems (JINTACCS) previously funded in 0604780M, Joint Interoperability of Tactical Command and Control Systems (JINTACCS) in FY 1992 and FY 1993.

B. (U) DESCRIPTION: This program element (PE) provides funding to ensure the inter/intraoperability of tactical command, control, communications, computers, and intelligence (C4I) systems required by the Marine Corps and the Department of Defense.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C0045 PROJECT TITLE: Tactical Systems Inter/ Intraoperability Program

C. (U) DESCRIPTION: This program ensures the inter/intraoperability of tactical C4I systems to the extent required by the Marine Corps and the Department of Defense.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued with the development and maintenance of the Interoperability Database System (IDBS). Continued systems engineering support/configuration management for the maintenance/update of the Marine Tactical Systems (MTS) Technical Interface Design Plan (TIDP), Marine Corps Tactical Communications Architecture (MCTCA) (near term and mid-term), the Marine Air Ground Task Force Interoperability Requirements Concepts (MIRC), and military telecommunications standards. Continued the development of the MTS Interoperability Test System (MITS) and assisted the Advanced Tactical Air Command Central Operational Testing and Evaluation. Completed the interface definition between the Army Maneuver Control System and the Tactical Combat Operations.

2. (U) FY 1993 PROGRAM: Continue with the maintenance of the IDBS and begin a transition to a new hardware/software suite. Proceed with revisions to the MIRC, MTS TIDP, and the MCTCA. Continue systems engineering services support, the development of military telecommunications standards, the (North Atlantic Treaty Organization (NATO) working groups, the Department of Defense working/steering groups, and the Marine Corps telecommunications modelling. Continue to develop MITS and begin interoperability testing and certification of Marine Corps Cost Effective and Integrated Tactical C4I systems for MTS TIDP compliance.

3. (U) FY 1994 PLANS: Maintain/update the existing IDBS and continue the transition to a new hardware/software platform. Continue systems engineering support/configuration management for the maintenance/update of the MTS TIDP, MCTCA, MIRC, and military telecommunications standards. Continue systems engineering services support, the development of military tele-communications standards, the NATO working group, the Department of Defense working/steering groups, and Marine Corps telecommunications modelling. Continue interoperability testing and certification of Marine Corps C4I.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA. CONTRACTORS: LOGICON-Eagle Technology Incorporated, Dumfries, VA; NSR Corporation, Colorado Springs, CO.

F. (U) RELATED ACTIVITIES: Marine Corps Tactical C4I systems.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C0103 PROJECT TITLE: Marine Air Command and Control Systems Operational Development

C. (U) DESCRIPTION: This project supports improvement of operational Air Command and Control Systems for Marine Corps and provides for Joint/Allied interoperability and compatibility.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed development of KG-84 Cryptographic capability modification to the AN/TYQ-3A Tactical Data Communications Central.

b. (U) Fielded Version 5 of AN/TYQ-3A Software.

c. (U) Sustained low level of effort planning modifications resulting from late delivery of Tactical Air Operations Modules (TAOM).

2. (U) FY 1993 PROGRAM: Continue to correct interoperability problems in fielded systems which arise with users of the TAOM and performance envelope deficiencies identified when the TAOM undergoes joint testing.

3. (U) FY 1994 PLANS:

a. (U) Begin and complete Marine Corps Tactical System message implementation upgrade.

b. (U) Develop communications system integration.

c. (U) Redesign Operator Console Unit power supply and complete in September 1994.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; NESEC, Vallejo, CA. CONTRACTORS: Litton, Van Nuys, CA.

F. (U) RELATED ACTIVITIES: Air Force Modular Control Equipment and New Mobile Radar Approach Control.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 64	27,000	0	2,550	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C1067 PROJECT TITLE: Aviation Radar Product Improvement Program

C. (U) DESCRIPTION: This project funds modifications in response to field identified discrepancies for existing radars. The modifications include electronic counter countermeasures, reliability improvements, and new threat enhancements. Multi-spectral Sensor Suite (MSSS) is a suite of active and passive ground based long range surveillance sensors to detect aircraft and missiles.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed verification of AN/TPS-59 Low Radar Cross Section (LRCS) capabilities and awarded contract.

b. (U) Developed specification for full scale development of a Modification Kit.

c. (U) Continued reliability improvement study and analyses.

d. (U) MSSS-1: Continued improvement of system software/hardware.

e. (U) MSSS-2: Selected system and began development of an Engineering Development Model.

f. (U) Non-Developmental Item (NDI) Radar: Evaluated NDI candidate systems. Updated specification.

g. (U) Both MSSS-1 and MSSS-2 programs terminated.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Monitor Low Radar Cross-Section (LRCS) contract.

b. (U) Test LRCS Modifications.

c. (U) Continue to analyze field identified deficiencies to Aviation radars.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NRL, Washington, DC; and NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Sensis Corporation, Syracuse, NY; General Electric, Syracuse, NY; and Westinghouse, Baltimore, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C1079 PROJECT TITLE: Joint Interoperability of Tactical Command and Control Systems

C. (U) DESCRIPTION: This program supports Marine Corps participation in the Joint Chiefs of Staff-sponsored Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program which provides for the development of joint character and bit-oriented message standards and procedures.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued the system engineering effort in the development of change proposals to Variable Message Format (VMF), Tactical Air Data Information Link-Joint (TADIL-J), and United States Message Text Format (USMTF) as evolving joint standards.
b. (U) Continued Joint Tactical Air Operations (JTAO) recertification of the Tactical Air Operations Center (TAOC) and Military Air Traffic Control Aided Landing System (MATCALS).
c. (U) Participated in the JTAO testing and certification of other joint Command, Control, Communication and Intelligence (C3I) Systems.
d. (U) Enhanced the USMTF Editor.

2. (U) FY 1993 PROGRAM:
a. (U) Continue the system engineering effort in the development of change proposals to VMF, TADIL-J, and USMTF as evolving joint standards.
b. (U) Begin joint testing and certification of TADIL-J C3I Systems.
c. (U) Continue JTAO recertification of the TAOC and MATCALS.
d. (U) Participate in system engineering effort to provide integrated Tactical Ballistic Missile Defense.

3. (U) FY 1994 PLANS:
a. (U) Continue the system engineering effort in the development of change proposals to VMF, TADIL J, and USMTF as evolving joint standards.
b. (U) Continue joint testing and certification of TADIL-J C3I Systems.
c. (U) Continue JTAO recertification of the MATCALS.
d. (U) Participate in system engineering effort to provide integrated Tactical Ballistic Missile Defense.
e. (U) Execute initial JTAO certification of Advanced Tactical Air Command Center (ATACC) and Tactical Air Operations Modules (TAOM).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Joint Interoperability Engineering Organization, Reston, VA; MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA. CONTRACTORS: Logicon/Eagle Technology, Incorporated, Dumfries, VA; NSR Corporation, Colorado Springs, CO.

F. (U) RELATED ACTIVITIES: PEs: 0604719M, Marine Corps Command/Control/ Communications Systems.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C1443 PROJECT TITLE: Training Devices/Simulators (Engineering) Program

C. (U) DESCRIPTION: Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) is a product improvement of the Tactical Warfare Simulation, Evaluation and Analysis System. MTWS is a tactical command and control training system for the MAGTF commander and staff which will provide realistic tactical training through wargaming. The MTWS program is software intensive and is envisioned to require technical changes as the elements it trains change. Highly qualified support is envisioned to provide product improvements through the system life-cycle.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed procurement of operational test site of equipment.

b. (U) Completed Detailed Design Phase of software development.

c. (U) Successfully conducted Critical Design Review.

d. (U) Proceeded into Code and Test Phase of software development.

2. (U) FY 1993 PROGRAM:

a. (U) Complete Code and Test Phase of software development.

b. (U) Conduct in-plant test of software.

c. (U) Conduct field testing of software in operational environment.

d. (U) Achieve Initial Operational Capability at conclusion of field testing/field first operational site.

3. (U) FY 1994 PLANS:

a. (U) Complete Milestone III (Approval for Service Use).

b. (U) Complete fielding of system via installation and testing at each site; reach Full Operational Capability.

c. (U) Transition software to the Software Support Agency.

d. (U) Initiate pre-planned product improvements (P3I) for the man-machine interface.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Systems Exploration Incorporated, San Diego, CA.

F. (U) RELATED ACTIVITIES: Navy, Naval Wargaming System.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	0	2,105	792	0	2,897

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2035 PROJECT TITLE: Position Location Reporting System /NAVSTAR/Global Positioning System



POPULAR NAME: PLRS/NAVSTAR/GPS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	GPSIU:	ORD/MS I/II	MS III		
	PCE:	ORD/MS I/II		MS III	
	PLGR:	ORD/MS I	MS II	MS III	
	DSMS:	ORD/MS I/II			MS III FY95
ENGINEERING MILESTONES	GPSIU:		19 EDMs		308 TOTAL
	PCE:		4 PROOF OF DESIGN MODELS	35 EDMs	308 TOTAL
	PLGR:		BID SAMPLE TEST		
	DSMS:			SOFTWARE VERSION AVAILABLE	
T&E MILESTONES	GPSIU:	DEMO PROTOTYPE	OT		
	PCE:		PHASE I DEMO	OP ANAL	OT
	PLGR:		BID SAMPLE TEST	OT	
	DSMS:			IOT&E	
CONTRACT MILESTONES	GPSIU:				PROD. FFP
	PCE:	PHASE I: CPFF	PHASE II: FFPI		PROD. FFP
	PLGR:		LRIP	PRODUCTION DECISION	
	DSMS:				PRODUCTION CONTRACT

BUDGET		FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	PCE:	671	1,565	948	1,159	6,124
SUPPORT CONTRACT	PCE:	200	162	200	0	1,119
IN-HOUSE SUPPORT		1,086	1,688	2,318	485	8,638
GFE/ OTHER						
TOTAL		1,957	3,415	3,466	1,644	15,881

B. (U) DESCRIPTION: The Position Location Reporting System (PLRS) Product Improvement Program consists of a Master Station Computer Replacement, the PLRS Communication Enhancement (PCE) and the Global Positioning System (GPS) Interface Unit (GPSIU). PCE is a three year development effort with production in FY 1996. GPSIU is a 2 year development effort with production in FY 1995. GPS is a two year test with Non-Developmental Item procurement in FY 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine CorpsCommand/Control/CommunicationsSystems
PROJECT NUMBER: C2035 PROJECT TITLE: Position Location Reporting System /NAVSTAR/Global Positioning System

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed 35 GPSIU prototypes.

b. (U) Continued development of PCE.

c. (U) Started Developmental Test on Precision Location GPS Receivers (PLGR).

d. (U) Marine Corps Tactical Systems Support Activity (MCTSSA) started effort to re-host Master Station software from AN/UYK-44 and AN/UYK-7 computers which are no longer in production to the Desk-top Tactical Computer and to convert this software to the ADA computer language.

e. (U) Continued PLRS Interface Controller (PIC) effort.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Master Station software re-host effort.

b. (U) Take delivery of 35 GPSIU prototypes.

c. (U) Begin Operational Test of GPS Receivers.

d. (U) Continue development of PCE and test four proof-of-design models.

e. (U) Complete PLRS Interface Controller software. Demonstrate at MCTSSA System Integration Environment.

3. (U) FY 1994 PLANS:

a. (U) Fabricate 35 PCE engineering development models.

b. (U) Perform Operational Test.

c. (U) Complete Master Station software for Desk-top Tactical Computer in CMS-2 language.

d. (U) Continue ADA conversion.

4. (U) PROGRAM TO COMPLETION: Continue software implementation to maintain PLRS components capability with other fielded command and control systems. This program is planned for completion in FY 1998.

D. (U) WORK PERFORMED BY: IN-HOUSE: GPS Interface Unit: NAVAIRWARCENACDIV, Warminster, PA; MCTSSA, Camp Pendleton, CA. GPS: Joint Program Office, Los Angeles, CA. Master Station Computer Replacement: MCTSSA, Camp Pendleton, CA; Army Communications and Electronics Command, Ft. Monmouth, NJ. CONTRACTORS: PCE: Sierra Cybernetics, Brea, CA; Hughes Aircraft Co., Fullerton, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2035 PROJECT TITLE: Position Location Reporting System /NAVSTAR/Global Positioning System

F. (U) PROGRAM DOCUMENTATION:

1.	(U) Required Operational Capabilities	January 1991	(GPSIU, PCE, and DSMS)
2.	(U) Integrated Logistics Support Plan	1992	(GPSIU, PCE, and DSMS)
3.	(U) Letter of Adoption in Procurement	1992	(GPSIU)
4.	(U) Materiel Fielding Plan	1993	(GPSIU)
5.	(U) Test and Evaluation Master Plan	1993	(GPSIU, PCE and DSMS)
		FY 1992	(PLGR)
6.	(U) Letter of Adoption in Procurement	1993	(GPSIU, PCE, and DSMS)
		FY 1993	(PLGR)
7.	(U) Operations Requirement Document	FY 1992	(PLGR)

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 51	0	13,618	15,170	3,724	44,274
(U) PMC Line 65	7,900	0	3,396	4,642	18,961

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: PLRS has cooperative agreements; however, the Army is the lead service and has documentation. GPS also has cooperative agreements with the Air Force as the lead service. GPS agreements documentation is provided by the Air Force.

J. (U) TESTING AND EVALUATION:

1. (U) GPSIU: During FY 1993 a total of 19 Engineering Development Models (EDMs) will be produced to conduct Operational Testing to pursue a production decision.

2. (U) PCE: During FY 1993 a total of 4 Modifications will be tested and as a result of this test, 35 EDMs will be produced and subsequently operationally tested to pursue a production decision.

3. (U) PLGR: Bid Sample Test occurs during FY 1993 and Operational Testing is scheduled for FY 1994.

4. (U) DSMS: During FY 1995 re-hosted software will be available for testing. This testing will complete in FY 1995 and a production contract award is anticipated for FY 1996.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2102 PROJECT TITLE: Improved Direct Air Support Center

C. (U) DESCRIPTION: The current Improved Direct Air Support Center (IDASC) will be upgraded to include physical/functional enhancements and a digital data interface to associated command and control systems. Improvements include digital mapping display and information overlay, communications processing, and data base manipulation. Preliminary designs for physical and functional enhancements were approved and prototype hardware developed. Work will continue on review and modification of off-the-shelf software and selection of prototype hardware, as well as, determining software baselines and prioritizing system upgrades.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Downsized IDASC baseline and incorporated previous hardware and software upgrades into highly mobile Standard Integrated Command Post (SICP) shelters on high mobility multi-purpose wheeled vehicles (HMMWVs).

2. (U) FY 1993 PROGRAM:

a. (U) Commence upgrading systems software to include compatibility with all external command and control agencies.

b. (U) Continue downsizing IDASC baseline and incorporate previous hardware and software upgrades into highly mobile SICP shelters on HMMWVs.

3. (U) FY 1994 PLANS: Develop and incorporate new message standards to improve interoperability with Tactical Air Command Center.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NISE WEST, Vallejo, CA; MCTSSA, Camp Pendleton, CA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line IDASC	3,264	2,800	2,370	0	8,434

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2122 PROJECT TITLE: Tactical Combat Operations



POPULAR NAME: TCO

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS I	MS III	CONT.
ENGINEERING MILESTONES				CONT.
T&E MILESTONES	OT	OT	OT&E	CONT.
CONTRACT MILESTONES				CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4.006	2.128	2.075	CONT.	CONT.
SUPPORT CONTRACT	340	222	239	CONT.	CONT.
IN-HOUSE SUPPORT	1.365	350	5.200	CONT.	CONT.
GFE/ OTHER			450	CONT.	CONT.
TOTAL	5.711	2.700	7.964	CONT.	CONT.

B. (U) DESCRIPTION: The Tactical Combat Operations (TCO) system will serve as the operations component to the Marine Tactical Command and Control System (MTACCS). TCO will use microcomputers to provide commanders the automation to receive, fuse, select, and display information from many sources, and disseminate selected information throughout the battlefield. Additional TCO attributes include: automated message processing, mission planning, development and dissemination of operations orders and overlays, display of tactical control measures, and interfaces with local and wide area networks. The Marine Integrated Personnel System/Marine Integrated Logistics System (MIPS/MILOGS) is one of the functional areas which constitute the MTACCS. MIPS/MILOGS is not a "system", but a conceptual association of a personnel and logistic status/decision support system for a number of stand-alone prototype and fielded personnel and logistic systems. It will fully automate current combat service support tasks by extracting personnel/logistics data from existing Class I systems and providing input to TCO.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2122 PROJECT TITLE: Tactical Combat Operations

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted Field Demonstration System (FDS)-1 with the 7th Marine Expeditionary Brigade during November 1991.

b. (U) Refined system requirements.

c. (U) Completed initial hardware and training analyses.

d. (U) Initiated the Cost and Operational Effectiveness Analysis (COEA).

e. (U) Performed evaluation of alternative, candidate systems.

f. (U) Refined detailed program documentation for pending Milestone I review.

g. (U) Participated in a joint effort with the Army Combat Service Support Control System (CSSCS) program.

2. (U) FY 1993 PROGRAM:

a. (U) Milestone I review during the fourth quarter of FY 1993.

b. (U) Concept demonstration is combined with full-scale software development.

c. (U) Complete documentation and obtain Milestone I decision.

d. (U) MIPS/MILOGS works in a cooperative effort with the Army development of CSSCS.

3. (U) FY 1994 PLANS:

a. (U) Initial Operational Testing occurs mid fiscal year.

b. (U) Conduct Operational Test and Evaluation.

c. (U) Achieve Milestone III fielding decision.

d. (U) Implement TCO training plan.

e. (U) Initiate fielding.

f. (U) Revalidate TCO hardware requirements.

g. (U) Continue MIPS/MILOGS cooperative effort with the Army to develop Marine Corps unique functions in the Army CSSCS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; Pacific Northwest Laboratory, Richland, WA; Communications Electronic Command, Ft. Monmouth, NJ; and DOT, Arlington, VA. CONTRACTORS: TRW, Los Angeles, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2122 PROJECT TITLE: Tactical Combat Operations

F. (U) PROGRAM DOCUMENTATION: Mission Need Statement approved June 1992.

G. (U) RELATED ACTIVITIES: All projects under this PE. Marine Air Ground Task Force II Logistics Automated Information Systems projects and Manpower Class I Systems.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TESTING AND EVALUATION:

(U) Operational Testing FY 1992 - FY 1994

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2150 PROJECT TITLE: Marine Tactical Auto C2 System

C. (U) DESCRIPTION: This program provides engineering and testing required to ensure implementation of operationally suitable, cost effective and integrated tactical command, control, computer and intelligence (C4I) systems required by the Marine Corps ashore and afloat in a joint environment. It implements the Marine Tactical Command and Control System (MTACCS) integrated architecture by developing required common software capabilities and computer hardware specifications; and providing system development direction and engineering services to MTACCS component C4I system programs. FY 1992 and FY 1993 funding contained in Project C2122, Tactical Combat Operations (TCO), under this program element.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Conducted integrated test of MTACCS in the Field Development System. Continued development of the specifications for the MTACCS architecture in terms of component systems, information requirements, common software, common hardware, system security requirements, communications/navigation systems, system control and operational facilities. Initiated development of the MTACCS Common Application Support Software (MCASS) V1. Initiated engineering efforts to integrate MTACCS with the Navy's evolving Copernicus and Integrated Interior Communication Control projects.

2. (U) FY 1993 PROGRAM: Continue to develop and configuration manage the specifications for the MTACCS architecture. Complete development, test and integration of the MCASS V1. Complete engineering efforts to support prototype of initial data exchange between MTACCS and the Navy afloat C4I systems. Develop the System Integration Environment (SIE) at Marine Corps Tactical Systems Support Activity (MCTSSA).

3. (U) FY 1994 PLANS: Field MCASS V1. Continue to develop specifications for the MTACCS architecture based on FMF user appraisals or new requirements, and to integrate MTACCS architecture with the Joint Services Command and Control architecture. Initiate the development of common integration design specifications for Marine C4I systems within mobile operational facilities. Initiate the development of MCASS V2.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; Pacific Northwest Laboratory, Richland, WA; NCCOSC RDTE DIV, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Columbia Research Corporation, Dumfries, VA.

F. (U) RELATED ACTIVITIES: PEs currently designated as MTACCS component systems's programs: 0604719M, Marine Corps Command/Control/ Communications Systems; 0206626, Marine Corps Command/Control/Communications Systems; 0206625M, Marine Corps Intelligence/Electronics Warfare Systems; and 0206313M, Marine Corps Communications.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 68	7,285	8,286	2,875	21,065	39,511

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications

A. (U) RESOURCES: (Dollar in Thousands)

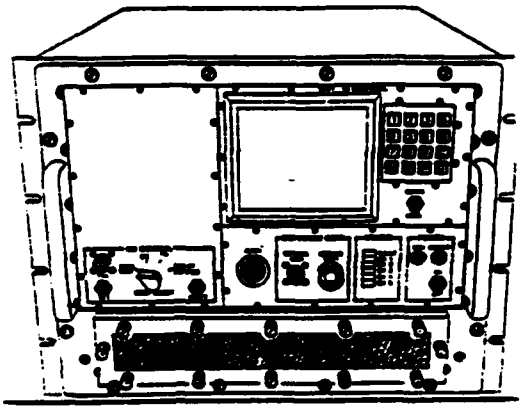
PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2044	Interoperability of Satellite	0	0	4,857	0	5,000
X1880	Joint Terminal Project Office (1)	3,389	2,236	2,412	CONT.	CONT.
X0728	EHF SATCOM Terminal (2)	33,070	25,896	15,155	CONT.	CONT.
X0731	Fleet Satellite Communications	31,031	25,583	33,358	CONT.	CONT.
	TOTAL	67,490	53,715	55,782	CONT.	CONT.

NOTE: (1) Funded in PE 0303603N in FY 93 and prior
(2) Funded in PE 0604577N in FY 93 and prior

B. DESCRIPTION: This program supports development of shipboard and shore based equipment operating through six communications satellite systems: Fleet Satellite (FLTSAT) Communications, Leased Satellite (LEASAT) Communications, Defense Satellite Communications System (DSCS), Ultra High Frequency Follow-On Program (UFO), NATO Allied, and Air Force Satellite Communications (AFSATCOM). The Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program provides for the development and production of terminals to provide anti-jam, low probability of intercept communications capability for Command and Control of the fleet. The Milstar program is comprised of satellites, control stations, and air, ship and ground terminals to provide worldwide, secure, anti-jam, survivable communications for the National Command Authority, Specified/Unified CINCs, and operational commanders.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X2044 PROJECT TITLE: Interoperability of Satellite



POPULAR NAME: TIBS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS III 9/94	
ENGINEERING MILESTONES			TIBS SDR 12/93 TIBS PDR 1/94 TIBS CDR 2/94 TIBS EDM 3/94	
T&E MILESTONES			TIBS DT-IIA 3/94 TIBS DT-IIB 5/94 TIBS OT-II 6/94	
CONTRACT MILESTONES			Studies/Upgrades Contract Award 10/93	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT			2,367		2,367
SUPPORT CONTRACT			745		745
IN-HOUSE SUPPORT			750		750
GFE/ OTHER			995		995
TOTAL	0	0	4,857	0	4,857

B. (U) DESCRIPTION: The Tactical Data Information Exchange System B (TADIXS B), Tactical Receive Equipment (TRE), and Tactical Information Broadcast System (TIBS) will receive, filter, format, and transfer incoming TADIXS B data, TRAP data, and TIBS data to tactical data processors for final processing. TADIXS B, TRAP, and TIBS are Ultra High Frequency (UHF) down links forwarding high interest contact reports in near real time to all services tactical commanders. TADIXS B TRE (termed "TRE" hereafter) is a multi-service program for which the U.S. Navy is designated as the executive (lead) service, and TIBS is a multi-service program for which the U.S. Air Force is designated as the executive (lead) service. TADIXS B TRE TIBS (termed "TIBS" hereafter) will integrate the TIBS capability into TRE.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X2044 PROJECT TITLE: Interoperability of Satellite

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Take delivery of TRE production systems, award upgrade of the TRE systems to include TIBS capability.
b. (U) Complete TIBS System Design Review (SDR).
c. (U) Conduct TIBS Preliminary Design Review (PDR) and Critical Design Review (CDR).
d. (U) Test and certify TIBS.
e. (U) Perform TIBS Operational Test and Evaluation (OT&E).

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDT&E DIV, San Diego, CA; NAVELEXCEN, Charleston, SC; CONTRACTORS: Frequency Engineering Laboratory, Farmingdale, NJ; E-Systems, Garland TX; VISICOM, San Diego, CA; Integrated Systems Control, Norfolk, VA; Advanced Communications Systems, Arlington, VA; Computer Sciences Corporation, Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

DCP X2408, 3/85
OR Number 048-94-85, Ser 098/5S353747 of 10/3/85
TEMP Number M848-05-1, revised, 6/30/88

G. (U) RELATED ACTIVITIES: None

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #P102	8,000	5,990	5,300	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: TRE OT&E was completed in September 1988. The system was considered operationally effective and suitable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X1880 PROJECT TITLE: Joint Terminal Project Office

C. (U) DESCRIPTION: The Milstar program is comprised of satellites, control stations, and air, ship and ground terminals to provide worldwide, secure, anti-jam, survivable communications for the National Command Authority, Specified/Unified CINCs, and operational commanders. The Milstar JTPO chartered by tri-service Memorandum of Understanding (MOU) coordinates and directs the development of user terminals in six joint tasking areas: (1) ensuring terminal interoperability, (2) joint integrated logistics support (ILS) planning, (3) conducting joint interoperability tests, (4) writing terminal specifications and participating in EHF military standards development, (5) monitoring service terminal designs and (6) providing technical support to OSD, OJCS, CINCs and users.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: The JTPO participated in the medium-data-rate (MDR) payload design definition; updated the Joint ILS Plan and Joint Training Plan to include Milstar II terminals; conducted joint interoperability testing with nine terminals and two on-orbit prototype satellites; completed draft of the Joint Milstar II Terminal Specification; reviewed tri-service low data rate (LDR) terminal designs for interoperability impacts; and assisted the CINCs and other users in exploiting the capability of Milstar networks.

2. (U) FY 1993 PROGRAM: The JTPO efforts in the six joint tasking areas include developing new MDR protocols to include the Transparent Messages protocol requirement; finalizing cross-service installation actions and agreements; planning for and participating in MST-8000 on-orbit interoperability testing; baselining the Joint Milstar II Terminal specification; participating in new LDR and MDR terminal design reviews; and solving technical problems for user/CINC terminal fieldings.

3. (U) FY 1994 PLANS: The JTPO will continue to coordinate and direct the development of user terminals, in the six JTPO joint tasking areas, LDR terminals are deployed and modified and as new LDR and MDR terminals enter Engineering and Manufacturing Development. Efforts include identifying and testing new baseband devices to ensure interoperability; overseeing the cross-service training of Milstar terminal operators and maintainers; planning for the conducting of joint interoperability testing with the first satellite on-orbit and new LDR and MDR Satellite Data Link Military Standard and exercising configuration control on the Joint Terminal Specifications; monitoring the designs of the new LDR and MDR terminals as they accomplish the critical design reviews; and supporting the CINCs/users in early network planning and implementation.

4. (U) PROGRAM TO COMPLETION: The JTPO will continue to support the six areas defined in the MOU. At Full Operational Capability (FOC) the JTPO will turn over its responsibilities to the USAF Space Command, the designated Milstar System Operational Manager.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDT&E Div, San Diego, CA; NAVAIRWARCENACDIV, Warminster, PA; NSSA, Los Angeles, CA; AF Wright Laboratory, Dayton, OH; MIT, Lincoln Laboratory, Lexington, MA. CONTRACTORS: Booz, Allen & Hamilton, Bethesda, MD; Galaxy Scientific Corporation, Alexandria, VA.

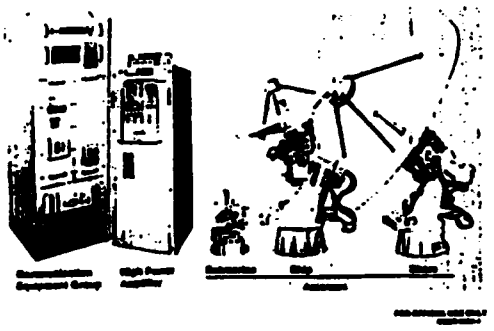
F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0728 * PROJECT TITLE: EHF Satellite Communications Terminal



POPULAR NAME: NESP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS III 3/93		CONT.
ENGINEERING MILESTONES	NECC SDR 1/92 NECC PDR 8/92	NECC EDM 6/93	Protocols 4/94	CONT.
T&E MILESTONES	MT-IID 2/92 OT-IIC 7/92 DT-IIJ 7/92	DT-III 9/93	FOT&E 3/94 OT-III 3/94	CONT.
CONTRACT MILESTONES		Studies/Upgrades Contract Award 4/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	16.675	11.771	7.479	CONT.	CONT.
SUPPORT CONTRACT	2.022	1.569	1.013	CONT.	CONT.
IN-HOUSE SUPPORT	12.182	10.725	6.229	CONT.	CONT.
GFE/ OTHER	2.191	1.831	434	CONT.	CONT.
TOTAL	33.070	26.896	15.155	CONT.	CONT.

B. (U) DESCRIPTION: Navy Extremely High Frequency (EHF) Satellite Communications (SATCOM) Program provides for the development and production of terminals to provide anti-jam, low probability of intercept communications capability for Command and Control of the fleet. The terminals will provide physical and electro-magnetically survivable, worldwide communications in the current and projected electromagnetic and nuclear threat. Navy EHF terminals are interoperable with Army and Air-Force terminals and will operate with Milstar as well as EHF packages on-board Ultra High Frequency (UHF) Follow-On (UFO) Satellites four through nine. Navy terminals operated during Desert Storm with EHF packages on-board Fleet Satellite 8. The increased capability provided by EHF terminals is accomplished by use of the wider bandwidths available at extremely high frequencies, narrow antenna beamwidths, spread spectrum techniques, on-board satellite processing and advanced signal processing technology.

(U) The Navy EHF Communications Controller (NECC) provides automated, netted tactical data exchange (IXS) over jam resistant EHF satellite links. The NECC will establish EHF networks, control data transfer over the networks and act as a gateway between networks.

* Program Element is 0604577N for FY93 and prior.

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: EHF Satellite Communications Terminal

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Commenced development of Milstar Pre-Planned Product Improvements (P3I) upgrades.

b. (U) Design, code and test of NECC Build 1 software and security External COMSEC Adaptor (ECA) completed.

c. (U) Performed NECC prototype hardware and software integration and test.

d. (U) Completed NECC Build 1.

2. (U) FY 1993 PROGRAM:

a. (U) Perform Terminal Developmental Testing III (DT-III).

b. (U) Complete NECC Build 1 Standard Communication Environment integration and test.

c. (U) Complete terminal to Milstar flight satellite compatibility testing.

d. (U) Gain approval for full production of Navy Program Decisions Meeting (NPDM).

e. (U) Perform Milstar Medium Data Rate (MDR) system definition and architectural design changes to Navy terminal.

3. (U) FY 1994 PLANS:

a. (U) Begin development of terminal improvements including Built-In Test Equipment (BITE) enhancements, Navigation studies, solid state High Power Amplifier (HPA), antenna test set development, Advanced Data Recording (ADR) improvements, alternative gyros, Milstar Operator Requirements Analyst (MORA), training enhancement/improvements.

b. (U) Test and integrate NECC Modular Security Device (MSD).

c. (U) Perform Terminal OT-III testing and Follow-on Test and Evaluation (FOT&E).

d. (U) Complete on-orbit Milstar satellite to terminal compatibility testing.

e. (U) Continue MDR architectural design refinements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVUNSEAWARCEN DET, New London, CT; NAVELEXCEN, Vallejo, CA; NRL, Washington, DC; NAVSURFWARCEN White Oak DET, Silver Spring, MD; NAVELEXCEN, Portsmouth, VA; NAVELEXCEN, Charleston, SC. CONTRACTORS: Raytheon, Sudbury, MA; Booz, Allen, & Hamilton Inc., Bethesda, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0728 PROJECT TITLE: EHF Satellite Communications Terminal

2. (U) SCHEDULE CHANGES: Some Milstar (P3I) upgrades and NECC Follow-on development testing will be deferred to later years and development of MDR capability is not planned to begin until FY 1995.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
DCP X0728, 4/89.
TEMP Number 784 (Rev. 1), 4/89.
Joint Milstar Communications Control and Operations Concept. (JMCCOC) Vol I (1st Rev. - 6/89) and Vol II (1st Rev. - 8/89).
Milstar Multi-service TEMP, 2/88.

G. (U) RELATED ACTIVITIES: The Navy EHF SATCOM Program is part of the Tri-service Milstar program. The Milstar satellite is being developed by the Air Force. Terminals are being developed by the Air Force, Army and Navy. Terminal requirements are coordinated by the Joint Terminal Program Office. Related PEs are: PE 0303603F, Milstar; PE 0303601F, Air Force Satellite Communications; PE 0303142A, Extremely High Frequency Communications Terminal.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN *	117,232	103,951	88,780	CONT.	CONT.
(U) MILCON	8,530	0	0		
P401	1,900				
P405	1,800				
P407	2,750				
P409	2,080				

* Includes EHF terminal and NECC procurement and installation included in the SATCOM Ship (52NN) #122 and SATCOM Shore Terminals (52NP) #123 P-1 funding lines.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Terminal Operational Test and Evaluation (OT-IIC) was completed in August 1992. The terminal was found by COMOPTEVFOR to be operationally effective and suitable. During OT-IIC, terminal reliability was found to be better than the 300 hour mean time between failure requirement. This was verified during the Factory Test Analyze and Fix demonstration. In addition, two terminals successfully completed ground compatibility testing with the first Milstar satellite.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications



POPULAR NAME: SATCOM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			Mini-DAMA III for (V)1 9/94	CONT.
ENGINEERING MILESTONES	Mini-DAMA CDR 3/92 TACINTEL II SRR 9/92	TACINTEL II SDR 4/93	TACINTEL II PDR 11/93 CDR 4/94	CONT.
T&E MILESTONES		Mini-DAMA (V)1 DT II 4/93	Mini-DAMA (V)1 OT II 3/94	CONT.
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	22.836	14.310	14.888	CONT.	CONT.
SUPPORT CONTRACT	1.428	2.368	2.246	CONT.	CONT.
IN-HOUSE SUPPORT	3.184	6.698	12.557	CONT.	CONT.
GFE/ OTHER	3.583	2.207	3.667	CONT.	CONT.
TOTAL	31.031	25.583	33.358	CONT.	CONT.

B. (U) DESCRIPTION: Fleet Satellite Communications is the principal carrier of Naval communications worldwide for fleet operations. The project supports development of shipboard and shore based equipment operating through six communication satellite systems: Fleet Satellite (FLTSAT) Communications, Leased Satellite (LEASAT) Communications, Defense Satellite Communication System (DSCS), Ultra High Frequency Follow-On Program (UFO), NATO Allied, and Air Force Satellite Communications (AFSATCOM). The principal mission is to provide global, continuous, secure communications among U.S. and Allied Forces via Ultra High Frequency (UHF) satellites and to provide secure and anti-jam communications between joint command centers and fleet commanders using DSCS satellites, and Extremely High Frequency (EHF) capable satellites. A secondary mission is to provide rapid transfer of administrative and logistics messages over commercial and military satellites.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications

(U) Specifically the efforts of this program develop UHF and Super High Frequency (SHF) communications systems, network controllers, time division multiplexers, and develop tactical applications. The FLTSAT Communication System provides fleet broadcast service to all Navy ships, Over-the-Horizon Targeting data for TOMAHAWK and Flag configured ships, submarine communications, intelligence data, and various other battle group and joint task force communications services.

(U) Tactical Data Information Exchange Subsystem (TADIXS) serves as the primary shore-to-ship communication link for providing over-the-horizon targeting data to TOMAHAWK missile equipped ships and Ocean Surveillance Products. TADIXS Phase IV provides world-wide connectivity and interoperability through gateways at major Naval communications stations.

(U) The Miniature Demand Assigned Multiple Access (Mini-DAMA AN/USC-42(V)) system will provide the same satellite channel utilization efficiencies for aircraft and submarines that are now enjoyed by surface ships and shore stations equipped with the larger version TD-1271 DAMA multiplexer. Mini-DAMA is being developed in three versions. The (V)1 is the submarine ship/shore application, (V)2 is the Auto-DAMA application and (V)3 is the airborne application.

(U) Officer in Tactical Command Information Exchange Subsystem (OTCIXS) Phase II software will be developed to provide OTCIXS Battle Group command and control data on a DAMA channel on the satellite. Sending OTCIXS data on DAMA frees valuable satellite channels for other fleet operational use.

(U) The Tactical Intelligence Information Exchange Subsystem Phase II (TACINTEL II) implements the Integrated Special Intelligence Communications (INSICOM) portion of the Copernicus architecture to provide services for transfer of Special Intelligence (SI) information between ships, aircraft, and shore activities in support of joint and combined operations. TACINTEL II will enable real time indications and warning support to joint and component commanders through reliable high speed transfer of sensor data and intelligence information. Enhanced interoperability with other services, agencies, and allies will permit a level of integration of SI operations not achievable with current systems.

(U) The SHF terminals operate within the DSCS. SHF provides high capacity Anti-Jam/Low Probability of Intercept (AJ/LPI) communications to major combatants and provides Navy connectivity to Allied and Joint Force Command Networks via the DSCS. The Universal Modem is a joint U.S./U.K. development to provide U.S. force and Allied interoperability for command and control networks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Completed Mini-DAMA Program Design Review (PDR), completed Critical Design Review (CDR).
   b. (U) TACINTEL II Plus System Specifications and Requirement Reviews.

2. (U) FY 1993 PROGRAM:
   a. (U) Begin Developmental Testing (DT-II) for Mini-DAMA AN/USC-42(V)1.
   b. (U) TACINTEL II System Design Review (SDR).
   c. (U) TACINTEL II operational demonstration of interim capabilities.
   d. (U) Hardware replacement for TACINTEL unit control facilities.
   e. (U) AN/USC-42(V)1/3 Pre-Production Unit/Engineering.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications

3. (U) FY 1994 PLANS:

a. (U) Conduct Mini-DAMA Operational Testing (OT) II for (V)1.
b. (U) Mini-Dama Milestone III for (V)1.
c. (U) Purchase TAC III hardware for TACINTEL II.
d. (U) TACINTEL II Preliminary and Critical Design Reviews (PDR/CDR).
e. (U) Conduct Operational Assessment for Mini-DAMA, AN/USC-42(V)3 Approval for Low-Rate Initial Production (ALRIP) Decision on P3.
f. (U) Milestone III ALRIP decision for Mini-DAMA, AN/USC-42(V)3.
g. (U) AN/USC-42(V)3 LRIP.
h. (U) Exercise AN/USC-42(V)3 LRIP options.
i. (U) EP-3E AN/USC-42(V)3 integration.
j. (U) Refurbish EDMs.
k. (U) Complete AN/USC-42(V)1/3 EDM deliveries.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDT&E DIV, San Diego, CA; NAVELEXACT, St. Inigoes, MD; NAVELEXCEN, Vallejo, CA; NAVELEXCEN, Charleston, SC; NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: Advanced Digital Systems, Inc, San Diego, CA; MA/COM, San Diego, CA; Computer Science Corporation, Falls Church, VA; Advanced Communication Systems, Inc., Arlington, VA; Scientific Research Corp., Atlanta GA; Klien & Stump Inc, Arlington VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
OR 184-094-89 (TACINTEL II) of 7/87
TEMP 252-8 (OTCIXS)
TEMP 252-10 (Mini-DAMA) 12/88
JOR H-C123-75 (DAMA) of 1/75
OR 174-094-87 (Mini-DAMA) of 8/87

G. (U) RELATED ACTIVITIES: Mini-DAMA. Mini-DAMA, the Navy DAMA Program; EMUT (PE# 0303142A, Title: Satellite Communications Ground Environment), the Army DAMA Program; and USTS (PE# 0303605F, Title: Ground Mobile Forces), the Air Force DAMA Program are all building interoperable DAMA terminals.
(U) Operational Intelligence Processor (OPINTEL) upgrade (NSA) (PE# NSA 0301055, Title: Project Embroidery), High Speed Fleet Broadcast (Navy) (PE# 0204163N, Title: Communications Automation), and Navy EHF Satellite Program (Navy) are providing building blocks that complete the INSICOM architecture when combined with TACINTEL II developments.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN *	29,813	47,094	41,786	CONT.	CONT.

* Includes UHF and SHF procurement and installation costs identified in SATCOM Ship Terminals (52NN) #122 SATCOM Shore Terminals (52NP) #123 P-1 funding lines.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Initiate development testing FY 1993 for Mini-DAMA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734	Communications Security R&D					
X0911	Computer Security					
TOTAL						

* Previously Funded under PE 0303401N
** Previously Funded under PE 0604574N

B. (U) DESCRIPTION: The goal of the Navy Information Systems Security program is to ensure the continued protection of Navy and Joint communications and computing systems from hostile exploitation. With the advent of the information age, the network environment and the proliferation of distributed systems, the Navy is making profound changes in the way it has traditionally approached communications and computer security. The development of complex systems, the networking of systems and rapid technological advances, which have virtually eliminated the traditional distinctions between telecommunications and information systems have mandated a systems-oriented approach to security. The program accomplishes this by; developing system security standards, criteria and guidelines identifying what is necessary to protect the system; developing INFOSEC products and technology for Naval tactical and strategic systems, improving the Naval method of key management and distribution by changing over the manual paperbased system to an automated, electronic key generation distribution system; and using life cycle support data to develop new technological approaches to maintain the INFOSEC certification (eg. confidentiality, integrity, and availability) of fielded systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734	COMSEC R&D					

* Previously Funded under PE 0303401N

B. (U) DESCRIPTION: The Communications Security (COMSEC) Project analyzes existing COMSEC equipments and develops improved, interoperable communications security equipment and methods to protect classified communications from adversary exploitation. The project is a continuing effort to modernize obsolete cryptographic equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat. Replacement COMSEC, in most cases, will be implemented using embedded modules (using NSA approved crypto engines). Under the Naval Key Distribution System (NKDS) program, the Navy COMSEC program will revolutionize the Navy's COMSEC Material System. The overall objectives of NKDS are to: (1) increase security for all on-line and off-line crypto systems and (2) eliminate most of the manual custodian workload. The NKDS program provides for the electronic distribution of Cryptographic Keying material and includes the development of the Navy Key Distribution System (NKDS) and supporting efforts for benign key fill with the eventual goal of end-to-end encrypted key to eliminate the Walker-Whitworth type insider threat. Other projects under COMSEC R&D development include: Security Support to communications systems such as Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS), Mini-Dama, Cooperative Engagement Capability (CEC), development of security architectures for Copernicus and its related systems, development of a family of security devices to satisfy developed security architectures called the Embeddable INFOSEC Product (EIP) and the Programmable EIP (PEIP)(formerly MSD).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (Funded in PE 0303401N)

a. (U) Awarded CLASSIC Lightning modification to the NKDS contract for Phase I of NKDS.

b. (U) Developed security policy/requirements for Copernicus Tactical Data Information Transfer System (TADIXS).

c. (U) Conducted Critical Design Review (CDR) for External COMSEC Adapter (ECA).

d. (U) Provided security evaluation support to multiple Navy sources programs: JTIDS/MIDS, Mini-DAMA, CEC, Tactical Intelligence Network (TACINTEL) II+, and Extremely High Frequency Information Exchange System (EHF-IXS).

2. (U) FY 1993 PROGRAM: (Funded in 0303401N)

a. (U) Conduct Preliminary Design Review and CDR for NKDS.

b. (U) Perform requirements definition for automated local benign key fill distribution in support of NKDS.

c. (U) Perform requirements definition for a joint TIER I level implementation of Key management for increased CINC and Joint Task Force (JTF) support.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

d. (U) Conduct integration and test of the ECA for the Copernicus TADIXS test bed.

e. (U) Begin Engineering and Manufacturing Development (E&MD) for EIP using the COMSEC Integrated Circuit (CTIC) DS-101 Hybrid (CDH) chip.

f. (U) Develop capability to perform system certification and accreditation of Copernicus TADIXS.

g. (U) Initiate requirements analysis for PEIP, which will be based on a chip of newer design with increased capability.

h. (U) Provide security evaluation support to Navy communications programs: MIDS, Mini-DAMA, Common High Bandwidth Data Link Shipboard Terminal (CHBDL-ST), CEC, EHF-IXS and TACINTEL II+.

3. (U) FY 1994 PLANS:

a. (U) Award NKDS Phase II contract.

b. (U) Conduct Development and Operational Tests for EIP.

c. (U) Complete requirements analysis for PEIP.

d. (U) Provide Project Outreach Support by certifying embedded security products with NSA support.

e. (U) Provide security support to future upgrades to Copernicus TADIXS, CINC Command Complex (CCC), and Tactical Command Center (TCC).

f. (U) Initiate development of embedded Naval Tactical Data System (NTDS) link and medium and high speed voice data and video standard embedded COMSEC products for Naval Tactical Systems.

g. (U) Conduct TECHEVAL/OPEVAL for the NKDS use of the NSA Key processor and Local COMSEC Management System Software.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVELEXSECCEN, Washington, DC; NCCOSC RDTE Div, San Diego, CA; and NAVELEXCEN, Portsmouth, VA. CONTRACTORS: Science Applications International Corporation (SAIC), San Diego, CA; ViaSat, Carlsbad CA; Booz Allen & Hamilton, Bethesda, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: NSA change in delivery schedule created revision in NKDS TECHEVAL/OPEVAL from FY93 to FY94.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

F. (U) PROGRAM DOCUMENTATION:
OR#14409486 Operational Requirement for NKDS 3/87
Program Change Approval Document (PCAD) for the NKDS 7/89
TEMP #0511-01 for NKDS 2/90
PCAD for the NKDS (Change 2) 8/91
Information Security Resources Plan 4/90

G. (U) RELATED ACTIVITIES: PE 0303401G, Cryptographic Equipments. National Security Agency TEMPEST program equipment and techniques used in the Navy's COMSEC Program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 132	61,300	73,200	36,900	CONT.	CONT.
(U) OPN Line 133	47,100	32,400	5,600	CONT.	CONT.
(U) OPN Line 130	1,400	300	0	CONT.	CONT.
(U) OPN Line 136	2,100	2,500	2,500	CONT.	CONT.
(U) OPN Line 135	419	423	176	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) MILESTONE SCHEDULE:

MAJOR MILESTONES	M/S II	DT	OT	M/S III
NKDS		1Q/94	2Q/94	3Q/94
EIP		3Q/94	*	4Q/95 (LRIP)

* As part of host systems

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan
PROJECT NUMBER: X0911 PROJECT TITLE: Computer Security

C. (U) DESCRIPTION: Project, in cooperation with industry, develops necessary capabilities to establish secure computing environments for Navy systems with particular emphasis on multi-level security (MLS). Project supports the following objectives to: (1) perform experienced-based development and evaluation of security-relevant methods and tools (including those for integration, composability, and formal certification), (2) assess state-of-the-art trusted products and components in a system context, and (3) apply the methods and incorporate the trusted products and components in high interest Navy systems such as the Operational Support System (OSS). Project also provides for the evolution of the Certification and Information Security (INFOSEC) Engineering Laboratory (CIEL) which facilitates the accomplishment of the project objectives.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: See P.E. 0604574N-Computer Security Program.

2. (U) FY 1993 PROGRAM: See P.E. 0604574N-Computer Security Program.

3. (U) FY 1994 PLANS:

a. (U) Complete mapping of Navy security architecture to the Copernicus architecture.

b. (U) Complete the MLS architecture for OSS Increment 2.

c. (U) Field demonstration of MLS OSS Automated Defense Information Network interface and downgrader.

d. (U) Demonstrate initial SCI/GENSER OSS capability.

e. (U) Investigate secure technology for the MLS OSS prototype.

f. (U) Assess TAC-4 computer capability to host MLS OSS Increment 2.

g. (U) Field demonstration of a secure data base with an enhanced B2 level of trust.

h. (U) Update and publish DoN INFOSEC strategy and architecture.

i. (U) Publish initial system integration and certification guidelines.

j. (U) Perform systems level assessments of existing trusted products and components utilizing CIEL; upgrade CIEL to include emerging trusted product technology.

k. (U) Assess Trusted Machine (T-MACH) capability to support an open system MLS architecture.

l. (U) Initiate design of a security information monitoring and assessment system.

m. (U) Begin development of concepts of operations, specification, evaluation, certification, and accreditation for distributed, heterogeneous systems.

n. (U) Begin development of INFOSEC standards and education and training materials.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303140N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Information Systems Security Plan
PROJECT NUMBER: X0911 PROJECT TITLE: Computer Security

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NCCOSC RDT&E Division, San Diego, CA. CONTRACTOR: MITRE Corp., Bedford, MA/McLean, VA; Booz•Allen & Hamilton, Bethesda, MD.

F. (U) RELATED ACTIVITIES: The following program elements address aspects of computer and system security relevant to the success of this project: PE 0301567G-Consolidated Computer Security Program; PE 0602301E-Strategic Technology; and PE 0603270N-C3 Advanced Electronic Warfare Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0524	DMSP-NAVY SUPPORT	1,279	1,225	666	CONT.	CONT.
X1452	GEOSAT	8,345	15,373	10,884	CONT.	CONT.
	TOTAL	9,624	16,598	11,550		

B. (U) DESCRIPTION: This program element includes two projects - the DMSP Navy Support project and the Geodetic/Geophysical Satellite (GEOSAT) project: (1) Defense Meteorological Satellite Program (DMSP) is a Joint Service use program which supports sensor and satellite engineering and technology. The DMSP Navy Support project provides for Navy participation in DMSP. (2) GEOSAT provided ocean topography information from a single satellite from 1985 until it failed in January 1990. In FY 1991, the Navy began to develop a follow-on capability to provide this required ocean topography information via the GEOSAT follow-on program (GFO).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program
PROJECT NUMBER: X0524 PROJECT TITLE: DMSP - Navy Support

C. (U) DESCRIPTION: This project provides Navy participation in the DMSP program. The program also acquires the information necessary to keep Navy ground receiving equipment compatible with future satellite data formats and data transfer rates. The project also provides for Navy participation as a voting member of the DMSP Configuration Control Board (CCB).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued study of Navy "option" sensors such as Special Sensor Microwave/Imagers, Scatterometers and Altimeters.

b. (U) Continued development of satellite data processing methods.

c. (U) Continued participation on the DMSP CCB.

2. (U) FY 1993 PROGRAM:

a. (U) Assess Navy requirements for DMSP Command, Control and Communications.

b. (U) Monitor Air Force sensor development efforts.

c. (U) Continue participation on the DMSP CCB.

3. (U) FY 1994 PLANS:

a. (U) Monitor ongoing DMSP engineering assessments.

b. (U) Continue to monitor Air Force sensor development efforts.

c. (U) Continue participation on the DMSP CCB.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSSA, Los Angeles, CA; CONTRACTORS: Hughes, Los Angeles, CA; Harris, Melbourne, FL; Aerojet, Azusa, CA; Lockheed, Sunnyvale, CA; GE, Princeton, NJ; Westinghouse, Baltimore, MD; Aerospace Corp, Los Angeles, CA.

F. (U) RELATED ACTIVITIES: PE 0305160F, Air Force DMSP - provides AF engineering for DMSP; PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from DMSP.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN	Line TBD	0	0	0	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1452	GEOSAT	8,345	15,373	10,884	CONT.	CONT.

B. (U) DESCRIPTION: This project provides a satellite-borne RADAR altimeter to obtain ocean topography measurements from which tactically significant features such as fronts, eddies, and ice edge are derived. Topography provides a unique and important data source in support of a number of Naval warfare areas such as anti-submarine and undersea warfare, as well as providing other agencies such as NOAA and NASA with valuable inputs to studies involving Global Warming and Climate change. The data was previously provided by GEOSAT from 1985 until its failure in January 1990. The GEOSAT Follow-On (GFO) satellite was originally intended to provide interim altimetry data until DMSP Block 6 becomes operational in FY 2005. However, cost analyses and the need for a common operational orbit may show that the use of GFO alone is superior to integrating an altimeter on DMSP Block 6.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

   a. (U) Began GFO satellite development via competitive procurement.

   b. (U) Continued radar altimeter sensor design.

2. (U) FY 1993 PROGRAM:

   a. (U) Complete Preliminary Design Review of GFO.

   b. (U) Continue satellite development.

   c. (U) Begin radar altimeter sensor development.

3. (U) FY 1994 PLANS:

   a. (U) Complete Critical Design Review of GFO.

   b. (U) Continue satellite development.

   c. (U) Continue radar altimeter sensor development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; Applied Physics Lab (sensor technology), Laurel, MD. CONTRACTORS: Ball Space System, Boulder, CO; E-Systems, St. Petersburg, FL; AIL, Deer Park, NY; Motorola Inc, Chandler, AZ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program
PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite

F. PROGRAM DOCUMENTATION:

Non-Acquisition Program Definition Document #217-094 dated 5 JUN 90.
Operational Requirement #217-094-92 dated 18 OCT 90.

G. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive altimetry from GFO.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

Begin GFO satellite development	08/92
Complete Preliminary Design Review	07/93
Complete Critical Design Review	01/94

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: IN-HOUSE INDEPENDENT LABORATORY RESEARCH
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

ONR THRUSTS	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
	In-House Independent Laboratory Research					
OCEAN SCI.		848	1,014	1,029	CONT.	CONT.
INFO. SCI.		910	1,088	1,104	CONT.	CONT.
ADV. MATLS.		1,497	1,791	1,816	CONT.	CONT.
SUST. PROG.		10,745	12,853	13,036	CONT.	CONT.
	TOTAL	14,000	16,746	16,985	CONT.	CONT.

B. (U) DESCRIPTION: This program has been closely tailored to the newly established warfare center structure, to better plan and control Navy Warfare Center high-risk, high-payoff research relevant to the warfare centers' missions and to the needs of the Navy. Prime objectives are to focus and enhance the creativity and productivity of warfare centers, and to attract and retain talented and creative scientists and engineers. Research is identified in those fields of science most closely related to the Navy's mission (reflected in the Office of Naval Research (ONR) Investment Strategy) and on new concepts relevant to future Navy requirements (ONR Thrust areas of Ocean Sciences, Advanced Materials, and Information Sciences, plus the overall Sustaining Programs); consideration is also given to relevance to the Department of Defense (DoD) Science and Technology (S&T) Thrusts. Efforts are selected by the warfare centers, approved by ONR and reviewed for the quality of science produced. Efforts are part of an integrated Department of Navy S&T process, recently initiated by ONR.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Examples are listed by ONR Investment Strategy emphasis. While research generally applies across the board to the DoD S&T Thrusts, the primary thrust is noted in parentheses.

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Ocean Sciences (S&T: Sea Control): Developed scattering models for the under-ice and shallow water environments that assist the progress of target identification and classification.

b. (U) Information Sciences (S&T: Precision Strike): Developed a general mechanism for machine learning of association of sensor features and motor responses. Such continuous and self-directed learning allows an autonomous robot or vehicle to behaviorally adapt to new conditions even when operating far from human control or supervision.

c. (U) Advanced Materials (S&T: Sea Control): Furthered the development of materials to fit the need of lightweight electromagnetic wave absorbers with long term environmental stability for naval ship application.

d. (U) Sustaining Programs (S&T: Sea Control): Demonstrated that a physical system exhibiting chaotic motion can be controlled; this control can be implemented in a variety of systems including chemical, biological, optical, electronic and mechanical. Primary application is in active control of vibrations in naval and aerospace structure.

2. (U) FY 1993 PROGRAM:

a. (U) Ocean Sciences (S&T: Sea Control): Investigate fluid flow phenomena which are related to various tactical and strategic weapons

operations/warhead design, and develop mathematical methodologies for these investigations.

b. (U) Information Sciences (S&T: Global Surveillance and Precision Strike): Investigate the areas of artificial intelligence, advanced filtering techniques, information handling, and computer systems architectures that may lead to smart weapons, highly adaptive systems, and improved Naval strategy.

c. (U) Advanced Materials (S&T: Precision Strike): Fundamental studies on materials with potential for major improvements in effectiveness of Navy weapons systems, ordnance, strategic/space systems. Investigate those phenomena and materials that are likely to lead to lighter-weight permanent magnets.

d. (U) Sustaining Programs (S&T: Sea Control): Investigate those phenomena involving propagation of charged particles for beam weapons and millimeter radiation.

3. (U) FY 1994 PLANS:

a. (U) Ocean Sciences (S&T: Global Surveillance and Sea Control): Study submarine detection by self-coherent matched-field processing as a means to improve target detection capability. Investigate acoustic propagation in ice to enhance detection in physically constrained areas, such as coastal regions or under arctic ice.

b. (U) Information Sciences (S&T: Precision Strike): Develop spatio-temporal image processing algorithms to track airborne targets in real time. Perform studies of neural and algorithmic networks.

c. (U) Advanced Materials (S&T: Sea Control): Determine acoustic properties of polymers for stealth applications. Research electro-magnetic properties of materials to reduce ship signatures.

d. (U) Sustaining Programs (S&T: Global Surveillance and Sea Control): Analyze nonlinear dynamics and fractals with a view toward control of nonlinear systems. Study parameters of ship signatures for designing for reduced signatures.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC, San Diego, CA; NAVUNSEAWARCENDIV, Newport, RI; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NAVTRASYSCEN, Orlando, FL; NAVPERSRANDCEN, San Diego, CA and NAVCIVENGRLAB, Port Hueneme, CA. CONTRACTORS: None.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: IN-HOUSE INDEPENDENT LABORATORY RESEARCH
PROJECT NUMBER: N/A PROJECT TITLE: N/A

G. (U) RELATED ACTIVITIES: Program Element (PE) 0601153N, Defense Research Sciences; PE 0602111N, Surface/Aerospace Surveillance & Weapons Technology; PE 0602234N, Materials, Electronics and Computer Technology; PE 0602314N, Undersea Surveillance and Weapons Technology. This program adheres to Tri-Service Reliance Agreements on Basic Research and oversight is provided by 6.1 cooperation between ONR, Air Force Office of Scientific Research, and Army Research Office. Work in this PE is related to and fully coordinated with efforts in PE 0601101A and PE 0601101F in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: DEFENSE RESEARCH SCIENCES
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

ONR THRUST	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
	Defense Research Sciences					
OCEAN SCI.		119,323	129,082	131,632	CONT.	CONT.
ADV. MATLS.		39,122	42,322	43,158	CONT.	CONT.
INFO. SCI.		31,872	34,478	35,160	CONT.	CONT.
ENVIRONMENTAL		4,100	13,000	13,000	CONT.	CONT.
SUSTAIN PGM.		183,517	189,962	193,972	CONT.	CONT.
	TOTAL	377,934	408,844	416,922	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of this program is to sustain U.S. naval scientific and technological superiority, to provide new concepts and technological options for the maintenance of naval power and national security, and to afford the means to avoid scientific surprise, while exploiting scientific breakthroughs. The program is guided by the Office of Naval Research (ONR) Investment Strategy, such that research efforts support naval warfare requirements and the DoD Science & Technology (S&T) Thrusts. The ONR Investment Strategy emphasizes Ocean Sciences, Advanced Materials, and Information Sciences. An example of the Ocean Sciences emphasis and support of Power Projection (a Navy priority mission) and Precision Strike (a DoD Thrust), is the Special Research Program (SRP) in Underwater Acoustics Reverberation; the SRP focuses on understanding the physics of underwater sound propagation associated with future naval systems. The sustaining portion of the ONR investment is directed toward maintenance of scientific superiority and provision of scientific options which may create and exploit scientific and technological surprise, as well as bridge critical scientific gaps in current key Department of Navy (DON) programs and DoD Advanced Technology Demonstrations (ATDs). Sustaining efforts support a diversity of other initiatives from cost reduction to operation and improvement of research ships and submersibles. Efforts are part of an integrated Department of Navy S&T process, recently initiated by ONR.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Examples are listed by ONR Investment Strategy emphasis; DoD S&T Thrusts are noted in parentheses.

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Ocean Sciences (S&T: Sea Control): Demonstrated feasibility of using low frequency sound transmission halfway around the world for long-term global monitoring (Heard Island experiment); demonstrated airborne laser profiling of mean sea ice thickness; and significant revision to sea surface-wind-ambient noise modeling which accounts for bubble cloud resonances from breaking waves and yields improved acoustic propagation modeling.

b. (U) Advanced Materials (S&T: Sea Control, Global Surveillance and Precision Strike): Demonstrated first high temperature super-conductor magnetic gradiometer; characterized & modified nanometer features beneath the surface of electronic devices (relates to very compact computer devices); controlled nucleation and growth of diamond film in chemical vapor deposition; demonstrated long charge retention time, basic to non-volatile DRAM (microcomputer memory); demonstrated 5 billion connections per second in neural network multiplication chip; exhibited new ceramic composite interfaces stable to 1400 degrees celsius for use in high temperature engine components; and electronic neural network fundamental knowledge transitioned to PE 0602234N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: DEFENSE RESEARCH SCIENCES
PROJECT NUMBER: N/A PROJECT TITLE: N/A

c. (U) Information Sciences (S&T: Synthetic Environments): Demonstrated experimentally and verified efficient performance of program (language and structure) execution on a variety of distinct types of parallel machines; transitioned parallel blackboard (representation and sharing of data from multiple sources, as in multi-sensor fusion) as turn-key product to a newly created small business; demonstrated cesium vapor cell for portable atomic clock (applicable to improvements in navigation systems); and transitioned software verification methodology tools to Naval Air Warfare Center, China Lake to facilitate avionics system updates.

d. (U) Environmental (S&T: Environmental Technology): Demonstrated ability of marine fungi to convert hydrocarbons to environmentally benign by-products.

e. (U) Sustaining Program (S&T: Sea Control): In bone marrow registry, developed improved DNA testing to better match donors and recipients, currently over 5,000 registrants; showed feasibility of cloning specific receptors as biosensors; demonstrated low pH protects against hypoxic injury (already employed in emergency rooms); demonstrated organisms (elasmobranchs) capable of detecting ocean electric fields of 5 nanovolts per centimeter intensity; developed microscope that allows digitized imaging of ion fluxes under pressure; and anti-fouling hull coating fundamental knowledge transitioned to PEs 0602234N and 0603712N.

2. (U) FY 1993 PROGRAM (topical titles of new research initiatives):

a. (U) Ocean Sciences (S&T: Sea Control): global change in middle atmosphere (ozone processes); marine boundary layer spectra similarity theory; oceanic turbulence production and dissipation; electromagnetic properties of sea ice; and coastal water clarity.

b. (U) Advanced Materials (S&T: Sea Control): adhesion/microscopic forces and nanomechanics; advanced deposition methods/coatings & interfaces in space; patterning & fabrication of nanometer structures; modeling of composite structures; energy release in heterogenous energetic decomposition; adaptive (smart) structures/metamorphic (active) materials; combustion processes of high energy fuels; and molecular/interfacial interactions at marine interfaces.

c. (U) Information Sciences (S&T: Global Surveillance): man-machine dialogue for computer-based decision support; image representation in biological & machine vision; domain specific massive parallelism/computational science; low light level optical image amplification & detection; and biophysical modeling of single neuron computation.

d. (U) Environmental (S&T: Environmental Technology): marine environmental quality; environmentally sound ships; and damage mitigation and compliance.

e. (U) Sustaining Programs (S&T: Precision Strike): psychophysical & neurophysical spatial orientation; environmental quality/protection & damage mitigation; enhanced vibronic interactions of heavy rare earth ions; and neural network-based mechanical diagnostics.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: DEFENSE RESEARCH SCIENCES
PROJECT NUMBER: N/A PROJECT TITLE: N/A

3. (U) FY 1994 PLANS (topical titles of new research initiatives):

a. (U) Ocean Sciences (S&T: Sea Control): atmospheric mesoscale dynamics in coastal regions; physical properties of coastal & shallow waters; and propagation of acoustic wavefields in dispersive waveguide.

b. (U) Advanced Materials (S&T: Surveillance & Affordability): magnetism in small structures; novel robotic actuators/materials, mechanics and control; mechanisms and prevention of biocorrosion; properties of nanometer structures/life cycle costs; and spin-polarized heterostructures/charge carrier systems.

c. (U) Information Sciences (S&T: Precision Strike; Synthetic Environments; & Affordability): optimization & computational logic; ultra wideband electromagnetics and signals; stochastic analysis of nonlinear ocean structures; virtual environment for training, targeting & teleoperation; and life cycle implications of computer science software.

d. (U) Environmental (S&T: Environmental Technology): ecotoxicology; low frequency acoustics & marine mammals; ship waste conversion.

e. (U) Sustaining Programs (S&T: Affordability): logically connected neuromorphic systems; non-equilibrium turbulence; and atomic control of structure (man-made semiconductors).

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Navy Laboratories (30%) CONTRACTOR: Universities (about 59% of funding), industry, not-for-profit and other institutions (11%).

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element (PE) 0602111N, Surface/Aerospace Surveillance and Weapons; PE 0602121N, Surface Ship Technology; PE 0602122N, Aircraft Technology; PE 0602234N, Materials, Electronic Devices and Computer Technology; PE 0602314N, Undersea Surveillance - Weapons Technology; PE 0603207N, Air/Ocean Tactical Applications; PE 0603785N, ASW Environmental Acoustic Support; PE 0601152N, In-House Independent Laboratory Research; PE 0601102A, Army Defense Research Sciences; and PE 0601102F, Air Force Defense Research Sciences. Activities are coordinated through Tri-Service 6.1 Reliance Scientific Planning Groups.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE/AEROSPACE SURVEILLANCE & WEAPONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Surface/Aerospace Surveillance and Weapons Technology	68,677	70,942	67,305	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE) supports future surveillance and weapons systems for surface, air, and space platforms for Navy missions in Anti-Air and Anti-Surface Warfare (ASUW). Programs in this PE are jointly planned with the Air Force and Army through panels of the Joint Directors of Laboratories (JDL). This PE supports four thrusts in the Department of Defense Science and Technology (S&T) Strategy. In particular, this program provides exploratory developmental underpinnings for: Global Surveillance - Multi-platform radar and infrared sensors for detection, identification, tracking, and damage assessment; Precision Strike - Mission planning, missile and propulsion technology, advanced warheads, and precision targeting; Air Superiority and Defense - Innovative ship based air defense and air superiority weapons technology; and Technology for Affordability - low cost guidance and control (G&C). Efforts are part of an integrated Department of Navy S&T process, recently initiated by the Office of Naval Research.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Ship Self Defense: Completed high performance missile technology investigations; demonstrated Detection/Track of Low Observable Target; completed Aerostat illuminator for ship horizon extension; completed design and specifications for Ship Infrared Search & Track (IRST); and demonstrated 3-Dimensional (3-D) algorithms for dim Infrared (IR) Targets. Completed shipboard installation study for modular high-energy laser system.

b. (U) Air Superiority: Completed active array cued/supercued investigation, and tested an 8-inch diameter guidance integrated fuze (GIF) active array antenna.

c. (U) Area/Wide Area Defense Weapons: Completed directional warhead investigation and transitioned to PE 0603609N.

d. (U) ASUW/Strike Weaponry: Terminated precision strike initiative and defense suppression technology projects. Fabricated and tested a 0.1°/hr brassboard fiber-optic gyro on a chip; conducted technology assessments of a low drag ram-jet propulsion concept and autonomous aim-point selectable seeker concepts for future anti-ship missiles.

e. (U) Wide Area Surveillance: Completed lab demonstration of space based IRST; High Altitude Remotely Piloted Surveillance System radar selected as candidate Tri-Service Testbed Radar. Fabricated Hi-band of Wide Band Airborne Early Warning (AEW) Radar Testbed. Demonstrated high frequency direction finding (HFDF) site location System. Completed lab demonstration of compact high frequency active system; and completed surface wake detection project.

f. (U) Area Surveillance: Established JDL joint program with Air Force for Non-Cooperative Target Recognition, and demonstrated 2-Dimensional (2-D) inverse synthetic aperture radar (ISAR) air target identification. Transitioned ultra-high frequency radar to Naval Sea Systems Command with subsequent deployment to Air Defense Initiative test-site at Kauai, HI. Conducted Tri-Service Anti-Radiation Missile (ARM) vulnerability testing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE/AEROSPACE SURVEILLANCE & WEAPONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

2. (U) FY 1993 PROGRAM:

a. (U) Ship Self Defense: Conduct hydro-code and small scale test lethality evaluation studies of explosively generated water columns for ship terminal defense; evaluate use of composites in launch tube and chamber of high pressure projectile, missile, and decoy launchers; and develop off axis recoil solution(s). Conduct multi-sensor/multi-target tracking investigations. Complete 3-D IR target algorithms; complete integration of point defense sensors; and complete exploratory development of IRST. Initiate multi-function radar technology development. Complete improvements of switch technology relevant to high power, frequency-agile, wideband radio frequency (RF) source development; and develop high power laser sources for IR Countermeasures.

b. (U) Air Superiority: Conduct hardware-in-the-loop simulations of lock-on-after-launch (LOAL) G&C components; and continue guidance-integrated fuze efforts jointly with Army and Air Force. Fabricate and test a 2.5 inch diameter, 1mm thick diamond IR dome for structural and thermal stresses.

c. (U) Precision Strike and ASUW Weaponry: Conduct airborne testing of real-time multi-sensor correlation algorithms for land attack targeting. Conduct application investigation of parallel distributed processing techniques for timely route and mission planning and adaptive mission control functions for smart weapons; develop an adaptive mission control concept simulation; and initiate development of automatic methods for real-time confirmation of relocatable targets in Synthetic Aperture Radar (SAR) imagery for littoral application.

d. (U) Global Surveillance: Complete AEW Testbed Radar fabrication and initiate advanced AEW Radar (Roto dome). Conduct IR polarmetric experiments. Complete compact HFDF development. Initiate advanced ship-wake sensing technology. Lab test space based ISAR algorithms and ground based imaging demo of space based interferometer. Initiate multi-spectral IR technology. Integrate volume surveillance radar with Point Defense sensors. Fabricate shared aperture electro-optical/infrared (EO/IR) sensors. Lab demo auto ship classifier. Field test 2-D Air Target Identification (ID) Processor. Conduct Tri-Service counter-ARM experiments. Conduct target detection assessment modeling.

3. (U) FY 1994 PLANS:

a. (U) Ship Self Defense: Conduct full scale multi-charge tests for generating water barrier to validate hydro-code analysis; and conduct barrier effectiveness test against fragments and missiles. Design and fabricate composite launcher tube and package in box configuration. Investigate beam steering, multipath, and glint problems associated with miniature RF seekers for medium caliber gun launch projectiles. Complete multi-sensor detection and multi-target tracking experiments. Continue ship combat system and weapon system control technology investigations. Initiate low probability intercept radar development; lab test survivable radar waveforms; initiate advanced multi-spectral IR Processor development; and continue multi-function radar development. Demonstrate single-pulse chemical laser burnout.

b. (U) Air Superiority: Conduct scale tests of selected close encounter warhead. Continue airframe control, high angle of attack aerodynamics, IR clutter suppression, fire control, LOAL G&C, and warhead investigations. Continue joint program in GIF technology with Army and Air Force.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE/AEROSPACE SURVEILLANCE & WEAPONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

c. (U) Precision Strike and ASUW Weaponry: Continue investigating application of neural network, wavefront propagation and other parallel processing techniques, and develop in-flight mission replanning capability for smart weapons. Using concept simulation module, begin simulations with Advanced Research Projects Agency WARBREAKER environment of adaptive mission control technologies being developed under this program. Continue to assess robustness of land attack multi-sensor correlation algorithms against a variety of terrain types, source data, and flight profiles. Continue littoral targeting investigations by expanding SAR data base to include relocatable targets, i.e. ships in berth, mobile land targets, etc. Complete classified development for ships in berth and transition technology to the Joint Surveillance Target Attack Radar System.

d. (U) Global Surveillance: Transition advanced AEW radar technology to Naval Air Systems Command. Develop IR novel discriminants processing techniques; and complete analysis of multi-spectral space based IR sensor. Complete development of ISAR classification of ships from space. Conduct field demonstration of shared aperture EO/IR sensors. Demo IR clutter rejection algorithms; test IR Power Spectral Density model.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC; and NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: APL/JHU, Baltimore, MD; MIT/LL, Lexington, MA; QuesTech Inc., Falls Church, VA; Hughes Aircraft Company, Fullerton, CA; TRW, Redondo Beach, CA; Ferranti, Manchester, UK; Westinghouse, Baltimore, MD. Grumman, Bethpage, NY; Texas Instruments, Dallas, TX; LORAL, Lexington, MA; Michigan State University, Lansing, MI.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This PE adheres to Tri-Service Reliance agreements with oversight provided by the JDL. This PE is related to and fully coordinated with efforts in the following:

1. Wide Area Surveillance Radar: PE's 0601102F, 0602702F, 0602302F, 0602102F, 0602101F, 0602203F, 0603789F, 0603428F, and 0603741D.
2. Air Intercept and Strike Radar: PE's 0603217N, Air Systems Advanced Technology Development; 0603109N, Integrated Aircraft Avionics; 0602782A, 0603253F, 0603203F, 0602204F, 0601101F, 0605502F, 0603227E, and 0602712E.
3. Air-Air and Anti-Surface EO: PE's 0603792N, Advanced Technology Demonstrations; 0602204F, 0603203F, 0603253F, 0603270F, 0602709A, and 0603710A.
4. Conventional Air/Surface Weaponry: PE's 0603609N, Conventional Munitions; 0603640M, Marine Corps Advanced Technology Demonstration; 0602618A, 0602624A, 0603004A, 0602303A, 0602203F, 0602602F, 0602302F, 0602601F, 0603216F, and 0603790D. This is in accordance with the ongoing Reliance joint planning processes. Another related activity is PE 0602234N, Materials, Electronics and Computer Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Surface Ship Technology	31,924	46,019	17,495	CONT.	CONT.

B. (U) DESCRIPTION: This program develops hull, machinery, and electrical technology to (1) reduce detectability and targetability for all ships; (2) increase ability of ships to absorb combat damage and fight hurt; and (3) allow more efficient, affordable warships. Project areas presently being pursued include: electromagnetic compatibility, signature reduction, advanced hull systems, passive ship protection, damage control, advanced propulsion and machinery and advanced electrical systems. Efforts are part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research.

(U) This element supports the Department of Defense Science and Technology Strategy in the following thrust areas: (1) Precision Strike - signature reduction, advanced propulsion, advanced electrical systems, passive ship protection, and damage control; (2) Air Defense - signature reduction, electromagnetic compatibility, advanced hull systems, passive ship protection, and damage control; (3) Sea Control & Undersea Superiority - acoustic quieting and magnetic signature reduction; and (4) Technology for Affordability - all project work, especially that related to advanced electrical systems and unidirectional double hulls within the advanced hull systems project area.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed generic radiated noise model for surface ships.
b. (U) Evaluated two alternate electro-optical field sensor candidates for shipboard radio frequency (RF) monitoring system.
c. (U) Validated resistance of new underwater bow shapes at model scale.
d. (U) Initiated small boat scale demonstration of permanent magnet motor/generator propulsion system.
e. (U) Initiated feasibility study of diesel fuel cells for shipboard power.
f. (U) Completed reduced scale testing of Halon alternatives for shipboard fire suppression.
g. (U) Implemented unidirectional double hull development effort per Congressional direction.
h. (U) Completed cooperative effort with other North Atlantic Treaty Organization navies to improve dynamic stability of ships in rough seas.
i. (U) Completed analytical model for missile debris and residual fuel damage.
j. (U) Transitioned non-linear whipping model to 6.3.

2. (U) FY 1993 PROGRAM:

a. (U) Demonstrate active noise control system for Ship Service Diesel Generator set on large scale ship model.
b. (U) Complete development of computational algorithm for radar-to-satellite communications interference interactions.
c. (U) Develop design guidelines for asymmetric propulsor ducts.
d. (U) Complete RF and infrared (IR) prediction algorithm and physical scale modeling development.
e. (U) Initiate competitive conceptual designs of power circuit breakers for Navy ships.

f. (U) Transition electrical power distribution system, monitoring and control system, and component level requirements to advanced development.
g. (U) Demonstrate feasibility of contra-rotating homopolar motor for electric drive.
h. (U) Demonstrate potential of composite diesel engine to minimize weight, acoustic emissions, and magnetic signature.
i. (U) Demonstrate feasibility of low cost, high speed, high payload advanced material transporter concept.
j. (U) Validate shipboard smoke-spread analysis model.
k. (U) Demonstrate fiber optic flooding sensors in a simulated shipboard environment.
l. (U) Transition stochastic fatigue design methodology to Navy designers.
m. (U) Validate affordability of automated fabrication and outfitting methods for unidirectional double hull ships.
n. (U) Complete above water explosion damage prediction method.

3. (U) FY 1994 PLANS:

a. (U) Transition closed loop degaussing magnetic signature modification system for steel hulled ships.
b. (U) Validate model for combining anti-radiation coatings and hull transmission path blockers to reduce radiated noise signatures.
c. (U) Initiate quiet design rudder development.
d. (U) Initiate development of acoustically inefficient composite/steel structures.
e. (U) Demonstrate ability of an electro-optic electromagnetic environment monitoring concept to remotely monitor shipboard RF emission over the entire RF spectrum.
f. (U) Develop design guidelines for vertical axis propulsor.
g. (U) Identify low signature concepts for topside shipboard systems.
h. (U) Initiate development of techniques for analyzing low level radar cross section and IR signature contributors.
i. (U) Demonstrate feasibility of light weight, low-observable, electromagnetically compatible, glass-reinforced plastic mast concept.
j. (U) Complete manufacturer and acceptance test and trials of permanent magnet electric drive for patrol boat demonstration.
k. (U) Transition design guidelines for a new family of shock-hardened power circuit breakers to advanced development.
l. (U) Complete development and demonstration of solid-state power converter for zonal electrical power distribution system.
m. (U) Complete development of limited duty cycle generator and construct resonant transformer model for feasibility demonstration.
n. (U) Complete fiber brush performance evaluation in homopolar generator.
o. (U) Complete assessment of Artificial Intelligence/Neural Network technology for intelligent machinery.
p. (U) Complete development of two alternate alloy candidates for wire and magnet components of a low temperature superconducting electric drive system.
q. (U) Determine feasibility of regenerative diesels for shipboard use.
r. (U) Demonstrate capability of surface acoustic wave sensor array to discriminate fire type in a shipboard environment.
s. (U) Complete probabilistic structural analysis guidelines.
t. (U) Complete structural design guidelines for unidirectional double hull ship geometries.
u. (U) Initiate concepts to prevent or lower the potential for magazine mass detonation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCENDIV, Dahlgren, VA; NRL, Washington, D.C.; NCCOSC, San Diego, CA. CONTRACTORS: Analytic Power Corporation, Boston, MA; Ball Aerospace Corporation, Boulder, CO; Baron Associates, Stanardsville, VA; Bath Iron Works, Bath, ME; Creare Incorporated, Hanover, NH; EML Research Inc., Hudson, MA; General Electric Company, Schenectady, NY; Ingalls Shipbuilding, Pascagoula, MS; Klein Systems Corporation Salem, NH; Lehigh University, Bethlehem, PA; Lockhead Space & Missile Corporation, Sunnyvale, CA; Massachusetts Institute of Technology, Cambridge, MA; Metro Machine, Norfolk, VA; Newport News Shipbuilding, Newport News, VA; Purdue University, West Lafayette, IN; The ReJen Company, Bishop, CA; SatCom Technology Corporation, Cambridge, MA; Seemann Composite Systems, Inc., Gulfport, MS; University of Houston, Houston, TX; University of Michigan, Ann Arbor, MI; Virginia Polytechnical Institute, Blacksburg, VA; Westinghouse Corporation, Pittsburgh, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0602131M, Marine Corps Landing Force Technology; PE 0603502N, Undersea Warfare and Mine Countermeasures Development; PE 0603508N, Ship Propulsion System; PE 0603513N, Shipboard System Component Development; PE 0603514N, Ship Combat Survivability; PE 0603553N, Surface Anti-Submarine Warfare; PE 0603564N, Ship Preliminary Design and Feasibility Studies; PE 0603573N, Advanced Surface Machinery Systems; PE 0602233N, Mission Support Technology; PE 0602234N, Materials, Electronics & Computer Technology; PE 0602315N, Mine Countermeasures, Mining and Special Warfare Technology; and PE 0602323N, Submarine Technology.
(U) Under the Tri-Service Reliance Agreement, the Navy has the lead for this Navy-unique program.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Aircraft Technology	20,098	25,061	21,253	CONT.	CONT.

B. (U) DESCRIPTION: This program develops technology for naval aviation, with emphasis on the demands imposed by aircraft carrier flight operations and Marine Corps amphibious and field operations. This program exploits the emerging technologies of: (a) composite and matrix materials for structures to reduce airframe and propulsion plant weight and the effects of saltwater corrosion; (b) reduced observable aerodynamic designs of Navy-unique aircraft components; (c) advanced gas turbine engine component designs for extended range/endurance; and (d) longer service life to bring about reduced at-sea replacements and spare inventory. Technologies are developed for needed upgrades to shipboard and arresting-gear-systems, visual landing aids for safer flight operations, and aircraft maintenance test equipment for increased weapon system availability. The program provides mission area analysis and concept definition required for the Exploratory Development phase of air vehicle and weapon system programs. Efforts are part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research.

(U) This element adheres to Tri-Service Reliance Agreements and supports the Department of Defense Science and Technology Strategy in the following areas: Air Superiority/Air Defense; Precision Strike; and Technology for Affordability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Built non-intrusive engine turbine inlet sensors for Integrated High Performance Turbine Engine Technology (IHPTET) program. Lighter weight, more efficient control systems capable of operation in more severe engine and aircraft environments will improve propulsion system thrust/weight, specific fuel consumption performance, and reduce susceptibility to countermeasures.

b. (U) Evaluated performance of an integrated crewstation in a capsule. Man-machine interfaces will be improved through the use of computer models to realistically define and assess aircrew interface requirements.

c. (U) Tested advanced helmet-mounted display visor optics. Visual display performance, head tracking, positive pressure breathing, and multi-wavelength laser eye protection will be systematically integrated with the helmet mounted display optical component.

d. (U) Designed a flight-control system which incorporates neural networks. Flight control computer complexity and hardware/software support costs would be potentially reduced through application of neural networks.

e. (U) Developed concept for generic autonomous vehicles for yellow gear application.

f. (U) Started developing the tactical utility of agility for Navy aircraft based upon Advanced Research Projects Agency's (ARPA) X-31A Enhanced Fighter Maneuverability aircraft.

2. (U) FY 1993 PROGRAM:

a. (U) Complete Advanced Subsonic Turbine Engine Technology turbine design for IHPTET program. Research is focused on increased temperature capability, advanced cooling schemes, and incorporation of next generation engine materials and thermal barrier coatings. The turbine will contribute to

the IHPTET initiative, which has as its goal the doubling of propulsion performance capability by the year 2003.

b. (U) Conduct a systems evaluation of the Advanced Technology Cockpit. Incorporation of an articulating seat for improved G protection, integration of movable flat panel displays, laser sequencing for aircrew escape systems, improved high speed escape and anti-exposure through use of a crew module, and improved severance of composite materials during initial ejection are being evaluated.

c. (U) Test the capabilities of flight controls against high-power microwaves. This will demonstrate the capability to operate without degradation at extremely high ambient electromagnetic flux levels (i.e., counter radio-frequency weapons).

d. (U) Transition aircraft battle damage technology to Navy repair and training facilities. Performing repairs on composite structures at field maintenance levels results in cost and manpower savings and increases operational readiness.

e. (U) Develop automated rapid aircraft-turn-around capability for carriers and air-capable ships. Directly following aircraft recovery, rapid turnaround will perform a quick assessment of aircraft status to determine optimal servicing and maintenance.

f. (U) Continue X-31A agility development for Navy applications.

3. (U) FY 1994 PLANS:

a. (U) Develop agility vector flying qualities for future advanced fighter designs based on the X-31A close-in combat capabilities.

b. (U) Evaluate an autonomous vehicle for the carrier deck. Technologies being developed by Naval Research Laboratory, Department of Energy, and ARPA will be used in attachable modules to clean up chemical, biological, and radioactive material contamination, to fight fires, and to load and handle weapons.

c. (U) Complete development of lightweight metal matrix landing and arresting gear components capable of withstanding the stress of carrier landings.

d. (U) Complete a computer model for next generation Navy aircrew station/interface function specification. The model would be used by industry to design future cockpits, backseat crewstations, and ejection capsules.

e. (U) Develop computer-aided interactive simulation deck-spotting board to provide seabased aircraft servicing and maintenance personnel aircraft status data in near real-time. Improvements in the deck-spotting decision aid will increase sortie rates, improve warfighting capability, and enhance mission flexibility.

f. (U) Develop, test, and evaluate remote sensing concepts to assess the performance of aircraft engines. Individual remote sensing concepts will be developed to acquire and analyze engine test parameters (i.e. acoustics, electrostatics, and thermal) and to assess, detect, predict and identify engine failures.

g. (U) Demonstrate application of active damped structures to areas susceptible to damage by severe vibration or buffeting. The lifetime and safety margin of these structures would be increased. The combined weight and volume of the active control and redesigned structures could potentially be reduced.

h. (U) Development of combustion, mechanical, and control and integration of propulsion components for IHPTET.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Trenton, NJ; NAVAIRWARCENACDIV, Lakehurst, NJ; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD;

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

NAVSURFWARCENDIV, Indian Head, MD; NRL, Washington, D.C. CONTRACTORS: General Electric, Cincinnati, OH and Lynn, MA; McDonnell-Douglas Corporation, St. Louis, MO; Pratt-Whitney Engines, West Palm Beach, FL; Rockwell International, Columbus, OH; Boeing Aircraft Corporation, Seattle, WA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element adheres to Tri-Service Reliance Agreements on Air Vehicles (Fixed), Air Vehicles (Rotary), Integrated Avionics, and Aeropropulsion with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to and fully coordinated with efforts in PEs 0601101F; 0601102F; 0601153N, Defense Research Sciences; 0602201F; 0602202F; 0602203F; 0602204F. Related Exploratory Development PEs include: 0602233N, Mission Support Technology; 0602234N, Materials, Electronic and Computer Technology. Other related PEs are: 0603003A; 0603109F; 0603112F; 0603202F; 0603205F; 0603211F; 0603216F; 0603217N, Air Systems Advanced Technology Development; 0603231F; 0603245F; 0603706N, Medical Development; 0603727F; and 0603792N, Advanced Technology Transition in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Marine Corps Landing Force Technology	18,036	20,216	17,225	CONT.	CONT.

B. (U) DESCRIPTION: This program is the only Department of Defense (DoD) Exploratory Development program that develops the technologies needed to support unique U.S. Marine Corps (USMC) expeditionary forces warfighting requirements. Mission needs are derived from specific threat capabilities and the requirement to operate in a variety of climates and tactical scenarios worldwide, including the conduct of amphibious operations, contingency operations, and Special Operations in Low Intensity Conflict. Specific requirement documents for the Navy Needs Statement are: the Marine Air Ground Task Force Master Plan, Marine Corps Long Range Plan, and Marine Corps Campaign Plan. This Program Element contains multiple efforts in various disciplines. Efforts are part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research. All are continuous, discrete efforts, but vary internally to address emerging requirements with evolving technology. This program is fully compliant with the Joint Director of Laboratories (JDL) Tri-Service Reliance Agreements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed fabrication and model testing of Crypto Pulse Propulsor (CPP), a propulsion device for advanced marine vehicles that employs bursts from columns of water jets similar to water jet propulsion. Evaluated and tested improved elastomers for use on Lightweight Band Track. Completed preliminary designs of: a Helo Transportable Multi-Mission Platform (HTMMP), a high speed/mobility self-loading Pallet Carrier, and a Space Frame Hull. Entered into a Joint Light Modular Combat Vehicle (LMCV) development program with Advanced Research Projects Agency (ARPA) and the United States Army.

b. (U) Determined viability of peroxide compounds for decontamination; developed antibodies for most significant biological warfare agents; provided developmental materials for Lightweight Suit Advanced Technology Transition Demonstrations (ATTD); transitioned advanced canister to Program Manager - Combat System Support (CSS) for procurement; and initiated function-based detection effort utilizing live cell technology.

c. (U) Completed the Stand-off Mine Detection Ground (SMDG) field tests for the multispectral Marine Detection and Surveillance test bed. Optimized and tested distributed explosive Mine Countermeasures (MCM) Technologies. Fabricated/tested Wide Area Mine Clearance (WAMC) components/breadboard system. Refined WAMC countermeasures software.

d. (U) Completed C2-2000 project, a command and control concepts study to provide advanced battlefield electronic support for the 2000 time frame. The study involved testing of improved interrogation devices, demonstration of a Command Information Processor, forward observer device, and software interfaces. Completed transition of applicable elements to various Marine Corps Tactical Command and Control Systems (MTACCS) projects. Expanded investigations of Short-Ranged Communications technologies.

e. (U) Evaluated ballistic protective fabric against live munitions (arena test). Completed classified efforts 645 and 500. Entered into joint Low Observable Technology development program with Land Systems Office (LSO) ARPA. Completed Phase I of joint USMC/U.S. Army Multi-Spectral Paint effort. Evaluated advanced Composite Armor Concepts. Completed Metal Matrix Composite Armor evaluation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

f. (U) Conducted workshops on functional and technology needs of the USMC in Advanced Amphibious Logistics. Published proposed technology categories for high-priority analyses.

g. (U) Completed testing of cognitive algorithms of the Advanced Processors for Weapons Sensor Fusion (APWSF), Initiated concept development for Expendable Acoustic Remote Sensor Artillery Launched (EARS-AL), and the Acoustic and Electronic Warfare Support Measures sensors of the Advanced Systems for Air Defense (ASAD). Completed testing of the Armor Piercing Tubular Sabot (APTS). ASAD was also packaged for transition to USMC ATTD in FY93.

2. (U) FY 1993 PROGRAM:

a. (U) Complete fabrication and begin testing of the HTMMP. Initiate design and fabrication of full scale CPP for an advanced assault amphibian. Start design of LMCV and systems. Continue investigation of advanced surface mobility concepts for both assault amphibians and wheeled vehicles. Complete Advanced Material Transporter, transition to an ATTD.

b. (U) Chemical/Biological Defense Technology Project being reduced radically to fully comply with JDL Tri-Service Reliance initiatives. Initiate advanced detector effort using antibody based and function based live cells technology.

c. (U) Under a joint Marine Corps/ARPA/Army program, evaluate technology for stand-off buried mine detection based on multi-sensor fusion and image processing. The SMDG multispectral technologies will merge into this program. Optimize MCM munition for Distributed Explosive Mine Neutralization System (DEMNS). Test and demonstrate WAMC countermeasures technology.

d. (U) Complete analysis, design, test protocols, and feasibility testing for short-ranged communication efforts. Continue development of MTACCS-Copernicus interfaces.

e. (U) Complete joint Multi-Spectral Paint effort. Complete ballistic protective fabric task and transition. Investigate advanced armor concepts. Conduct test of blast resistant vehicle technology.

f. (U) Evaluate logistics effort on highest priority technology thrusts. Conduct analysis on second round of priority requirements for USMC; identify and recommend technology efforts for additional show stopper CSS requirements.

g. (U) Refine APTS Technology under a joint advanced Lethality Enhancement program. Continue the innovative cognitive algorithms and processor effort in APWSF. Conduct detailed chemistry, physics and programmatic studies for the Particulate Volumetric Explosive. Evaluate technologies for fusion of sensor/weapons to support battalion level combat.

3. (U) FY 1994 PLANS:

a. (U) Test and evaluate subsystems and components on HTMMP. Continue evaluation of advanced technology for USMC vehicles.

b. (U) Conduct major field tests with exploratory development multi-sensor test beds for airborne buried mine detection. Complete MCM munition development for DEMNS. Transition WAMC sensor/decoy/software technology to advanced technology demonstrations. Evaluate mechanical neutralization concepts.

c. (U) Assemble brassboard short-ranged communications systems. Demonstrate MTACCS-Copernicus interfaces. Continue development of remote sensor improvements.

d. (U) Evaluate advanced tactical deception technology. Pursue advanced armor technology. Continue blast survivability efforts.

e. (U) Initiate new efforts in logistics for equipment packaging and part identification.

f. (U) Integrate innovative fire control solutions and target acquisition technologies into the Mobile Automated Fire Support System. Test prototype APWSF Models. Transition EARS-AL to a joint ATTD. Diversify Acoustic

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

Alert Queuing Technology to other crew served weapons systems. Evaluate technology for intelligent fire control test bed.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NRAD, San Diego, CA; LABCOM HDL, Adelphi, Md; NAVPERSRANDCEN, San Diego, CA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVCIVENGRLAB, Port Hueneme, CA; LABCOM MTL, Watertown, MA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; DOE, Las Vegas, NV/Los Alamos, NM/Idaho Falls, ID; LANL, Los Alamos, NM; NAVAIRWARCENWPNDIV, China Lake, CA; LABCOM NRDEC, Natick, Ma; Chemical R&D Engineering Center, Aberdeen Proving Ground, Aberdeen, MD. CONTRACTORS: EOS, San Diego, CA; MITECH, Vienna, VA; MIKROS, Princeton, NJ; SPARTA, San Diego, CA; General Dynamics, San Diego, CA; AAI Corporation, Hunt Valley, MD; MTU Corporation, Friedrichshafen, FGR; Solar Turbines, San Diego, CA; Tracor Hydronautics, Laurel, MD; EASI, St. Louis, MO; Aardvark, Aberdeen, Scotland; APL/Univ. of Washington, Seattle, WA; EG&G, Las Vegas, NV; 3M Corporation Battelle, Columbus, OH.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements in Chem/Bio Defense, Command, Control and Communications, Conventional Air/Surface Weaponry, Electronic Devices, Ground Vehicles, Ships & Watercraft, Manpower & Personnel, and Training Systems. Other related activities include: Program Element (PE) 0602232N, Command, Control and Communications Technology; PE 0603555N, Undersea Superiority Technology Demonstration; PE 0604577N, EHF Satcom; PE 0603635M, Marine Corps Ground Combat/Support System; PE 0603611M, Marine Corps Assault Vehicles; and PE 0603640M, Marine Corps Advanced Technology Demonstration. In addition, the US Army, US Air Force, US Navy Tech Base Programs are monitored by Project Officers through their counterparts in those organizations to ensure that no unwarranted duplication exists. The USMC has no laboratories as do other claimants, thus, all work is done through or by other DoD or National Laboratories who are also bound by reliance compliance.

H. (U) OTHER APPROPRIATED FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATION AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: COMMAND, CONTROL & COMMUNICATIONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Command, Control & Communications Technology	15,984	20,078	18,155	CONT.	CONT.

B. (U) DESCRIPTION: This program provides the technologies needed by the primary warfare areas to develop more survivable Command, Control, and Communications (C3) systems, secure communications, tactical communications interoperability, timely data fusion, decision aids, and accurate navigation systems. Present emphasis in joint operations requires, as a high priority, Joint Service/North Atlantic Treaty Organization tactical C3 systems interoperability. Operation Desert Storm emphasized priority needs in higher communications capacity and high volume information management. Efforts are part of an integrated Department of Navy Science and Technology program, recently initiated by the Office of Naval Research.

(U) This element adheres to Tri-Service Reliance Agreements, and is coordinated through the Joint Directors of Laboratories (JDL) Joint Service Program Plan for C3.

(U) In cooperation with Army and Air Force under the JDL Technology Panel for C3, the program supports the C3 technology demonstrations identified by the Director of Defense Research and Engineering Science and Technology Thrust on Global Surveillance and Communications.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) C3 SYSTEM ARCHITECTURE

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed improved network routing protocols to accommodate more efficient data throughput and dynamic network membership.

b. (U) Initiated development of a new battlegroup subnetwork architecture utilizing higher capacity super-high frequency (SHF) links capable out to extended line-of-sight ranges.

c. (U) Integrated hardware and software into the advanced submarine communications testbed.

2. (U) FY 1993 PROGRAM:

a. (U) Complete network protocols development and simulation.

b. (U) Develop SHF ship interface to the Integrated Services Data Network.

c. (U) Conduct long-haul communications link test on the advanced submarine communications testbed for integration into battlegroup networks.

3. (U) FY 1994 PLANS:

a. (U) Plan for SHF subnetwork demonstration of multimedia (voice, data, imagery, video) broadcast data.

b. (U) Initiate development of Open Systems Interconnect-compatible multicast transport protocol.

c. (U) Incorporate image compression technology in the SHF subnetwork.

d. (U) Develop common, joint service, open architecture for network management.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) COMMUNICATIONS

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Transitioned submarine extremely-high-frequency satellite communications antenna to engineering development under Submarine Integrated Antenna Systems (SIAS) program.

b. (U) In cooperation with the Air Force, extended the Adaptive Locally-Optimum Processing (ALOP) technique to the high frequency (HF) band

and determined its potential applicability to the joint Service (Air Force/Army/Navy) multiband, multimode radio program.

c. (U) Completed fabrication and test of the joint (Air Force/Navy) Low-Probability-of-Intercept (LPI) airborne communication system.

2. (U) FY 1993 PROGRAM:

a. (U) Initiate transition of the adaptive locally optimum processing algorithm to the joint-service multiband-multimode radio.

b. (U) Complete exploratory development of the joint (Air Force/Navy) LPI airborne communication system.

c. (U) Complete exploratory development of the Advanced Digital anti-submarine warfare (ASW) receiver.

3. (U) FY 1994 PLANS:

a. (U) Transition the HF/LPI expendable submarine communications buoy to the SIAS engineering development program.

b. (U) Develop and perform single-antenna field tests of the extremely-low-frequency corona antenna.

c. (U) Test and perform shipboard integration of the SHF communications system.

d. (U) Demonstrate the ALOP algorithm to ultra-high-frequency satellite application as part of the Tri-Service Speakeasy program.

e. (U) Investigate critical technologies for compact SHF antenna arrays embedded in aircraft skin.

4. PROGRAM TO COMPLETION: This is a continuing program.

(U) COMMAND SUPPORT

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Transitioned real-time scheduling to real-time distributed operating system (R-MACH) for eventual productization.

b. (U) Transitioned FIBERTAP, a network monitor for the Fiber Distributed Data Interface to the Naval Tactical Command System-Afloat (NTCS-A).

c. (U) Demonstrated the Express Transport Protocol (XTP) on a fiber-optic local area network.

2. (U) FY 1993 PROGRAM:

a. (U) Integrate the XTP on fiber-optic local network with a real-time distributed operating system.

b. (U) Develop prototypes of the trusted database management system and the trusted distributed operating system.

c. (U) Conduct at-sea demonstration of prototype ASW data quality monitoring system for the NTCS-A program in preparation for transition.

3. (U) FY 1994 PLANS:

a. (U) Conduct tests of R-MACH distributed operating system.

b. (U) Develop integrated real-time architecture using XTP, fiber optic network and R-MACH.

c. (U) Develop object-oriented database for image exploitation.

d. (U) Test user interface for the ASW tactical data quality system.

e. (U) Transition 5.25 inch rewritable optical disk technology to deployment on military aircraft.

4. (U)PROGRAM TO COMPLETION: This is a continuing program.

(U) NAVIGATION

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Demonstrated high-accuracy ring-laser gyro for submarine.

b. (U) Demonstrated closed-loop fiber-optic gyro operation.

c. (U) Designed and fabricated stellar-inertial navigation system in cooperation with the Air Force

2. (U) FY 1993 PROGRAM:

a. (U) Develop long-wavelength optical sources for fiber-optic gyros.

b. (U) Develop and test absolute velocity measuring system for ships and submarines.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: COMMAND, CONTROL & COMMUNICATIONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

c. (U) Conduct lab and flight tests of stellar-inertial navigation system jointly with the Air Force.

3. (U) FY 1994 PLANS:
   a. (U) Test prototype fiber-optic gyro.
   b. (U) Conduct fleet demo of the absolute velocity measuring system.
   c. (U) Flight-test the stellar-inertial navigation system.
4. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NCCOSC/NRAD, Warminster, PA; NCCOSC, San Diego, CA; NAVUNSEAWARCEN DET, New London, CT; NRL, Washington, D.C. CONTRACTORS: Bolt, Beranek and Newman, Cambridge, MA; Litton Industries, Los Angeles, CA; Carnegie Mellon University, Pittsburgh, PA; Metron, McLean, VA; Lockheed-Sanders, Nashua, NH.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element (PE) adheres to Tri-Service Reliance Agreements on Command, Control and Communications with oversight provided by the JDL. Work in this PE is related to and fully coordinated with efforts in PE 0602782A, Command, Control and Communications Technology and PE 0602702F, Command, Control and Communications in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Services.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Mission Support Technology	32,102	42,953	34,424	CONT.	CONT.

B. (U) DESCRIPTION: This program provides mission support technologies essential for all naval operations. Personnel, training, and human factors technologies enhance the Navy's ability to select, assign, and manage its people; to train effectively in classroom settings, in simulated environments, and while deployed; and to operate with increasingly complex weapons systems in the high-stress and ambiguous environments of limited-objective warfare. Personnel performance and safety technologies improve safety of operational personnel and enhance performance capabilities under adverse conditions. Chemical and Biological Defense (CBD) technologies improve the ability to respond to existing and future CBD threats. Logistics technologies increase operational readiness through effective management and movement of supplies ashore and at-sea, and advanced techniques for more cost-effective construction and maintenance of shore and off-shore facilities. Environmental protection technologies will improve Navy-unique capabilities to meet air and water quality regulatory standards and to reduce toxic-waste generation. Efforts are part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research.

(U) This element adheres to Tri-Service Reliance agreements and supports the Department of Defense (DoD) Science and Technology Strategy in Synthetic Environments and Technology for Affordability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed development of computer-based tools to reduce development costs and improve comprehensibility of instructional material.

b. (U) Completed development of a low-cost air combat training analysis and debrief system which will enhance the effectiveness of Navy and Air Force training ranges.

c. (U) Completed evaluation of neurophysiological techniques to predict operator decrement due to fatigue and workload.

d. (U) Completed documentation and validation of a Chemical and Biological Vapor, Liquid, and Solid Tracking simulation, and transitioned to 6.3.

e. (U) Completed evaluation of intermittent cooling systems for use aboard ship in hot spaces too confined for continuous use of microclimate cooling systems.

f. (U) Introduced into the Fleet protective clothing made of abrasion-resistant aluminized fabrics.

g. (U) Completed development of Hot Isostatic Processing techniques to extend gas turbine blade life and increase time between overhauls.

h. (U) Completed development of pipeline repair techniques and incorporated them into an experimental expert system.

i. (U) Developed automated control mechanisms to be used by heavy equipment operators that will increase operator speed and reduce training requirements.

2. (U) FY 1993 PROGRAM:

a. (U) Complete development of software to optimize naval enlisted personnel assignment decisions.

b. (U) Begin evaluation of virtual environment (artificial reality) simulation technology for low-cost approaches to maintaining and enhancing operator skills.

c. (U) Begin evaluation of training strategies to counteract the effects of stress on individual and team tactical decision-making.

d. (U) Complete development of operator interface design guidelines to improve the display of multiple-source sensor data.

e. (U) Complete and transition all technology information gathered during microclimate cooling system evaluations.

f. (U) Complete evaluation of aging and weathering of experimental sample from collective protective system carbon.

g. (U) Complete initial physiologically-based pharmacokinetic model and extend to additional high interest chemicals.

h. (U) Complete development of the silicon-based sensor electrode for detection of a wide range of toxins.

i. (U) Measure agent destruction by prototype corona and pulsed power agent destruction device.

j. (U) Complete prototype test of single molecule chemical, biological detector.

k. (U) Complete determination of physical, sleep, hydration, and nutritional requirements for special warfare missions.

l. (U) Complete laser dazzle recovery time work and begin transition of agile laser protection.

m. (U) Complete development of means to estimate pressure loading on dry-docks and quaywalls, and the degree of structural settlement resulting from liquefaction.

n. (U) Complete techniques on determining structural condition of piers and ability to withstand heavy equipment loading over time.

o. (U) Determine whether membrane separation technology is a viable means by which shipboard wastewater from galleys, showers, and laundry facilities can be treated.

p. (U) Complete work on cytokine inhibition therapy for Adult Respiratory Distress Syndrome.

q. (U) Develop protocols for analyses of physiological effects of Freeze Dried red blood cells and platelets.

r. (U) Develop stem cells that respond selectively to interleukin 3.

3. (U) FY 1994 PLANS:

a. (U) Complete development of personnel strength forecasting techniques to improve Navy manpower planning and policy decisions.

b. (U) Complete development of high-performance special-purpose simulation co-processor concepts for low-cost training applications.

c. (U) Develop improved tactile and force sensors and displays for use in virtual environment training and teleoperation systems.

d. (U) Complete evaluation of active sonar simulation techniques to improve training for mine detection and recognition.

e. (U) Complete development of advanced data visualization techniques for rapid review of large volumes of undersea surveillance data.

f. (U) Complete and transition development of corona chemical agent destruction device.

g. (U) Complete and transition development of therapies for adult respiratory distress syndrome.

h. (U) Complete and transition determination of sites of destruction of blood substitutes.

i. (U) Complete toxicity trials for immune system oral adjuvant.

j. (U) Develop processes whereby Navy Industrial Wastewater Treatment Plants can meet anticipated environmental requirements of the future.

k. (U) Complete integration of hose, fittings, and other components into a compact, lightweight amphibious refueling system.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

l. (U) Complete techniques for forecasting future equipment status focused on a condition-based maintenance philosophy.

m. (U) Develop a draft synthetic fiber rope specification guide that will enable the Navy to transition from less desirable wire rope.

n. (U) Develop techniques to convert existing manual technical publications to an interactive electronic format.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Trenton, NJ; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NCCOSC, San Diego, CA; NRL, Washington, D.C.; NAVCIVENGRLAB, Port Hueneme, CA; NAVHLTHRSCHCEN, San Diego CA; NAVMEDRSCHINSTITUTE, Bethesda, MD; NAVTRASYSCEN, Orlando, FL; NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: Smithsonian Institution, Washington, DC; National Institute of Standards and Technology, Gaithersburg, MD; Carnegie-Mellon U., Pittsburgh, PA.; Scientific Management Associates, Landover, MD; Boston Universtiy, Boston, MA; Scripps Institute of Oceanography, La Jolla, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This Program Element (PE) adheres to Tri-Service Reliance Agreements on Training Systems, Manpower & Personnel, Medical, Chemical & Biological Defense, Civil Engineering, and Environmental Quality. Oversight is provided by the Training and Personnel Systems Science & Technology Evaluation & Management committee for Training Systems and Manpower & Personnel programs; the Armed Services Biomedical Research Evaluation and Management committee for Biotechnology programs; the Joint Directors of Laboratories, the Joint Chemical Effects Data Research Guide, Joint Development Objectives Guide, and DoD instruction for CBD programs; and Joint Engineers for Civil Engineering and Environmental Quality. Related Navy PEs include: PE 0602111N, Surface/Aerospace Surveillance & Weapons Technology; PE 0602232N, Command, Control, & Communications Technology; and PE 0602314N, Undersea Surveillance & Weapons Technology. Other related PEs are: PE 0602716A, Human Factors Engineering Technology; PE 0602727A, Non-System Training Device Technology; PE 0602785A, Manpower, Personnel and Training Technology; PE 0602202F, Human Systems Technology; PE 0602205F, Personnel, Training and Simulation; 0602787A, Medical Technology; and PE 0602131M, Marine Corps Landing Force Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MATERIALS, ELECTRONICS AND COMPUTER TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Materials, Electronics and Computer Technology	78,977	94,645	71,063	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element (PE) comprises a broad technology base program to provide the Navy with the capability, resources, and expertise to implement advanced weapon and platform system concepts. The materials, electronics, and computer technology areas address fundamental limitations in terms of performance, reliability, and cost in order to accelerate transition of advanced technology to fleet use. This PE supports the Office of the Secretary of Defense Science and Technology Investment Strategy in the following thrusts: Global Surveillance & Communications, Precision Strike, Air Superiority & Defense, Sea Control & Undersea Superiority, Simulated Environments, and Affordability. Efforts are part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Transitioned high thermal-conductivity composites technology to the SHARP program for an increased-life standard electronic module-E.

b. (U) Demonstrated controllable process technology and material reproducibility for metal-matrix electronic heat sinks.

c. (U) Demonstrated intelligent spray forming process with non-reactive metals for low-cost ship and submarine machinery parts.

d. (U) Flight-tested metal-matrix composite radiators with advanced satellite battery for improved battery operation.

e. (U) Completed evaluation of ingot-metallurgy aluminum-lithium alloys for decreased aircraft airframe weight.

f. (U) Started major new tri-Service initiative on radio-frequency (RF) Vacuum Electronics Technology. The program consists of five major projects: (1) Microwave Power Modules - hybrid solid state/vacuum tube modules for high power active array applications; (2) Computational Techniques - advanced computer-aided design methods for the Power Tube industry; (3) High Performance Millimeter Wave Devices - devices to extend radio frequency spectrum utilization; (4) Design for Low Cost - design methods to reduce the cost of tubes for electronic decoys; and (5) Vacuum Microelectronics - an emerging technology for building a wide variety of electronic devices based on microminiature field-emitting arrays.

g. (U) Demonstrated acousto-optic Bragg cell and heterodyne detector array and magnetostatic wave channelized receiver for Electronic Warfare applications.

h. (U) Developed a solid-state laser-diode-array pump that is temperature insensitive over the military temperature environment.

i. (U) Demonstrated transmission lines implemented by Metallo Organic Chemical Vapor Deposition of high temperature superconducting films.

j. (U) Demonstrated coherent subcarrier multiplexed lightwave communication system operating at 16 Gigabits/sec.

k. (U) Completed a demonstration version of low power/low weight digital signal processor.

l. (U) Converted the Capabilities Assessment Expert System (CASES) version 6.0 sequential algorithms to parallel CASES 6.0 and installed it at Commander in Chief, Pacific Fleet.

m. (U) Prototyped complex system engineering tools that have the capability to automatically transform system requirements into a design.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MATERIALS, ELECTRONICS AND COMPUTER TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

n. (U) Developed mathematics and graphics algorithms that exploit massively parallel architectures and enhance acoustic fixed distributed systems visualization.

2. (U) FY 1993 PROGRAM:

a. (U) Complete Phase 1 of the robust processing of advanced composites initiative.
b. (U) Complete development of thin-walled carbon-carbon spacecraft truss structure for on-orbit weight reduction.
c. (U) Complete hydrostatic bearing development for eliminating noise in main-shaft submarine bearings.
d. (U) Demonstrate thin-film diamond coatings on zinc sulfide and zinc selenide sensor windows for tactical missiles through rain erosion testing, and develop anti-reflection coatings for bulk diamond and coated diamond windows.
e. (U) Down-select intermetallic material compositions for demonstrations of increased thrust-to-weight ratio in generation six integrated high performance turbine engine technology.
f. (U) Demonstrate a 16-bit, 125-Megasample/sec (MS/sec) A/D converter in a dual-chip, single-package configuration.
g. (U) Continue Navy-led, Tri-Service initiative on RF Vacuum Electronics Technology.
h. (U) Demonstrate a 300 Watt (W) peak (10 W average) impact, avalanche transit-time power source at W band.
i. (U) Demonstrate monolithic receiver front-end for Joint Tactical Information Distribution System application.
j. (U) Demonstrate a high efficiency (95-97%) power system compatible in size and performance needs with very high speed integrated circuit chips.
k. (U) Begin Tri-Service program in Computer-Aided Microelectronics to promote the rapid insertion of electronic technology into systems.
l. (U) Demonstrate silicon-on-insulator transistors with a buried conductor technology for 3-Dimensional circuit applications.
m. (U) Complete development of Strategies for Discourse Modelling for Computerized Natural Language Processing and an intelligent tutoring technique to reduce training instructor workload.
n. (U) Demonstrate computer learning with multiple threats via simulation of a multi-plane dogfight.
o. (U) Develop and demonstrate enhanced signal, image and acoustic processing utilizing design through simulation tools, high performance algorithms and space/time neural network simulation tools.
p. (U) Develop automated systems engineering tools to facilitate optimization of design structures of large, complex mission critical systems for parallel/distributed architectures.
q. (U) Demonstrate a 100X100 neural network, self-learning array, capitalizing on efforts in PE 0601153N.

3. (U) FY 1994 PLANS:

a. (U) Develop environmentally compatible, controlled-release biomolecular antifoulants for reduced fuel consumption, drawing on efforts transitioned from PE 0601153N.
b. (U) Demonstrate improved lethality torpedo warhead material against new threat environments.
c. (U) Transition hollow superplastic formed/diffusion bonded ship propeller development for decreased noise.
d. (U) Develop airfield pavement materials for the high temperature jet engine environment to eliminate engine damage.
e. (U) Conduct demonstration tests of carbon-carbon satellite radiators for lower weight thermal management systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MATERIALS, ELECTRONICS AND COMPUTER TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

f. (U) Demonstrate a 6-18 gigahertz, 100 Watt monolithic microwave integrated circuit/Traveling Wave Tube module.

g. (U) Demonstrate high duty cycle, low noise crossed-field amplifier for the SPY-1 radar.

h. (U) Develop Wavelet-aided tracking algorithms which will facilitate the classification of images by multi-resolution processing.

i. (U) Demonstrate a first generation prototype of automated specification, design and traceability tools.

j. (U) Develop a general purpose intelligent team-learning software system that interacts with multiple simulators to produce performance at an expert level in a tactical domain.

k. (U) Reconfigure existing Naval Global Ocean Prediction Systems to run in a massively parallel, distributed memory computer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVCIVENGRLAB, Port Hueneme, CA; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Trenton, NJ; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN CARDEROCK DIV, Bethesda, MD; NAVSURFWARCENDIV, Crane, IN; NRL, Washington, DC., NCCOSC, San Diego, CA. CONTRACTORS: ALCOA, Alcoa Center, PA; Amoco Performance Products, Alpharetta, GA; Grumman Aerospace, Bethpage, NY; LMSC, Sunnyvale, CA; Martin Marietta Labs, Baltimore, MD; Texas Instruments, Dallas, TX; Westinghouse, Pittsburgh, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This PE adheres to Tri-Service Reliance Agreements on Advanced Materials, Electronic Devices and Computer Technology with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to and fully coordinated with the efforts in PE 0601102A; PE 0601102F; PE 0601153N, Defense Research Sciences; PE 0601525A; PE 0602102F; PE 0602105A; PE 0602303A; PE 0602601A; PE 0602624F; PE 0602702F; and PE 0602786A in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments. Related Navy Exploratory Development PEs include: PE 0602111N, Surface/Aerospace Surveillance & Weapons Technology; PE 0602121N, Surface Ship Technology; PE 0602122N, Aircraft Technology; PE 0602314N, Undersea Surveillance & Weapons Technology; and PE 0602323N, Submarine Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Electronic Warfare Technology	12,485	16,472	14,896	CONT.	CONT.

B. (U) DESCRIPTION: This program addresses required technology for Electronic Warfare (EW) cooperatively with the other services and uniquely addresses war-at-sea EW technologies. It supports the Department of Defense (DoD) Science and Technology (S&T) Strategy and the following DoD S&T Thrusts: Global Surveillance and Communications; Precision Strike; Air Superiority/Air Defense; Sea Control/Undersea Superiority; and Synthetic Environments. All work in this program is jointly planned by the Army, Navy, and Air Force in accordance with Tri-Service Reliance agreements. Efforts are part of an integrated Department of Navy S&T process, recently initiated by the Office of Naval Research. Beginning in FY 1993, the Joint Directors of Laboratories (JDL) Technology Panel for Electronic Warfare plans and oversees the execution of EW S&T programs designated by Reliance to be joint.

(U) The absence of the polarizing influence of United States/Soviet opposition has led to the emergence of numerous regional and local power centers. As demonstrated during Desert Storm, the threat may come from any nation and the weapons which must be engaged can come not only from the former Soviet Bloc, but from Third World and Western countries as well. As Eastern and Western arms industries compete internationally, the technological complexity and performance capabilities of the world's weapons will increase. Successful development of countermeasures to a heterogeneous combination of new and old threats requires continuing and commensurate advances in EW technology. The structure and balance of this program is responsive to Office of the Chief of Naval Operations guidance and Systems Commands' needs, and capitalizes on lessons learned from Desert Shield/Storm. It supports Ship's Self-Defense and develops EW technologies to counter threats, including multi-spectral/multi-mode sensors and seekers, spanning the entire electromagnetic spectrum (radio frequency (RF), infrared (IR), electro-optical (EO), ultra-violet, and millimeter wave (MMW)). This is accomplished through the close coupling of improvements in the threat warning technologies, in the areas of threat detection, identification, and locating performance. Additionally, the program emphasizes detection of and countermeasures to Unintentional Modulation on Pulse/Limited Probability of Intercept signals for a variety of platform applications, and EO threat warning integration for aircraft applications. These developments provide continuing technology transfers to Tactical Aircraft Programs, reduced signature platforms, and the Surface Ship Advanced Integrated Electronic Warfare System research and development and SLQ-32 pre-planned product improvement programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Integrated false-target/decoy discriminator into a commercial navigation radar in preparation for future incorporation into a fleet SPS-10 radar.

b. (U) Field tested dispersion, polarization, and radar cross section characteristics of thin ring chaff which will be used to counter threat RF missile seekers.

c. (U) Demonstrated proof of concept involving fusing of simulated radar and Electronic Warfare Support Measure (ESM) data, to support initial investigation of sensor integration specification definition for the Ship Self-Defense Initiative.

d. (U) Demonstrated 3-Dimensional visualization of terminal phase missile-on-ship EW engagements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

e. (U) Conducted antenna coupling experiments and noise waveform investigations against an over-the-horizon type radar.

f. (U) Conducted operational tests against a synthetic aperture radar using a MMW direction finding receiver antenna array.

g. (U) Completed evaluation of Phase I Millimeter Monolithic Integrated Circuit (MIMIC)/EW receiver favorably and began Phase II receiver fabrication.

h. (U) Technology for color-balanced flare transferred into on-going 6.3/6.4 kinematic flare program for tactical aircraft.

i. (U) Performed field test experiments of full scale Multi-cloud IR chaff decoy rounds for transition to on-going shipboard chaff production programs.

2. (U) FY 1993 PROGRAM:

a. (U) Demonstrate integrated shipboard EW sensor algorithms in a real world environment; incorporate optimized algorithms into the Ship Self-Defense Initiative/Quick Reaction Combat Capability (QRCC) program.

b. (U) Develop results of Over-the-Horizon Radar (OTHR) tests to be developed into an Advanced Technology Demonstration (ATD) proposal for a FY 1995 start.

c. (U) Develop Small Ship Compatible Decoy and lightweight MK-36 Compatible Decoy payload for potential subsystem application to Ship Self-Defense Initiative/QRCC.

d. (U) Transition Advanced Multi-mode Active electronic countermeasures program to a 6.3A ATD.

e. (U) Explore results of technologies being evaluated in surface ship decoy work, DDG-51 model development, and evaluate generic countermeasures concepts against Anti-Shipping Missiles for Ship Self-Defense Initiative/QRCC applications.

f. (U) Prepare kinematic Advanced Material Decoy technology for tactical and combat support aircraft for transition to 6.3/6.4 product improvement programs, following demonstration of full-up rounds.

g. (U) Insert Polarization Vector characterization technology into on-going RF countermeasures ATD efforts at the close of FY 1993.

h. (U) Continue development and evaluation of shipborne MMW receiver/jammer prototype.

3. (U) FY 1994 PLANS:

a. (U) Demonstrate EW effectiveness monitoring system during at-sea tests.

b. (U) Demonstrate High Altitude/Line-of-Sight jammer against OTHR.

c. (U) Demonstrate the generation of false, credible radar targets using the Van Atta Array modulation concept on an RF decoy during at-sea tests.

d. (U) Demonstrate effectiveness of thin ring MMW chaff in full-up chaff rounds during at-sea testing against simulated missile threats.

e. (U) Flight test and demonstrate the effectiveness of the Smart Towed IR Decoy.

f. (U) Demonstrate shipborne MMW receiver/jammer techniques in the laboratory using low power components.

g. (U) Demonstrate the effectiveness of the Shipborne IR Distraction Decoy during at-sea tests.

h. (U) Demonstrate Infrared Search and Track countermeasures hardware and techniques during flight tests.

i. (U) Demonstrate the final design of a digitally augmented receiver to be used for advanced signal detection.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

j. (U) Demonstrate the Phase II MIMIC technology (analog) ESM receiver.

k. (U) Demonstrate Expert System technology as applied to state-of-the-art ESM systems to enhance signal identification, decision making, and resource allocation/management tasks.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCENACDIV, Warminster, PA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: LOCUS, State College, PA; Questech INC., McLean, VA; Johns Hopkins University/Applied Physics Lab, Silver Spring, MD; Westinghouse Corp., Pittsburgh, PA; Tracor, San Ramon, CA; Hughes Aircraft Company, Fullerton, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element (PE) adheres to Tri-Service Reliance Agreements on EW with oversight and coordination provided by the JDL and is associated with efforts that are being pursued under the following Army and Air Force PEs: 0602204F, 0603270F, 0602270A, 0603270A, and 0605604A. This program is also closely associated with the following Navy PEs: 0603270N, Advanced Technology Electronic Warfare; and 0603792N, Advanced Technology Transition (EW related); 0602111N, Surface/Aerospace Surveillance & Weapons Technology; 0602232N, Command, Control & Communications Technology; 0602234N, Materials, Electronics & Computer Technology; and 0602315N, Mine Countermeasures, Mining and Special Warfare Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: UNDERSEA SURVEILLANCE AND WEAPONS TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Undersea Surveillance and Weapons Technology	129,885	134,580	107,960	CONT.	CONT.

B. (U) DESCRIPTION: (U) This program element (PE) develops critical undersea surveillance and weapons technologies to It is aligned with the Department of Defense Science and Technology Strategy (S&T) for Undersea Superiority in the areas of robust shallow-water/regional warfare capability, platform defense and Unmanned Undersea Vehicles (UUVs). In order to prevent duplication of efforts and to ensure coordination, related technologies from SSBN Security and Survivability Program have been included in this PE for FY94. The purpose of this program is to ensure current covert mobility and pre-launch survivability of the Fleet Ballistic Missile Submarine Force with respect to emerging applications of advanced technology in the ocean environment. Efforts are part of an integrated Department of Navy S&T process, recently initiated by the Office of Naval Research.

(U) The program has been restructured to respond to changes in the threat and the world political situation, including the break-up of the Soviet Union and rise in third-world regional powers. Emphasis is on technologies to improve surveillance and weapon performance in harsh, acoustically noisy, shallow waters typically found adjacent to third-world nations, and to provide highly capable torpedo defense systems. Proliferation of quiet diesel-electric submarines, and potential for third-world acquisition of submarines based on air-independent propulsion, as well as worldwide availability of advanced sensors and weapons, exacerbates the problem in performing assigned missions. Furthermore, the drawdown of Fleet assets increases the importance of unit self-protection from torpedo attack. Also, the former Soviet Union still possesses large numbers of modern, quiet attack submarines and ballistic missile submarines which could still pose a formidable threat to the United States.

(U) The program contains a balanced mix of efforts to address the emerging shallow-water threat and maintain open-ocean Anti-Submarine Warfare (ASW) capability. Better, lower-cost sensors are being developed for systems deployed from air, surface, and submarine platforms. deployable distributed sensor systems capable of operating in shallow-water environments have new emphasis. Additionally, technology is being developed for: airborne and surface ship active systems; non-acoustic sensors automated full-spectrum processing of passive acoustic signals; and platform and theater level acoustic warfare and data fusion. Weapon performance will be improved by better guidance, control, and homing in shallow water against submarines, with emphasis on detection and tracking, countermeasure resistance, and warheads. Advanced propulsion, explosives and warhead technologies will provide increased lethality in existing multi-use weapons, which reduces costs and increases weapon loadouts. Quieting programs emphasize closed-cycle electric and thermal propulsion, advanced engine machinery, propulsors and pumpjets. Counter-measures work includes for platform point defense.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
(U) SURVEILLANCE:
1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Conducted sea-test of towed array.
b. (U) Conducted lab test of 2000 channel, 30 decibel continuous wave sensor.
c. (U) Conducted in-water test of a node for rapidly deployable surveillance systems.

d. (U) Demonstrated processing of passive sonar system.
e. (U) Conducted test of data fusion algorithms for integrating existing sensors.
f. (U) Demonstrated improved active-classification techniques incorporating and display capabilities.
g. (U) Conducted preliminary airborne test.
h. (U) Initiated development of processor for active sonar.

2. (U) FY 1993 PROGRAM:
a. (U) Conduct sea-test of dual, deployable arrays.
b. (U) Complete development of an advanced array sonobuoy
c. (U) Demonstrate enhanced undersea signal detection by fusion of data fro sensors.
d. (U) Transition active classification algorithms to system.
e. (U) Complete development of and test an array of for Air ASW.
f. (U) Fabricate and test active transducer.
g. (U) Transition data-fusion algorithm
h. (U) Sea-test detector/classifier.

3. (U) FY 1994 PLANS:
a. (U) Conduct a cooperative sea test with NATO's SACLANT ASW Center.
b. (U) Sea-test deployable array of
c. (U) Complete algorithm for signal processing.
d. (U) Conduct at-sea demonstration of algorithms and processor.
e. (U) Demonstrate an deployable array.
f. (U) Conduct sea test of processor.
g. (U) Test a two-way capacity.
h. (U) Test a dual-channel accelerometer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) WEAPONS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Demonstrated source for long-endurance vehicle hours.
b. (U) Demonstrated interim with digital telemetry.
c. (U) Conducted in-water runs to test torpedo guidance law for open ocean and shallow water.
d. (U) Tested propulsion, warhead, fuze, and guidance technologies
e. (U) Demonstrated combat Maneuver Decision Aid feasibility.

2. (U) FY 1993 PROGRAM:
a. (U) Conduct in-water test of HYDROX propulsion system on large-diameter (26.5 inch) thermal testbed.
b. (U) Conduct laboratory demonstration of battery integrated with an electric motor system.
c. (U) Conduct in-water tests of testbed with advanced system and a array.
d. (U) Demonstrate an intelligent controller for advanced guidance and control (G&C) systems for shallow-water/regional-warfare applications.
e. (U) Conduct in-water closed-loop demonstration G&C and fuze concept.

3. (U) FY 1994 PLANS:
a. (U) Complete design and fabrication of brassboard hydrogen and oxygen generators for HYDROX propulsion system for 21 inch thermal testbed.
b. (U) Complete design of electric propulsion system.
c. (U) Convert testbed for use as technology demonstration test bed.

d. (U) Conduct in-water tests of under realistic dynamic conditions.

e. (U) Conduct experiment to obtain database using a target.

f. (U) Demonstrate initial shallow water detection/classification upgrades for current weapons.

g. (U) Demonstrate counterweapon technologies.

h. (U) Develop explosives for water and applications.

i. (U) Transition castable explosive formulations based on the CL-20 ingredient to the Insensitive Munitions Advanced Development Program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) SSBN SECURITY AND SURVIVABILITY

1. (U) FY 1992 ACCOMPLISHMENTS: This Project was transferred from Project R00S PE 0101224N for FY94. FY92 accomplishments are reported under that PE.

2. (U) FY 1993 PLANS: This Project was transferred from R0092 PE 0101224N for FY94. FY93 plans are reported under that PE.

3. (U) FY 1994 PLANS:

a. (U) Complete the final contaminants preliminary detectability assessment (PDA).

b. (U) Complete the final PDA.

c. (U) Upgrade the detectability assessment

d. (U) Measure hydrodynamic issues.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE - NAVSURFWARCEN WHITE OAK DET, White Oak, MD; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVAIRWARCENDIV, Warminster, PA; NCCOSC, San Diego, CA; NAVUNSEAWARCENDIV, Newport, I and New London, CT; NAVUNSEAWARECENDIV, Keyport, WA; NRL, Washington, DC and Stennis Space Center, MS; NAVCIVENGRLAB, Fort Hueneme, CA. CONTRACTORS - ARL/PSU, State College, PA; ARL/UTex, Austin, TX; APL/JHV, Laurel, MD; GE, Syracuse, NY; Raytheon, RI; AT&T, Whippany, NJ and Alexandria, VA; SAIC, McLean, VA; TI, Dallas, TX; EML, Hudson, MA; Dynamics Technology, Los Angeles, CA; and Westinghouse, Cleveland, OH.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD #011-02 June 1991.

G. (U) RELATED ACTIVITIES: PEs 0101224N, SSBN Security and Survivability Program; 0601153N, Defense Research Sciences; 0603741D Air Defense Initiative; 0603747N Advanced ASW Technology; 0603555N, Undersea Superiority Technology Demonstrations; 0603792N, Advanced Technology Transition; 0602?41N, Surface/Aerospace Surveillance & Weapons Technology; 0602315N, Mine Countermeasures, Mining and Special Warfare Technology; 0602323N, Submarine Technology; and 0602435N, Oceanographic and Atmospheric Technology. This program adheres to Tri-Service Reliance Agreements on Conventional Air/Surface Weaponry--in particular, in the area of explosives--with oversight provided by the Joint Directors of Laboratories. Work is fully coordinate with efforts in PEs 0602602F, 0603601F and 0602624A in accordance with the ongoing Reliance joint planning process.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Selected ASW Surveillance and Weapons technology issues and investigations supported by this PE are coordinated with collaborative efforts addressed by the ASW sonar and weapons panels of The Technical Cooperation Program with Australia, Canada, New Zealand, and the United Kingdom.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MINE COUNTERMEASURES, MINING AND SPECIAL WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Mine Countermeasures, Mining and Special Warfare Technology -	21,430	41,154	21,944	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE) provides technologies for U.S. naval mines, Mine Countermeasures (MCM), Special Warfare, and Explosive Ordnance Disposal (EOD) equipment. It is strongly aligned with the Department of Defense (DoD) Science & Technology (S&T) Investment Strategy for Undersea Superiority, with particular emphasis on addressing the urgent technology needs for Shallow-Water (SW) and Surf-Zone (SZ) MCM. Efforts are part of an integrated Department of Navy S&T process, recently initiated by the Office of Naval Research.

(U) MCM Technology: Third-world nations have the capability to procure, stockpile and deploy all types of mines in all water depths.

"Desert Storm" demonstrated that U.S. Navy needs to counter the projected third world mine threat. Advanced technologies are needed to rapidly detect and neutralize all mine types, especially in the SW and SZ regions. The DoD S&T Strategy has identified three major MCM Thrusts: (1) Surf-Zone Clearance, (2) Shallow-Water MCM, and (3) Mine Detection/Avoidance. The SZ Clearance Thrust will develop distributed explosives, weapon deployment, and minefield obstacle breaching technologies, culminating in a SZ critical technology demonstration (CTD). The SW MCM thrust supports sweeping of

mines in SW. Advanced very shallow-water (VSW)

technologies will be integrated to support the MHK demonstration. The Mine Detect/Avoid thrust includes sensor technologies integrated with advanced UUV technologies for conducting rapid mine reconnaissance operations. CTDs for the DoD S&T Strategy UUV Technology thrust will demonstrate the effectiveness of UUV technologies to support MCM missions.

(U) Mine Technology: The need for improved mine technologies has diminished The elevated threats today may be encountered in the littoral waters or regional conflicts. Despite the diminished sophisticated threat, it is imperative that the Navy maintains its "critical mass" effort and capabilities in mine sensors, environment, and systems performance analysis technology. Emphasis will be placed on potentially high pay-off advanced target detection sensors and low cost mine system concepts with expanded weapon effectiveness for regional warfare.

(U) Special Warfare Technology: Naval Special Warfare missions primarily support covert naval operations. The goal is to develop technology required to of Special Warfare units. An important Sea-Air-Land (SEAL) mission is the pre-invasion clearance of mines and obstacles in the VSW and SZ approaches in the amphibious landing areas. Improvements to mission support equipment are needed to increase the probability of mission success. A major current focus is

to targeted mission sites.

(U) EOD Technology: Technology development for the EOD needs addresses the Navy's Joint Service and interagency responsibilities in EOD, including that required to counter and neutralize The technologies developed are required for locating, rendering safe, and disposal of conventional devices. These operations typically occur

Advanced technologies are needed for gaining access to areas

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: MINE COUNTERMEASURES, MINING AND SPECIAL WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

These technologies are expected to transition to the Joint Services EOD Program or the DoD Technical Response Group.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) MINE COUNTERMEASURES AND MINING TECHNOLOGY:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Fabricated prototype for , minehunting demonstration.

b. (U) Completed VSW acoustic characterization measurements against proud and buried mines to determine optimum frequency, processing, and sonar design.

c. (U) Designed and fabricated moored mine "Hardkill" attachment device for mechanical mine sweeping demonstration.

d. (U) Developed 3-Dimensional (3-D) hydrocode performance model for Distributed Explosive Technology (DET) arrays and line charges for neutralizing SZ mines.

e. (U) Demonstrated capability

f. (U) Completed effort on

g. (U) Evaluated

2. (U) FY 1993 PROGRAM:

a. (U) Conduct at-sea demonstration/optimization tests of wide-swath, volume search sonar prototype for use with remote minehunter.

b. (U) Demonstrate motion-compensated operation of synthetic aperture mine search sonar under vigorous SW conditions.

c. (U) Demonstrate at sea the mechanical sweeping tracking/communications systems and sweep wire/mooring line engagements.

d. (U) Demonstrate minesweep "hardkill" concept against tethered mines.

e. (U) Develop and transition technologies to the mine sweep gear advanced technology demonstration (ATD).

f. (U) Incorporate environmental effects of shock propagation in water-saturated sand into distributed explosive and SZ mine vulnerability models.

g. (U) Investigate alternatives for SZ mine and obstacle clearance, DET array deployment, and deployed array marking concepts.

h. (U) Fabricate/test alternative high efficiency mine detector application.

i. (U) Conduct lab testing and analysis of

3. (U) FY 1994 PLANS:

a. (U) Conduct towed vehicle sea tests of remote minehunter Side-Look Sonar for optimizing signal and image processing algorithms.

b. (U) Sea-test robust VSW sonar using underwater towed vehicle.

c. (U) Sea-test acoustic/magnetic terminal homing sensors against buried, proud and moored mines for mine neutralizer reacquisition characterization.

d. (U) Conduct at-sea tests of a mechanical minsweeping depth-following capability.

e. (U) Conduct laboratory and at-sea tests

f. (U) Validate/test and transition DET array hydrocode development, explosive formulation, and rocket deployment technology to the Explosive Neutralization ATD.

g. (U) Analyze and down-select alternative SZ obstacle clearance and DET array deployment concepts.

h. (U) Lab evaluate

i. (U) Verify approach for in SW by using

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) SPECIAL WARFARE/EXPLOSIVE ORDNANCE DISPOSAL

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed 3-D water-entry model and performed for SEALs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: MINE COUNTERMEASURES, MINING AND SPECIAL WARFARE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

b. (U) Evaluated
c. (U) Validated entry technique.
d. (U) Demonstrated
e. (U) Performed in water testing of
f. (U) Tested EOD
2. (U) FY 1993 PROGRAM:
a. (U) Collect water-entry load and acceleration data
b. (U) Develop robotic serpentine manipulator with end effectors for safer EOD examination & identification of explosive devices.
c. (U) Test/evaluate candidate sensors
d. (U) Develop
e. (U) Transition oxygen sensor technology to product improvement program for MK 16 Underwater Breathing Apparatus.
f. (U) Transition
3. (U) FY 1994 PLANS:
a. (U) Conduct air drop tests.
b. (U) Incorporate for improved mine detection in VSW.
c. (U) Demonstrate
d. (U) Demonstrate for boring through ordnance casings.
e. (U) Test ability of

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NCCOSC RDTE DIV, San Diego, CA; NAVEODTECHCEN, Indian Head, MD; NRL, Washington, DC; NRL SSC, Stennis Space Center, MS; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: Ball Aerospace, Golden, CO; IBM Corp., Manassas, VA; Lockheed Missile & Space Corp., McLean, VA; Texas A&M Univ., College Station, TX; Woods Hole Ocean. Inst., Woods Hole, MA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE's 0601153N, Defense Research Sciences; 0602233N, Mission Support Technology; 0602314N, Undersea Surveillance and Weapons Technology; 0602435N, Oceanographic and Atmospheric Technology; 0603555N, Sea Control and Littoral Warfare Technology Demonstration; 0602131M, Marine Corps Landing Force Technology; 0603502N, Undersea Warfare and MCM Development; 0603654N, Joint Service EOD Development; 0604654N, Joint Service EOD Development; 1160401BB, Special Operation Technology Development; and 1160402BB, Special Operation Advanced Technology Development. This program adheres to Tri-Service Reliance Agreements on EOD with coordination provided by the Joint Directors of Laboratories.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Selected Mine Warfare (MIW) technology issues are coordinated with efforts addressed by the MIW Panel of The Technical Cooperation Program with Australia, Canada, New Zealand, and the United Kingdom. Coordination is also maintained with data exchange arrangements involving Italy, France, Denmark, Netherlands, Germany, Norway, Spain, Belgium, South Korea, and Japan.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Submarine Technology	16,611	17,589	14,575	CONT.	CONT.

B. (U) DESCRIPTION: (U) This program element (PE) provides new technologies for submarine vehicles to improve stealth and reduce vulnerability to threat weapons, while holding acquisition costs at current or reduced levels. The program is aligned with the Department of Defense Science and Technology Investment Strategy for Sea Control and Undersea Superiority, specifically contributing to the Undersea Superiority Technology Demonstration and the Advanced Technology Demonstration Project. Efforts are also part of an integrated Department of Navy Science and Technology process, recently initiated by the Office of Naval Research.

(U) While the probability of conflict with those nations that formerly constituted the Soviet Union is greatly reduced, the probability of regional conflict remains. Although the SSN-21 Class is being terminated after the completion of two units, it is imperative that the infrastructure for submarine Research and Development (R&D), design, and construction be maintained, with an emphasis on continuance of United States superiority in submarine stealth performance.

(U) This program is a key source of new technologies which have applications to the new attack submarine (NAS) design. It develops a broad range of affordable technology alternatives. Among the technologies impacting the future design are:

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: This PE is structured into thrusts in the areas of Hydrodynamics, Survivability, and Machinery which are described in the following.

(U) HYDRODYNAMICS THRUST: This thrust combines the previous hydroacoustics prediction development work performed in this program with the which has transitioned from the Advanced Research Projects Agency (ARPA) Advanced Submarine Technology Program (ASTP). This thrust forms these capabilities into submarine concepts and design tools and directly supports the Sea Control and Undersea Superiority Technology Thrust.

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Accelerated the Hydrodynamics effort to include: applicable to the NAS, and validation of computational fluid dynamics (CFD) tools for submarine design.
   b. (U) Verified by scaled experiment that is potentially a low cost way to reduce propulsor acoustic noise.
   c. (U) Evaluated special shapes for
   d. (U) Demonstrated effectiveness of

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

2. (U) FY 1993 PROGRAM:
a. (U) Transition propulsor to advanced development program.
b. (U) Complete evaluation of multiple emitter system at 1/20th scale.
c. (U) Accomplish CFD code enhancement solutions for adaptive gridding for improved submarine maneuvering and control.

3. (U) FY 1994 PLANS:
a. (U) Develop maneuvering and control CFD simulation for NAS design.
b. (U) Validate low noise turbo machinery computational models.
c. (U) Demonstrate design for affordable
d. (U) Demonstrate design or for affordable, lightweight propulsors.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) SURVIVABILITY THRUST: Improve covertness in all signature areas, directly supporting the Sea Control and Undersea Superiority Technology Thrust, along with improving hull strength and other characteristics which resist weapon damage effects.

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Designed quiet quarter-scale elastomeric ejection system bladder torpedo launcher.
b. (U) Demonstrated single element sensitivity of fiber optic sensor
c. (U) Demonstrated ferromagnetic algorithm

2. (U) FY 1993 PROGRAM:
a. (U) Demonstrate Signature Control by full-scale trial at multiple locations.
b. (U) Evaluate alternatives.
c. (U) Evaluate low cost protection from warheads.
d. (U) Test joint concept of a 1/10th scale lightweight composite stern model for shock, strength, and vibration.

3. (U) FY 1994 PLANS:
a. (U) Demonstrate far field, deep-water, full-scale trial.
b. (U) Demonstrate reduced cost acoustic silencing with
c. (U) Demonstrate fluidborne noise control
d. (U) Demonstrate light weight, cost effective composite equipment foundations.
e. (U) Demonstrate

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) MACHINERY THRUST: This Thrust pursues reduction of weight, volume, energy, and maintenance impact of machinery systems while reducing acquisition and life-cycle costs, enhancing performance, and reducing noise.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Conducted laboratory demonstration of acoustic quieting of a variable displacement hydraulic pump for reduced cost hydraulic systems.
b. (U) Computer simulation of submarine electrical system.
c. (U) Completed decentralized Heating, Ventilation, and Air Conditioning system concept trade-off studies.
d. (U) Construct laboratory model of Malone cycle non-chloro-flouro-carbon air conditioning plant, for the elimination of chloro-flouro-carbons.
e. (U) Completed hydroacoustic tests of shaftless pump.

2. (U) FY 1993 PROGRAM:
a. (U) Hardware validation of NAS electric distribution system.
b. (U) Demonstrate low-cost actuator.
c. (U) Demonstrate digital models of the proposed direct current electric system.
d. (U) Demonstrate Malone cycle hardware for alternative air conditioning cycles.

3. (U) FY 1994 PROGRAM:
a. (U) Demonstrate advanced shaftless seawater pump.
b. (U) Transition variable displacement pump technology to R&D submarine.
c. (U) Complete detailed alternatives for electrical systems.
d. (U) Complete Malone cycle experiments for improved pump/motor technology.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: Applied Research Lab, Pennsylvania State University, State College, PA; University of Washington, Seattle, WA; US Composites, Troy, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This Navy-unique PE contains no unwarranted duplication of effort among Military Departments or Defense Agencies. Related Navy PEs are: 0602234N, Materials, Electronics, and Computer Technology; 0603561N, Advanced Submarine System Development; and 0604561N, SSN-21 Development. Another related program is: PE 0603569E, Advanced Submarine Technology (ARPA). Close coordination with the ARPA ASTP is maintained via ARPA's Advanced Submarine Advisory Panel, mandated by Congress.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULES: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEANOGRAPHIC AND ATMOSPHERIC TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Oceanographic and Atmospheric Technology	41,601	44,887	37,711	CONT.	CONT.

B. (U) DESCRIPTION: (U) As military technology grows more complex and sophisticated, the effect of the variability of the natural environment on system performance becomes increasingly significant. This program element (PE) applies knowledge of the oceanographic and atmospheric environment through (1) Environmental Support for development of new systems, by quantifying environmental effects on their performance during system definition, and (2) Tactical Oceanography, by developing environmental sensors and environmental information management technology to exploit the locally prevailing environment in the field. Environmental Support builds in the flexibility to cope with environmental variability. Tactical Oceanography, defined as the military use of environmental data and computer-based predictions for tactical advantage, provides environmental tactical decision aids that enable the local commander to use his flexibility effectively. Together, these two components yield a constructive force multiplication by exploiting environmental windows and preventing environmental surprise. With the demise of the former Soviet Union, emphasis has shifted from open-ocean conditions to the more variable, more difficult shallow-water environments of regional conflicts.

Successful prosecution of this PE will provide the quantitative understanding of environmental effects, improved environmental sensors and sensing technology, and environmental information management capability needed for successful operation in these harsh environments. This PE supports the Naval Warfare Mission Areas of Anti-Submarine Warfare (ASW); Mine Warfare; Anti-Surface Ship Warfare; Strike Warfare; Anti-Air Warfare; and Command, Control, and Communications. It supports and is an integral part of the Department of Defense (DoD) Science and Technology (S&T) Strategy for Undersea Superiority, with a Critical Technology Demonstration of an Ocean Information Network for regional conflicts in coastal regions. It also supports other DoD S&T Thrusts in Global Surveillance & Communications; Precision Strike; Air Superiority & Defense; and Synthetic Environments. In addition, efforts are part of an integrated Department of Navy S&T process, recently initiated by the Office of Naval Research.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Transitioned new empirical algorithm for active sonar sea-surface backscattering in terms of wind speed and acoustic frequency, and validated model of passive correlation loss due to multipath in shallow water.

b. (U) Completed a 6-parameter shallow-water bottom-provincing scheme that provides inputs to bottom-scattering models in torpedo guidance and control (G&C) development.

c. (U) Fabricated and tested conductivity-temperature-depth probe, lake-tested Slocum vehicle in gliding and ocean-thermal powered modes, and conducted integration tests of a submarine-based oceanographic system.

d. (U) Achieved medium resolution of eddies (approximately 1/4-degree) in global ocean model, and delivered Gulf Stream data-assimilating forecast system for operational test and implementation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEANOGRAPHIC AND ATMOSPHERIC TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

e. (U) Completed development of ground parametrization and cumulus downdrafts, and incorporated into Navy Operational Global Atmospheric Prediction System.

f. (U) Completed and released improved version of the Engineer's Refractive Effects Prediction System, began performance assessment of electro-magnetic/electro-optic (EM/EO) sensors in complex coastal regions, and developed mesoscale data-assimilation method for EM/EO propagation prediction.

2. (U) FY 1993 PROGRAM:

a. (U) Complete initial active sonar model of and begin shallow water environmentally adaptive signal processing.

b. (U) Complete and close out the program, archivally documenting results and lessons learned.

c. (U) Validate shallow-water surface reverberation model using shallow water data, and use in optimizing torpedo G&C waveforms.

d. (U) Initiate environmental development in high frequency acoustics, atmospheric and ocean optics, and active and passive magnetic clutter

e. (U) Continue work on an ocean information network, including sensor deployment mechanisms and data fusion techniques in coastal regions.

f. (U) Initiate development of an MCM Tactical Environmental Data System (MTEDS) for rapid environmental characterization in MCM operations.

g. (U) Begin limited-area runs with high resolution of eddies (1/8-degree) in ocean modelling, complete assessment of forecast models in the Northwest Atlantic, and initiate models for the Mediterranean Sea, Yellow Sea, Sea of Japan, and their associated coastal environments.

h. (U) Include cloud microphysics in Navy Operational Regional Atmospheric Prediction System, and evaluate coastal-region rain forecasts.

i. (U) Release validated millimeter-wave over-water propagation models based on Pacific, North Atlantic and Mediterranean data, develop EM propagation models over variable terrain and sea-land boundaries, develop infrared background radiance models for use in EO tactical decision aids, and transition Navy Ocean Vertical Aerosol Model.

3. (U) FY 1994 PLANS:

a. (U) Identify in surface-reverberation-limited scenarios; evaluate for surface/volume-reverberation-limited areas; upgrade active acoustics model capability to provide predictive capability for shallow water regions; use experimental data to identify system and environmental factors relevant to the improvement of active acoustic system performance in adverse environments.

b. (U) Validate Time-Dependent Parabolic-Equation shallow water acoustic propagation model up to 400 Hertz, and assess detection improvements by field test techniques for environmentally-adaptive processing, full spectrum processing, and gains that can be achieved through use of

c. (U) Develop physics-based, full spectrum ambient noise source functions that describe dominant environmental noise sources to permit quantify resolvability of individual noise sources and characterize angle-time-frequency properties of the noise field.

d. (U) Determine the time/frequency/spatial correlation character of high-frequency shallow-water surface-reverberation for improved torpedo G&C; validate false target and bistatic bottom scattering strength models.

e. (U) Conduct field tests to measure optical parameters in coastal regions, and employ Sea-Viewing Wide-Field-of-View Sensor data in coastal areas to support optical methods in MCM; measure high-frequency acoustics in sediments and develop a performance model for buried mine detection.

f. (U) Construct expendable mooring for ocean sensors along with a real-time channel calibration algorithm for rapid acoustic characterization; develop synthetic aperture radar algorithms for remotely sensing coastal

PROGRAM ELEMENT: 0602435N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: OCEANOGRAPHIC AND ATMOSPHERIC TECHNOLOGY
PROJECT NUMBER: N/A PROJECT TITLE: N/A

regions; adapt reverberation array heading rose to shallow water, extend the common-grid model to shallow water, to permit the integration and display of diverse oceanographic, acoustic, and tactical data bases.

g. (U) In MTEDS, demonstrate sea floor classification system for mine burial prediction, demonstrate airborne electro-magnetic system capability for use in MTEDS, complete integration of environmental sensor hardware/software, and design database architecture; conduct assessment of environmental effects on MCM tactical decision aids.

h. (U) Perform tests of the global eddy-resolving ocean model using data assimilation as a basis for development of the global forecast system; develop turbulent mixing and thermodynamic models for inclusion in the Mediterranean Sea layered model; develop numerics for the influence of the deep ocean on shallow seas through the shelf boundary; develop a relocatable ocean model for shelf regions of the Mediterranean Sea.

i. (U) Complete data assimilation techniques for the Semi-Automated Mesoscale Analysis System, including a neural network cloud classifier, and data quality controls; demonstrate increased resolution effects in a global atmospheric model.

j. (U) Incorporate rough-surface models into EM/EO propagation assessment systems, transition ship-response decision aids to Tactical Environmental Support System, and incorporate environmental overlays into Navy Tactical Command System Afloat; develop and evaluate refractivity sensing and inference techniques, both ground-based and satellite.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C., Monterey, CA, and Stennis Space Center, MS; NCCOSC, San Diego, CA; NAVSURFWARCENCOASTSYSTA, Panama City, FL. CONTRACTORS: Woods Hole Oceanographic Institution, Woods Hole, MA; Applied Physics Laboratory, University of Washington, Seattle, WA; Applied Research Laboratory, University of Texas, Austin, TX; Marine Physical Laboratory, Scripps Institution of Oceanography, La Jolla, CA; Applied Physics Laboratory, Johns Hopkins University, Baltimore, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0601153N, Defense Research Sciences; PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602315N, Mine Countermeasures, Mining and Special Warfare Technology; PE 0603785N, Combat Systems Oceanographic Performance Assessment. This program adheres to Tri-Service Reliance Agreements on Environmental Sciences with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to and fully coordinated with efforts in PE 0602784A and PE 0602101F in accordance with the ongoing Reliance joint planning process.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Using Nunn Amendment funds in Fiscal Years 1991/1992, the U.S. Navy, in coordination with the Republic of Korea, conducted a Coastal/Harbor Defense project to improve ASW defenses. This program also supports collaborative efforts within the Undersea Warfare Subgroup of the Technical Cooperation Program with Australia, Canada, New Zealand and the United Kingdom.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602790N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Small Business Innovation Research Program (SBIR)/Small Business Technology Transfer Pilot Program (STTR)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1864	SBIR	0	81,443	83,486	CONT.	CONT.
R2204	STTR	0	0	2,627	14,670	17,297
TOTAL		0	81,443	86,113	CONT.	CONT.

B. (U) DESCRIPTION: The SBIR and STTR programs are statutorily mandated programs under PL 102-564 designed to provide small businesses federal research funds to develop innovative solutions to problems that will assist the Navy in performing its mission while providing small business the opportunity to commercialize developed products/technology in the private sector. Small businesses in all 50 states and the various territories receive two solicitations per year which generally provide over 250 project topics to which they may submit proposals. The project descriptions, which state a Navy problem or need, vary in scope from narrowly defined to extremely broad, and require a technological solution. Projects typically encompass science and technology areas which support DOD technology thrust areas and DOD/Navy key technologies. The program is executed by small businesses which address the need/problem through a three phase contractual process. Phase I contracts (six month duration) are typically funded at $50-$100K while Phase II contracts (two year duration), if deemed appropriate, are typically funded at $500-$750K. A Phase III (non-SBIR funded follow-on activity) effort can follow a successful Phase II with non-SBIR/STTR funds. Approximately 5% over the statutory requirement is programmed in the budget submission to fund administrative costs of the program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602790N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Small Business Innovation Research (SBIR)/Small Business Technology Transfer Pilot Program (STTR)
PROJECT NUMBER: R1864 PROJECT TITLE: Small Business Innovation Research Program (SBIR)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1864	SBIR	0	81,443	83,486	CONT.	CONT.

B. (U) DESCRIPTION: The SBIR program is a statutorily mandated program under PL 102-564 designed to provide small businesses federal research funds to develop innovative solutions to problems that will assist the Navy in performing its mission while providing small business the opportunity to commercialize developed products/technology in the private sector. Small businesses in all 50 states and the various territories receive two solicitations per year which generally provide over 250 project topics to which they may submit proposals. The project descriptions, which state a Navy problem or need, vary in scope from narrowly defined to extremely broad, and require a technological solution. Projects typically encompass science and technology areas which support DOD technology thrust areas and DOD/Navy key technologies. The program is executed by small businesses which address the need/problem through a three phase contractual process. Phase I contracts (six month duration) are typically funded at $50-$100K while Phase II contracts (two year duration), if deemed appropriate, are typically funded at $500-$750K. A Phase III (non-SBIR funded follow-on activity) effort can follow a successful Phase II with non-SBIR funds. Approximately 5% over the statutory requirement is programmed in the budget submission to fund administrative costs of the program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Examples of the SBIR program are shown below by DOD S&T Thrust area (where appropriate) with DOD/Navy key technologies in parenthesis. The projects initiated in FY 1994 will have a greater emphasis on dual-use technologies.

1. (U) FY 1992 ACCOMPLISHMENTS: (Previously funded under PE 0605502N)

a. (U) Global Surveillance (Communications): Developed neural net technology used in shipboard multisensor fusion of similar and dissimilar data for high confidence target identification or air traffic control systems.

b. (U) Technology for Affordability (Manufacturing): Transitioned SBIR developed technology for manufacture of composite pipe for both commercial and military application. Ingalls Shipbuilding used the technology in three SA'AR5 corvette ships manufactured for the Israeli government.

c. (U) Air Superiority and Defense (Radar): Completed initial development of the Advanced Anti-radiation Guided Missile (AARGM) for Marine Corps helicopters and vertical takeoff aircraft. The AARGM is an advanced "Sidearm type missile" with a dual mode seeker capable of operating under all weather/environmental conditions.

d. (U) Synthetic Environments (Communications): Completed development of Mini Ranging and Data Link Transponder. The transponder provides connectivity at reduced cost between the master station computer and all of the participants in a battlefield exercise. This unit is 85 cubic inches (previously 320 cubic inches) allowing additional instrumentation for Global Positioning System (GPS), Inertial Reference and solid state recorder in the carrying pod. The transponder has transitioned to a Phase III effort.

e. (U) Synthetic Environments (Simulation/Training): Completed and transitioned Compact Radio Frequency (RF) Communication Environment Simulator. The simulator can generate up to 48 independent simultaneous signals at baseband with various modulation types. Completed and transitioned Algorithm Development for coordinated Multi-Platform Anti-Ship Cruise Missile engagements. Research demonstrated the feasibility of effective planning functions that can be implemented in the Tomahawk Weapons Control Program to measure the probability of success of a proposed engagement in terms of

objectives and to optimize coordinated attacks based on threat defenses and acquisition of targets.

f. (U) Sea and Undersea Control (Software/Hardware Producibility): Completed development of planning system aid for battle group surveillance. The aid (computer method) predicts the most likely location of a target based on previous contact, non-contact surveillance and knowledge of enemy tactics. Completed and transitioned to Phase III, the Underwater Digital Signal Processor (UDSP) module which reduces space and energy requirement for undersea weaponry. The UDSP can be reconfigured for different applications to be interoperable with the Link 11 Tactical Data System aboard AEGIS.

2. (U) FY 1993 PROGRAM: (Previously funded under PE 0605502N)

a. (U) Initiated environmentally active projects, including decontamination of PCB-treated wood, clean-up of fluids after fighting fuel fires, treatment of mineralized ordnance compounds, landfill barriers, and development of high rate rapid air monitoring for lead.

b. (U) Global Surveillance (Communications): Develop and demonstrate Multi-Media Network Control Software algorithms compatible with the Navy's Communication Support System. Develop/demonstrate Security Engineering Expert Designer for assisting the design of secure architectures.

c. (U) Technology for Affordability (Logistics): Two projects to complete and transition under this area:

(1). (U) A system was developed which eliminates manual processing and administration associated with tracking Navy personnel qualification records.

(2). (U) A system was developed that facilitates locating specific items, such as spare parts (in a warehouse or in a container crossing the ocean), using RF technology. This system has been transitioned to Army, Air Force, DOD, Marine Corps, and Navy for further development and use. The technology is also being used by private companies in the U.S. and foreign countries.

d. (U) Precision Strike (Materials): Develop and transition for advanced development, light weight 20mm cannon/ammunition system suitable for aircraft/close-in defense.

e. (U) Medical: Complete prototype development and transition non-intrusive, portable blood diagnostic instrument for military/civilian use. The instrument provides estimates of blood analytes, such as, sodium, potassium, calcium, urea, and glucose. A Navy Phase III program is planned.

f. (U) Global Surveillance/Communication: Initiate solar cell development to provide cost efficiencies in manufacture, longer life, higher power efficiencies, and sustained survivability in radiation belts.

g. (U) Develop a lightweight environment-sealed parachute and harness assembly and transition to the Air Force and private sector.

3. (U) FY 1994 PLANS:

a. (U) Advanced Land Combat (Logistics): Develop an automated passenger recognition system to increase efficiency and assist in alleviating long check-in lines when processing passengers for air travel. Transition the technology to commercial/DOD use for air travel in FY 95.

b. (U) Undersea Control (Signal Processing): Develop low power digital signal processing chip for Mark 30 undersea target. Develop an automated inspection system for multichip modules for transition to ARPA.

c. (U) Precision Strike (Materials): Complete development and transition of cost-effective near-net-shaped sapphire missile domes.

d. (U) Technology for Affordability: Optimize high efficiency thermoelectric material and demonstrate its usefulness as a coolant, replacing typical refrigerants; and initiate task to study CFC replacement for air-conditioning and refrigeration.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602790N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Small Business Innovation Research (SBIR)/Small
PROJECT NUMBER: R1864 Business Technology Transfer Pilot Program (STTR)
PROJECT TITLE: Small Business Innovation Research Program (SBIR)

e. (U) Air Superiority and Defense (Materials): Provide guidelines for damage tolerance and durability of composites as well as ways for tailoring or applying new materials in military and industry uses.

f. (U) Advanced Land Combat (Medical): Complete development of enzyme-based EZ-SCREEN^{R} kit and one-step particle-based RECON^{TM} delivery system to indicate various toxins such as Botulinus Toxins A, B and E, B anthraces, Staphylococcal Enterotoxin B and Ricin Toxin. E-Z Screen^{R} system is slightly larger than a deck of playing cards and contains all materials necessary to test one sample and a control for the indicated toxin.

g. (U) Undersea Control (Computers): Demonstrate technical feasibility of an analog acousto-optic signal processor for sonar systems.

h. (U) Technology for Affordability (Computers): Initiate projects to develop a digital memory device capable of storing, reading, and writing 25 terabits per square centimeter with bit-access of nanoseconds and develop a Legged Vehicle for Underwater Mobile Operations.

i. (U) Environmental - Initiate projects to identify failure mechanisms, methods, and materials to increase longevity of sub-structure repairs to reinforced concrete structures, such as piers, to 20 years or more, and develop methods of removing existing paint systems from wood, concrete or steel that produces minimal debris/dust with high productivity.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: CONTRACTORS: Small business contractors in thirty eight of fifty states and the District of Columbia. Contracts are monitored by technical personnel at the Navy Corporate Laboratory, Warfare Centers, Engineering and Rework Centers and Headquarters Activities.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable with this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program relates to most RDT&E programs ongoing in the Navy. Work in this Program Element is related to and coordinated with efforts in PE 0602790A, PE 0602790F, PE 0602790C, PE 0602790D, PE 0602790E, PE 0602790H, PE 0602790BB and contains no unwarranted duplication.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602790N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: Small Business Innovation Research Program (SBIR)/Small Business Technology Transfer Pilot Program (STTR)
PROJECT NUMBER: R2204 PROJECT TITLE: Small Business Technology Transfer Pilot Program (STTR)

C. (U) DESCRIPTION: The STTR program is a statutorily mandated program under Title II of PL 102-564 and scheduled to begin in FY 1994. It is a three year pilot program designed to take advantage of the innovative thinking and work being conducted at universities/colleges (UNIV), non-profit institutions (NP) and/or government owned/company operated laboratories (FFRDC) and combine it with the production ability of small businesses. Under the STTR program UNIV's, NP's and/or FFRDC's enter into an agreement with small businesses and propose solutions to topics (project descriptions) defined by participating federal agencies. The topics submitted will generally be broad in scope to allow the STTR participants the latitude to define an innovative solution while providing a government and private sector with a product. Projects typically encompass science and technology areas which support DOD technology thrust areas and DOD/Navy key technologies while providing a dual-use. Like the SBIR program, STTR is a three phase process. Phase I contracts (typically six month duration) are funded at a $100K level while Phase II contracts (two year duration) if deemed appropriate, are typically funded at a $500K level. A third phase (non-STTR funded follow-on activity) effort can follow a successful Phase II with non-SBIR/STTR funds.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: The STTR program starts in FY 1994. Examples of the plans for the STTR program are shown below:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Initiate programs under microelectronic development area to advance development of the technology and develop cost effective mechanisms in production.

b. (U) Initiate programs under DOD "Thrust 7" (Technology for Affordability) to promote state-of-the-art advancement and cost effective measures in manufacturing.

E. (U) WORK PERFORMED BY: Contractors which comprise small businesses combined with universities or non-profit institutions or government owned-company operated laboratories. The solicitation or topic descriptions will be issued in October 1993.

F. (U) RELATED ACTIVITIES: Program will relate to most RDT&E programs ongoing in the Navy. Work in this PE is related to and coordinated with efforts in PE 0602790A, PE 0602790F, PE 0602790C, PE 0602790D, PE 0602790E, PE 0602790H, PE 0602790BB and contains no unwarranted duplication.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROGRAM NUMBER: R0118 PROJECT TITLE: OCEAN MEASUREMENT SENSORS

C. (U) DESCRIPTION: The Ocean Measurement Sensor (OMS) project manages and sponsors the development of highly specialized ultra-high resolution oceanographic systems and measurement techniques in support of CNO-approved warfare requirements. OMS funds development of systems to measure, analyze, and display environmental reconnaissance information of direct concern to the SSBN Security Program, non-acoustic anti-submarine warfare, mine warfare, special warfare, and amphibious warfare. Additionally, the project develops instrumentation in response to Fleet specific environmental requirements for amphibious and special warfare.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed towed bioluminescence survey system.
b. (U) Completed environmental aspects of vorticity sensor.
c. (U) Reported on Mediterranean non-acoustic phenomena.
d. (U) Completed expendable integrated optical sensor package (AXKT).
e. (U) Initiated expendable bioluminescence sensor (XBP).
f. (U) Initiated ultra-violet absorption spectra (UVAS) and Liquid Atomic Emission Spectrometer (LAES) survey system for marine chemistry.

2. (U) EY 1993 PROGRAM:

a. (U) Continue optical bioluminescence aspects of the Tactical Oceanographic Monitoring System (TOMS) system for submarine tactical decision aids (TACAIDS).
b. (U) Test prototype XBP.
c. (U) Complete universal expendable sensor package.
d. (U) Initiate expendable current meter design.
e. (U) Initiate Harbor Analog study and shallow water sensors for SpecWAR support.
f. (U) Participate in Fleet Sharem Exercise.

3. (U) FY 1994 PLANS:

a. (U) Transition XBP to 6.4 in support of shallow water ASW.
b. (U) Transition TOMS system to fleet submarine use in support of shallow water ASW..
c. (U) Complete expendable current meter for coastal areas.
d. (U) Complete suite of optical/physical drifting buoys for satellite communications of environmental coastal conditions.
e. (U) Initiate sensor suite for autonomous underwater vehicle.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS; NRL, Washington, DC; NCCOSC RDT&E Division, San Diego; NAVUNSEAWARCENDIV, Newport, RI. CONTRACTORS: APL/JHU, Laurel, MD; APL/UW, Seattle, WA; Sippican Corp., Marion, MA; UCSB, Santa Barbara, CA; ARETE Corp., Washington, DC; General Dynamics/EBD, Groton, CT; WHOI, Woods Hole, MA.

F. (U) RELATED ACTIVITIES: PE 0101224N, SSBN Security and Survivability Program; PE 0604218N, Air/Ocean Equipment Engineering.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROGRAM NUMBER: R1987 PROJECT TITLE: MAPPING, CHARTING & GEODESY TECHNIQUES

C. (U) DESCRIPTION: This project develops new charting, bathymetry, magnetic, and gravimetric survey techniques necessary to reduce the existing shortfall in accessible, coastal hydrographic survey requirements as validated through the Defense Mapping Agency in support of littoral warfare requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued digital MC&G Analysis and evaluation weapons system inputs (WSI) task.
b. (U) Investigated Canadian autonomous vehicle for remote bathymetry work.
c. (U) Investigated aircraft remote laser bathymetry measurement techniques.
d. (U) Transitioned and validated tidal prediction model.
e. (U) Initiated helicopter borne remote Electromagnetic (AEM) pulse techniques for rapid response bathymetry measurements.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Digital MC&G Analysis and evaluation of WSI task.
b. (U) Complete Statistical Model on Sea Floor Roughness.
c. (U) Begin test of Army's laser bathymetry system for Navy Application techniques.
d. (U) Transition satellite based Global Positioning System (GPS) technique for precise 3-dimensional positioning of survey aircraft.
e. (U) Begin joint NASA effort to calibrate visible passive satellite sensors for coastal bathymetry techniques.

3. (U) 1994 PLANS:

a. (U) Continue Digital Analysis and support for WSI task.
b. (U) Complete prototype AEM system for rapid response coastal bathymetry.
c. (U) Initiate automonous vehicle sensor suite for coastal sea floor imaging.
d. (U) Complete joint deep ocean imaging sensor development effort with Department of Interior Geological Survey group.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SCC, Stennis Space Center, MS; NRL, Washington, DC. CONTRACTORS: Planning Systems, Inc., Slidell, LA; San Diego State University, San Diego, CA; NOAA PMEL, Newport, OR.

F. (U) RELATED ACTIVITIES: PE 0601153N, Defense Research Sciences; PE 0604235N, Ocean and Atmospheric Technology; PE 0303109N, SIRUS; PE 0305160N, Defense Meteorological Satellite Program; PE 0603785N, Combat Systems Oceanographic Performance Assessment.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0118	Ocean Measurement Sensors	*3,649	*3,267	2,918	CONT.	CONT.
X0513	Air/Ocean Prediction	1,508	1,491	1,429	CONT.	CONT.
X0514	Air/Ocean Shipboard Measurements	1,971	1,996	1,879	CONT.	CONT.
X0523	Air/Ocean Data Assimilation	*1,118	*743	785	CONT.	CONT.
X0948	Precise Timing and Astrometry	1,369	1,513	1,403	CONT.	CONT.
X1596	Satellite Ocean Tactical Application	*4,668	*3,732	4,029	CONT.	CONT.
R1987	Mapping, Charting and Geodesy Techniques	*1,399	*1,276	1,583	CONT.	CONT.
X2008	Tactical Ocean Data Assimilation and Prediction	2,353	2,219	2,213	CONT.	CONT.
TOTAL		18,035	16,237	16,239		

B. (U) DESCRIPTION: This program provides a shipboard environmental support capability designed to optimize weapon, sensor and platform performance as a function of the changing ocean and atmosphere. Projects within this program element develop atmospheric and oceanic data assimilation techniques, forecast models, data base management systems and associated software for use in both mainframe and tactical scale computers afloat. They also provide for the development of algorithms to process and display remotely sensed satellite data for the integration and tactical application of significant oceanographic information. In addition, the projects provide for the advanced development of specialized, ultra-high resolution oceanographic instrumentation and techniques to measure ocean parameters, new sensors, communications, interface and precise time technologies. Mapping, Charting and Geodesy efforts address the bathymetric and gravimetric needs of the fleet. The projects relate synergistically to support the infrastructure necessary to provide on-scene commanders with timely data needed to make tactical decisions to avoid, mitigate or exploit environmental effects. The principal goal of this program element is to allow the operating environment and its effects to be an integral part of Navy Command and Control.

* Project X0523 transferred from PE 0305111N. Projects R0118, X1596 and R1987 transferred from PE 0603704N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0513 PROJECT TITLE: Air/Ocean Prediction

C. (U) DESCRIPTION: This project develops Large Scale Computer numerical oceanic and atmospheric forecasting models. Other models under development focus on sea ice, ocean thermal structure and circulation prediction. In addition, the project develops expert systems/artificial intelligence applications which will utilize the model output data to afford decision makers better understanding of operational limitations induced by the environment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Delivered Gulf Stream regional model.

b. (U) Continued development of NOGAPS 4.0 for Large Scale Computer.

c. (U) Began development of relocatable high resolution atmospheric model.

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of relocatable high resolution atmospheric model.

b. (U) Deliver NOGAPS 4.0 for Large Scale computer.

c. (U) Deliver upgraded Electro-optical decision aid.

d. (U) Begin development of tropical cyclone forecasting expert system.

3. (U) FY 1994 PLANS:

a. (U) Deliver relocatable high resolution atmospheric model.

b. (U) Begin development of tactical scale nested atmospheric forecast model.

c. (U) Deliver tropical cyclone forecasting expert system (version 1).

d. (U) Deliver combined ocean and sea ice model for large scale computer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0514 PROJECT TITLE: Air/Ocean Shipboard Measurements

C. (U) DESCRIPTION: This project provides for the advanced development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters. Major emphasis areas include tactical workstations, data compression, connectivity, interface technology and the advanced development of new sensors such as active and passive atmospheric profilers for the Shipboard Meteorological and Oceanographic Observing System (SMOOS).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued advanced development of LIDAR (light detection and ranging) atmospheric profiler.

b. (U) Began advanced development of the High Resolution Interferometer Sounder (HIS) passive atmospheric profiler.

c. (U) Completed advanced development of the NTCS-A Integrated Tactical Environmental System (NITES) workstation.

2. (U) FY 1993 PROGRAM:

a. (U) Complete advanced development of LIDAR atmospheric profiler; transition to engineering development.

b. (U) Continue advanced development of the HIS profiler and data connectivity and interfaces with C2 systems.

c. (U) Continue advanced development of data compression techniques.

3. (U) FY 1994 PLANS:

a. (U) Begin advanced development of next generation SMOOS sensors.

b. (U) Complete advanced development of data connectivity with the Afloat Planning System.

c. (U) Complete advanced development of the HIS passive atmospheric profiler; transition to engineering development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRAD, San Diego, CA; NRL, Wash. DC; CONTRACTORS: ARL, Penn State University, State College, PA.

F. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering - Provides for transition to engineering development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0523 PROJECT TITLE: Air/Ocean Data Assimilation

C. (U) DESCRIPTION: This project develops systems and associated software to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder afloat. The project also supports code conversion, rehosting of software from other sources and modifications to the Tactical Environmental Support System - TESS(3) - Data Base Management System (DBMS).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Began development of capability for integrating atmospheric sounder and microwave imager data into data base.

b. (U) Continued modifications to TESS(3) DBMS.

c. (U) Began code conversion for large scale computer.

2. (U) FY 1993 PROGRAM:

a. (U) Begin development of capabilities to ingest data from new satellite sensors into data base.

b. (U) Complete code conversion for large scale computer.

c. (U) Complete modifications to TESS(3) DBMS.

3. (U) FY 1994 PLANS:

a. (U) Continue development of capabilities to ingest data from new satellite sensors into data base.

b. (U) Complete next generation DBMS for TESS(3).

c. (U) Begin modifications to TESS(3) DBMS to accommodate upgraded hardware and systems software.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash, DC. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering - provides engineering development for AN/SMQ-11, TESS(3) and related systems.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0948 PROJECT TITLE: Precise Timing and Astrometry

C. (U) DESCRIPTION: Upgrade the accuracy of the U.S. Naval Observatory's Master Clock System (MCS) for DOD surface, subsurface, air and shore communications, navigation and time dissemination systems. Develop near-real-time Earth orientation predictions through use of satellite or fiber optics transmission of Very Long Baseline Interferometer (VLBI) data, for DOD navigation and positioning systems. Develop advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of positions of both faint and bright stars, satellite tracking, and space debris studies.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Fast interferometer delay line and prototype siderostat telescope delivered and tested.

b. (U) Charge-Coupled-Device (CCD) multiple array sensor testing completed.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Master Clock upgrade and evaluate new technology cesium clock performance.

b. (U) Start development of prototype Clock Environment Behavior Models (CEBM).

c. (U) Install large wide-field CCD on transit telescope and install delay lines and siderostats at interferometer site.

d. (U) Design VLBI correlator improvements.

3. (U) FY 1994 PLANS:

a. (U) Develop clock environmental test bed ensemble.

b. (U) Perform VLBI fiber optics and VLBI satellite data transfer tests.

c. (U) Design operational CCD transit telescope and acquire first infrared detectors for transit telescope and interferometer.

d. (U) Conduct first test observations with prototype interferometer and test large wide-field CCD on transit telescope.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: USNO, Washington, DC; NRL, Washington, DC. CONTRACTORS: Universities Space Research Association, Columbia, MD; Interferometrics, Inc., Vienna, VA; University of New Mexico, Albuquerque, NM; University of Arizona, Tucson, AZ; California Institute of Technology, Pasadena, CA; Monterey Institute for Research, Monterey, CA.

F. (U) RELATED ACTIVITIES: PE 0602435N, Project RM35G83, Astronomy, supports exploratory development in the general areas covered in this summary, and many projects transition to PE 0603207N. Initial research in clock steering algorithms, VLBI - related atmospheric studies, and exploratory research into various methods of observing faint stars and developing star catalogs is performed under this related activity.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X1596 PROJECT TITLE: Satellite Ocean Tactical Applicat:

C. (U) DESCRIPTION: This project develops concepts and software techniques f the integration and tactical application of significant ocean and atmospheric data derived from satellite-borne sensors. Included are techniques and algorithms for the processing of sensor suite measurements, the conversion of signal data to geophysical information, analysis schemes for satellite data applications and field validation of the products.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued development of Synthetic Aperture Radar (SAR) ocean remote sensing applications.

b. (U) Began development of expert system image analysis techniques.

c. (U) Delivered Electromagnetic/Electro-optics (EM/EO) performance model.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver expert system for clear air turbulence predictions.

b. (U) Begin expert system for satellite imagery feature analysis.

c. (U) Continue SAR development and acoustic exercise participation.

3. (U) FY 1994 PLANS:

a. (U) Deliver expert system for electromagnetic refractivity.

b. (U) Begin transition of ocean color sensor operational capability.

c. (U) Begin transition of shipboard scatterometer data applications.

d. (U) Continue SAR development and acoustic exercise participation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL Washington, DC. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X2008 PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

C. (U) This project develops new means of environmental data assimilation, including conventional and satellite remotely sensed data, and includes the development of tactical models to utilize these data. The goal is to provide t Navy with a real-time, stand-alone, shipboard tactical scale atmospheric and oceanographic forecasting capability for the Tactical Environmental Support System - TESS(3).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Delivered range dependent electromagnetic (EM) prediction model.

b. (U) Began development of Mediterranean Sea tactical scale model.

c. (U) Delivered prototype Vapor, Liquid and Solid Tracking (VLSTrack) model for surface effluents.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver 3D VLSTrack model for surface effluents.

b. (U) Continue development of Mediterranean Sea model; begin development of coastal and enclosed basin tactical scale models for the Sea of Okhotsk, Yellow Sea, and Sea of Japan.

c. (U) Deliver upgraded range dependent EM prediction model.

3. (U) FY 1994 PLANS:

a. (U) Deliver local forecasting capability for use in TESS(3).

b. (U) Deliver 3D VLSTrack model for surface and upper air effluents.

c. (U) Deliver Mediterranean Sea model.

d. (U) Begin incorporation of expert system/artificial intelligence techniques in the four-dimensional assimilation of tactical scale data.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NRAD, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering - TESS(3) will incorporate data assimilation techniques and models.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Training System Aircraft

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1142	T-45 IMP	48,056	49,165	28,939	- 0	731,872
H1150	JPATS	0	0	3,626	CONT.	CONT.
TOTAL		48,056	49,165	32,565	CONT.	CONT.

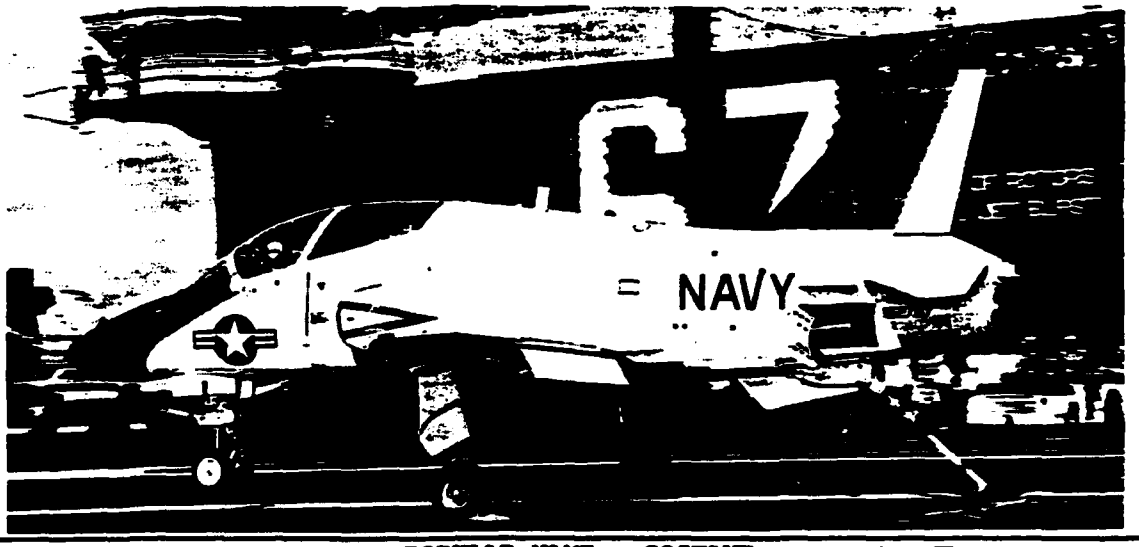
B. (U) DESCRIPTION:

1. (U) The T45TS mission is to provide undergraduate jet pilot training f prospective carrier-based Navy and Marine Corps pilots, and selected international students, to meet aircrew requirements in the 1990's and beyond. Projected T-2 and TA-4 aircraft shortages due to attrition and service life expiration, as well as increasing operating and support costs, require development of a cost effective replacement. T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support.

2. (U) The Joint Primary Aircraft Training System (JPATS) is an ACAT ID, program initiated to provide a high degree of commonality between the flight training program of the United States Navy (USN) and United States Air Force (USAF). The JPATS is to replace the T-34 and T-37 for the USN and USAF, respectively. JPATS shall employ a common primary training aircraft and relate aircrew training devices (simulators, computer-aided instruction terminals, etc to satisfy both the USAF Primary Aircraft Training System (AFPATS) and the Nava Primary (and some intermediate) Aircraft Training System (NPATS) requirements. JPATS shall also address the individual service elements of syllabus courseware data management, and system support. The mission of JPATS will be to train entry-level USN/USAF student pilots in primary flight instruction. The USN wil also use JPATS to provide some intermediate undergraduate pilot training and undergraduate naval flight officer training.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1142 PROJECT TITLE: T-45 Improvements



POPULAR NAME: GOSHAWK

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		IOC 3/93	MS III 8/94	
ENGINEERING MILESTONES		CP21 CDR 5/93 CP21 PDR 12/92	CP21 PROTOTYPE DELV 5/94	
T&E MILESTONES			CP21 DT/OT 9/94 TECHEVAL 10/93 OPEVAL 2/94	
CONTRACT MILESTONES	CP21 AWARD 5/92	DELV ACFT #12 IOC 3/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	41.773	40.227	25.764	0	679.521
SUPPORT CONTRACT	0	0	0	0	3.799
IN-HOUSE SUPPORT	6.283	8.938	3.175	0	19.928
GFE/ OTHER					28.624
TOTAL	48.056	49.165	28.939	0	731.872

B. (U) DESCRIPTION: The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilots, and select international students, to meet aircrew requirements in the 1990's and beyond. T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support. Development of a digital cockpit upgrade (including a 1553 avionics architecture and multi-functional displays) funded for FY-92 - FY-94 with production and retrofit incorporation into the entire system planned for FY-95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1142 PROJECT TITLE: T-45 Improvements

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed DT IID (including initial sea trials).

b. (U) Completed DT IID for Production Training Integration System (TIS).

c. (U) Continued Engineering, Manufacture and Development of aircraft and ground training system including final portion of high angle of attack and spin program.

d. (U) Conducted OT II Phase 2 TIS.

e. (U) Initiated development of digital cockpit including system design review, configuration mockup and assembly layouts.

2. (U) FY 1993 PROGRAM:

a. (U) Complete Engineering, Manufacture and Development of aircraft and ground training system.

b. (U) Prepare for TECHEVAL.

c. (U) Envelope expansion flight testing to extend clearances for ordnance and baggage containers.

d. (U) Complete digital cockpit design efforts and continue development including preliminary and critical design review and integration bench tests. Commence fabrication of prototype for aircraft and flight simulator.

e. (U) Conduct feasibility assessment and, if cost effective, down select to one alternate engine leading to qualification verification of an alternate engine for T-45A.

3. (U) FY 1994 PLANS:

a. (U) Complete digital cockpit prototype fabrication. Conduct ground tests, government and contractor flight tests and evaluation. FY 1994 is the last year of RDT&E funding.

b. (U) Complete TECHEVAL of basic system (without digital cockpit).

c. (U) Conduct OPEVAL of basic system.

d. (U) Conduct MS-III of basic system.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV Patuxent River, MD; NAVAIRWARCENACDIV Warminster, PA; NAVAIRWARCENACDIV Lakehurst, PA; NAVAIRWARCENACDIV Indianapolis, IN; NAVAIRWARCENACDIV Trenton, NJ; NTC Orlando, FL. CONTRACTORS: McDonnell Douglas Corporation, St. Louis, MO.

E. (U) COMPARISON WITH AMENDED 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: TECHEVAL, OPEVAL and MS III were delayed due to an aircraft mishap in June 1992.

3. (U) Cost Changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1142 PROJECT TITLE: T-45 Improvements

F. (U) PROGRAM DOCUMENTATION:

Mission Element Need Statement	6/79
Navy Training Plan	6/91
TEMP	1/91
DCP	5/91
ILSP	6/91
Acquisition Plan Update	3/92

G. (U) RELATED ACTIVITIES: PE 0603216N, Aviation Survivability; PE 0604215N, Standards Development; PE 0604264N, Aircrew Systems Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN-LINE 17/18	340,713	262,640	289,981	3,226,598	5,194,132
MILCON LINE P-236	0	10,100	0	0	31,100

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) TEST AND EVALUATION: This information contained in the Congressional Data Sheets.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1150 PROJECT TITLE: Joint Primary Aircraft Trainer

PICTURE NOT AVAILABLE

POPULAR NAME: JPATS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			II 7/94	III 30/98
ENGINEERING MILESTONES				
T&E MILESTONES				DT&E 20/97 MOT&E 20/98
CONTRACT MILESTONE			CNTR AWARD 7/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	1,230	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	0	0	2,396	CONT.	CONT.
GFE/ OTHER	0	0	0		
TOTAL	0	0	3,626	CONT.	CONT.

B. (U) DESCRIPTION: The JPATS is an ACAT ID, program initiated to provide a high degree of commonality between the flight training program of the United States Navy (USN) and United States Air Force (USAF). The JPATS is to replace the T-34 and T-37 for the USN and USAF, respectively. JPATS shall employ a common primary training aircraft and related aircrew training devices (simulators, computer-aided instruction terminals, etc.) to satisfy both the USAF Primary Aircraft Training System (AFPATS) and the Naval Primary (and some intermediate) Aircraft Training System (NPATS) requirements. JPATS shall also address the individual service elements of syllabus courseware, data management, and system support. The mission of JPATS will be to train entry-level USN/USAF student pilots in primary flight instruction. This is a new start for the Navy. The Air Force is the executive/leadservice for the program and has funding in FY 1993 and prior years.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable

2. (U) FY 1993 PROGRAM: Not applicable

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1150 PROJECT TITLE: Joint Primary Aircraft Traine:

3. (U) FY 1994 PLANS:

a. (U) Conduct technical analysis in support of source selection.

b. (U) Begin engineering change proposal (ECP) analysis.

c. (U) Provide engineering support of qualification and operational test and evaluation (Q/OT&E) and any USN unique requirements for data or analysis.

d. (U) Conduct management support and field activity tasking.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Lakehurst, NJ; NAVAIRWARCENACDIV, Warminster, PA; NTC, Orlando, FL; NAVAIRWARCENACDIV, Trenton, NJ and Indianapolis, IN; NAVAIRSYSCOMDET PMA(F) 227, Patuxent River, MD and Naval Aviation Maintenance Office (NAMO-333), Patuxent River, MD.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Test and Evaluation Master Plan (TEMP) Summary	5/93
Operational Requirements Document (ORD)	6/92
Integrated Program Summary (IPS)	5/93
Acquisition Program Baseline (APB)	5/93
Program Life Cycle Cost Estimate (PLCCE)	3/92
Independent Cost Estimate (ICE)	3/92
Cost Analysis Requirements Description (CARD)	3/92

G. (U) RELATED ACTIVITIES: USAF PE# Aircraft 0604233F; Ground Based Training System (GBTS) 0604227F; Production-GBTS 0804741F.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Qualification and operational suitability testing will be performed on both the aircraft and the ground based training simulators/training devices.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0097	Aircrew Impact Injury Prevention	2,618	8,088	1,770	CONT.	CONT.
W0584	Aircrew Protective Clothing & Devices	12,590	10,694	4,118	CONT.	CONT.
1/W0591	A/C Survivability & Vulnerability & Safety	4,779	4,359	3,184	CONT.	CONT.
1/W0592	A/C & Ordnance Safety	2,876	3,912	1,683	CONT.	CONT.
1/W1277	Nuclear Survive A/C (FAANTAEL)	3,195	2,848	1,736	CONT.	CONT.
1/W1819	CV A/C Fire Suppression System	1,928	2,148	1,181	CONT.	CONT.
	TOTAL	27,986	32,049	13,672	CONT.	CONT.

1/ Previously funded under Program Element 0603262N

B. (U) DESCRIPTION: Aviation Survivability addresses the issues of both aircrew and platform survivability, enhancing overall chances for protection and enhanced performance. The capabilities addressed under this program element will counter emerging threats of the next generation of operational weapons systems and will enhance combat effectiveness in future operational mission scenarios.

1. (U) Two of the projects address aircrew requirements. Aircrew Impact Injury Prevention develops human dynamic and injury response models to impact acceleration and determines the correlation of these dynamic responses with the physiological effects and injuries. Aircrew Systems Technology uses these models to develop and functionally integrate systems and equipment to ensure aircrew protection against natural and induced environmental or physiological hazards encountered during routine, combat and emergency flight operations as well as during escape, survival and rescue, following loss of the aircraft. Life support system projects are coordinated within the Tri-Service Life Support Equipment Research, Development Testing and Evaluation (RDT&E) Steering Committee, the Joint Environmental Working Group (Flight), the Tri-service Aerospace Medical Research Panel and Technical Working Groups in biodynamics and vibrations/acoustics, to eliminate duplication and ensure commonality.

2. (U) The remaining four projects address platform survivability, to address not only the reductions in aircraft susceptibility to enemy and non-combat threats but also aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological, and directed energy. The Aircraft Survivability and Vulnerability and Safety project expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. Aircraft and Ordnance Safety transitions generic Insensitive Munitions technology to Navy and Marine Corps air weapons, ensuring that they are insensitive to fast cook-off, slow cook-off, bullet and fragment impact, and sympathetic detonation. The Fleet Aircraft Assessment for Navy Testing and Analysis for Electromagnetic pulse Limitation (FAANTAEL) assesses the vulnerability of tactical aircraft to damage/upset from electromagnetic pulse. CV Aircraft Fire Suppression Systems develop improved firefighting systems and fire protective measures for aircraft carriers.

3. (U) Together these projects provide for the survivability and reduced vulnerability of Naval aircrew and aircraft operating in the maritime environment.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: M0097 PROJECT TITLE: Aircrew Impact Injury Prevention

C. (U) DESCRIPTION: This project develops human dynamic and injury response models of impact acceleration and determines the correlation of these dynamic responses with physiological effects and injuries. These models will be used to evaluate human protective systems designed to prevent impact type injuries.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Analyzed human response data for vertical +Gz impact with symmetrical head-mounted devices.

b. (U) Completed development and testing of new state-of-the-art kinematic data acquisition system.

c. (U) Completed kinematic model for multi-axis human and manikin impact response.

2. (U) FY 1993 PROGRAM:

a. (U) Publish evaluation of new state-of-the-art kinematic data acquisition system.

b. (U) Collect human response data for vertical +Gz, with modified Navy HGU-55 helmet and simulated Night Vision Goggle's (NVG's).

c. (U) Implement Cooperative Agreement with University of New Orleans to establish an Advanced Marine Technology Center.

3. (U) FY 1994 PLANS:

a. (U) Collect and analyze female human response data for -Gx impact.

b. (U) Publish preliminary on-axis +Gz, -Gz impact response guidelines for head-mounted devices.

c. (U) Publish updated safe/unsafe acceleration guide.

4. (U) PROGRAM TO COMPLETION: This is a continuing program

E. (U) WORK PERFORMED BY: IN HOUSE: NAVBIODYNLAB, New Orleans, LA; NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: Crescent Ltd, University of New Orleans and Tulane University, New Orleans, LA; GSA Technical Service, Ft. Worth, TX. OTHER: USAF Armstrong Laboratory Det., WPAFB, Dayton, OH; USA Aeromedical Research Laboratory, Ft. Rucker, AL; U.S. Department of Transportation, Washington, D.C.

F. (U) RELATED ACTIVITIES: P.E. 0602201F Aerospace Flight Dynamics; P.E. 0604264N Aircrew Systems Development; and P.E. 0604706F Aircrew Systems Development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W0584 PROJECT TITLE: Aircrew Protective Clothing and Devices

C. (U) DESCRIPTION: Develops technology for functionally integrated Navy unique aircrew and life support systems designed to ensure crew protection and enhance crew performance. Congressional increases from FY 1990 to FY 1992 have been applied to initiate an F/A-18 compatible Navy Combat Edge (CE) System to enhance combat capability of current aircraft and to transition CE through Milestone (MS) II.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Transitioned Navy CE through MS II.
   b. (U) Commenced evaluation of Laser Visor Eye Protection (LVEP) prototypes.
   c. (U) Completed evaluation of Aircrew Integrated Life Support System (AILSS) design concepts and initiated design to Navy requirements.
   d. (U) Completed 21st Century Head Protection (21st CHP) models and commence physical properties testing.
   e. (U) Continued Medium Energy Laser Eye Protection (MELEP), Crash Worthiness (CW), and Advanced Oxygen Delivery System (AODS) design efforts.
   f. (U) Initiated Advanced Technology Crew Station (ATCS) detailed design.
   g. (U) Initiated Phase I low cost BioFidelic Manikin (BFM) design.
   h. (U) Initiated Integrated Helmet Mounted Display/Sight (HMD/S) design to incorporate ejection safe optical sight/display.

2. (U) FY 1993 PROGRAM:
   a. (U) Continue LVEP prototype evaluations.
   b. (U) Complete AILSS and MELEP preliminary designs.
   c. (U) Complete ATCS functional design mockups.
   d. (U) Document 21st CHP, CW and AODS designs for HMD/S design.
   e. (U) Evaluate Automatic Variable Load Energy Attenuator (AVLEA)s.
   f. (U) Initiate Navy analysis and development tasks in support of US Navy/Air Force advanced technology escape project.
   g. (U) Initiate advanced chemical and biological protection development.

3. (U) FY 1994 PLANS:
   a. (U) Complete LVEP laboratory and flight test and evaluation.
   b. (U) Continue ATCS as an in-house effort.
   c. (U) Test AVLEA with helicopter crashworthy seats.
   d. (U) Flight test AILSS and MELEP prototypes.
   e. (U) Continue design of HMD/S Test & Evaluation (T&E) prototypes.
   f. (U) Continue Navy tasks for USN/USAF escape project.
   g. (U) Initiate helicopter cockpit safety analysis/design.
   h. (U) Provide BFM prototypes for testing under project M0097.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA and Patuxent River, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: Boeing Advanced Systems Division, Seattle, WA; McDonnell Douglas, St. Louis, MO; Gentex Inc., Carbondale, PA; OTHERS: USAF Armstrong and Wright Laboratories, WPAFB, Dayton, OH.

F. (U) RELATED ACTIVITIES: Program adheres to Tri-Service Reliance agreements on Crew Station and Life Support Systems with oversight provided by the Joint Directors of Laboratories. Work in this PE is fully coordinated with efforts in PE 0602201F - Aerospace Flight Dynamics; and PEs 0604264N and 0604706F - Aircrew Systems Development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W0591 PROJECT TITLE: A/C Survivability & Vulnerability & Safe

C. (U) DESCRIPTION: This project expands the survivability technology base and develops prototype hardware to improve the survivability of Navy and Marine Corps aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of kill if the aircraft is hit (vulnerability) This program has developed prototype hardware for the reduction of vulnerability a susceptibility of Navy and Marine Corps aircraft which has been or will be incorporated in production.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated and completed Phase II - advanced development of the LIM KNIGHT program.

b. (U) Initiated Phase III - aircraft modification/prototyping of LIMIT KNIGHT program.

2. (U) FY 1993 PROGRAM:

a. (U) Complete Phase III - aircraft modification/prototyping of the LIMI KNIGHT program.

b. (U) Initiate and complete Phase IV - flight testing LIMIT KNIGHT program.

c. (U) Initiate Phase I - diagnostic testing of the LIMIT RAM program.

d. (U) Initiate and complete Phase I - diagnostic testing of the OUTLAW AQUARIUM program.

e. (U) Initiate Phase II - advanced development of OUTLAW AQUARIUM progra

3. (U) FY 1994 PLANS:

a. (U) Complete Phase I - diagnostic testing of the LIMIT RAM program.

b. (U) Initiate the Demonstration and Validation (DEMVAL) phase OUTLAW AQUARIUM (Weapon 2) program.

c. (U) Complete the DEMVAL Phase of the OUTLAW AQUARIUM (Weapon 2) progra

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA and Point Mugu, CA; NAVAIRWARCENACDIV, Warminster, PA and Lakehurst, NJ; Naval Postgraduate School, Monterey, CA. CONTRACTORS: Grumman Aerospace, Bethpage, NY; McDonnell Douglas, St. Louis, MO; Bell Helicopter, Textron, Inc., Fort Worth, TX.

F. (U) RELATED ACTIVITIES: P.E. 0605132D, Joint Technical Coordinating Group on Aircraft Survivability, supports joint combat survivability development, test and evaluation programs, activities and ensures no duplication of effort between the Services with respect to survivability programs.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W0592 PROJECT TITLE: A/C and Ordnance Safety

C. (U) DESCRIPTION: This project transitions technology from Insensitive Munitions (IM) Advanced Development (Generic Technology) to Air Weapon Systems to comply with Chief of Naval Operations (CNO) direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), Bullet and Fragment Impact (BI/FI), and sympathetic detonation (SD).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Advanced Air to Air Missile (AAAM) small-scale propellant IM testing and initiate IM testing of contractual residual motors.
b. (U) Fabricated and tested advanced IM booster for Joint Direct Attack Munition (JDAM) (formerly Advanced Bomb Family).
c. (U) Conducted SD analysis of Advanced Interdiction Weapon (AIWS) candidate unitary warheads.
d. (U) Completed extensive IM demonstration task for the Advanced Rocket System Development (ARS) M261 submunition warhead.
e. (U) Fabricated 40 FMU-143 IM Improved boosters to support the program to develop Navy version of the United States Air Force BLU-109 penetrator bomb.
f. (U) Conducted SD, SCO and FI tests on low signature Sidewinder motors.
g. (U) Completed IM testing on the Advanced Medium Range Air to Air Missile (AMRAAM) composite case rocket motors. Conduct small-scale tests on AMRAAM ducted rocket propellant.
h. (U) Completed IM and performance testing of the HELLFIRE Optimized Missile System improved warhead in a joint task with the Army.

2. (U) FY 1993 PROGRAM:

a. (U) Complete IM validation tests of AAAM residual propulsion units.
b. (U) Demonstrate effectiveness of the advanced JDAM booster using special test main fill explosive.
c. (U) Conduct SD tests on candidate Joint Standoff Weapon (JSOW) (formerly AIWS) unitary warheads.
d. (U) Conduct IM tests on AMRAAM ducted rocket hardware.
e. (U) Demonstrate fuze direct initiation of ARS blast fragment warheads.
f. (U) Demonstrate IM design for GATOR mines.
g. (U) Develop cook-off modeling tools to predict ordnance reaction violence.

3. (U) FY 1994 PLANS:

a. (U) Continue IM support for JDAM.
b. (U) Complete IM evaluations on JSOW.
c. (U) Support ARS development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD. CONTRACTORS: Advanced Ordnance Technology, Inc., Waldorf, MD.; D.P. Associates, Arlington, VA.

F. (U) RELATED ACTIVITIES: P.E. 0603609N, Conventional Munitions and individual missile development program elements.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W1277 PROJECT TITLE: Nuclear Survive A/C (FAANTAEL)

C. (U) DESCRIPTION: Fleet Aircraft Assessment for Navy Testing and Analysi Electromagnetic pulse (EMP) Limitations (FAANTAEL) assesses the vulnerabilit tactical aircraft to damage/upset from EMP, verifies aircraft hardness, and assesses the ability of aircraft to perform their mission in an EMP environm In response to Department of Defense (DoD) direction to validate hardness th cost-effective testing, simulation and analysis, the Navy has developed a fu scale, threat testing capability at both NAVAIRWARCENACDIV, Patuxent River, and NAVAIRWARCENWPNDIV, China Lake, CA. FAANTAEL provides research into fib optic sensors, digital instrumentation, test pulser development, recommended solutions/work-around to EMP induced problems, and correlation of EMP with lightning phenomena, high powered microwave (HPM), and ultra wideband (UWB) pulsed power threats. FAANTAEL researches the Unified Electromagnetic Environment (UEME) approach and the development of DoD-STD-2169A capabilitie

D. (U) PROGRAM ACCOMPISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Issued P-3C test reports and Naval Air Training and Operatin Procedures Standarization warnings.
b. (U) Conducted EA-6B, AV-8B, and AIM-54C assessments.
c. (U) Verified NAVAIRWARCENWPNDIV pulser and site performance.
d. (U) Developed engineering model of optical sensor.
e. (U) Researched correlation of nuclear EMP, lightning phenomena, HPM, and UWB pulsed power threats to develop UEME assessment methodology.
f. (U) Assessed pulse guard wafer for EMP vulnerability reduction.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct all pre/post-assessment planning/analysis and issue reports for scheduled AH-1W, CH-53E, AGM-84-1C, AGM-84E and AGM-114.
b. (U) Incorporate Vertical Polarity Dipole integration at NAVAIRWARCENACDIV.
c. (U) Continue to research EMP vulnerability reduction and assessment of the pulse guard wafer.

3. (U) FY 1994 PLANS:

a. (U) Conduct all pre/post-assessment planning/analysis and issue reports for scheduled aircraft and air launched ordnance (F-14D, SH-60, AGM- & AGM-88).
b. (U) Pretest planning and point of entry definition for EMP Hardn Assurance Maintenance Surveillance (HAMS)/HPM/UWB assessment for F/A-18.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; COMNAVAIRLANT, Norfolk, VA; COMNAVAIRPAC, San Diego, CA; NAVAIRWARCENWPNDIV, China Lake, CA NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTORS: EG&G/WASC/UIE/BDM Lexi Park, MD; ARC/PSG, Inc., Arlington, VA; D.T. Brown, Bohemia, NY.

F. (U) RELATED ACTIVITIES: P.E. 0101402N (Project H0793, TACAMO). Crown Helicopter EMP HAMS programs.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aviation Survivability
PROJECT NUMBER: W1819 PROJECT TITLE: CV A/C Fire Suppression System

C. (U) DESCRIPTION: This project develops improved firefighting systems an fire protective measures for aircraft related fires on aircraft carriers including assessment of aircraft fire properties, the development of the P-2 firefighting vehicle, and improvements to firefighting agents and delivery systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Evaluated proposed designs of P-25 for prototype solicitatio

b. (U) Continued advanced development of flight deck imaging system video firefighter trainer, ordnance cooling requirements, advanced flight de fire simulator, and performed full scale fire tests on various aircraft and weapons materials.

2. (U) FY 1993 PROGRAM:

a. (U) Award contract for design and manufacture of P-25 prototypes

b. (U) Continue development of flight deck imaging system, video firefighter trainer, ordnance cooling requirements, advanced flight deck fir simulator, and perform full scale fire tests on various aircraft and weapons materials.

3. (U) FY 1994 PLANS:

a. (U) Continue design and manufacture of P-25 prototypes.

b. (U) Evaluate prototype of video training system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVSURFWARCEN WH OAK DET, Silver Spring, MD; NAVAIRWARCENACDIV, Trenton, NJ; NAVAIRWPNSTA, Ch Lake, CA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0446	Advanced Avionics Subsystems	2,976	6,570	5,545	CONT.	CONT.
W0447	Electromagnetic Radiation Source Elimination (ERASE)	2,979	5,526	5,190	CONT.	CONT.
W2014	Integrated High Performance Turbine Engine Technology (IHPTET)	2,947	7,073	8,209	CONT.	CONT.
W2152	Advanced Short Takeoff and Vertical Landing (ASTOVL) Demonstrator	0	0	11,061	11,000	22,061
W2185	Advanced Anti-Radiation Guided Missile (AARGM)	0	9,586	0	0	9,586
TOTAL		8,902	28,755	30,005	CONT.	CONT.

B. (U) DESCRIPTION: Develops and demonstrates advanced concepts for Naval Aviation. Tasks are not confined to a single platform, and address needs beyond current acquisitions. Work is coordinated with other services, Advanced Research Projects Agency (ARPA), and National Aeronautics and Space Administration (NASA), and focuses on Navy unique aviation requirements. There are five projects:

1. (U) Advanced Avionics Subsystems: Develops and demonstrates advanced integrated modular avionics (IMA) concepts for application to Navy aircraft. Work is focused on unique Navy concerns, such as demanding physical environment, intense electromagnetic environment, constrained sea-based support environment, and unique Navy mission profiles.

2. (U) Electromagnetic Radiation Source Elimination (ERASE): ERASE is Navy's principal source of defense suppression technology for aircraft survivability in the presence of lethal radar-directed threat systems and related threat emitters. The program has provided the technology for every U.S. anti-radiation guided missile system including Standard ARM, HARM, SIDEARM and others. ERASE has been used to demonstrate fundamental microwave components, radomes and special receivers, and full systems such as HARM and SIDEARM.

3. (U) Integrated High Performance Turbine Engine Technology (IHPTET): This program provides experimental engine testing to demonstrate readiness fo entering engineering development of new gas turbine engine technologies. IHPTET is a tri-service program in which each service contributes agreed-to 6.2 and 6.3 funding and laboratory resources to meet specified goals of doubling thrust-to-weight ratio and halving fuel consumption by year 2003, relative to a 1987 baseline, while maintaining engine durability at current levels. This program covers the Navy share of IHPTET demonstrator engine work, ensuring that unique Navy design and operational requirements are met.

4. (U) Advanced Short Takeoff and Vertical Landing (ASTOVL) Demonstrator: This is a joint Navy/ARPA/NASA program to demonstrate the necessary technologies required to fabricate and fly an ASTOVL Demonstrator aircraft by FY 1999. This continues work initiated by ARPA to investigate the feasibilit of designing a single lightweight, affordable aircraft to conduct missions currently performed by the AV-8B, F-16, and F/A-18. The ASTOVL Demonstrator program consists of four phases: Phase I, accomplished by ARPA, consisted of cost analyses, program planning, and propulsion system concept development. Phase II, to be jointly conducted by Navy and ARPA, consists of technology validation, producibility analysis, and preliminary design of a demonstrator aircraft. Phase III will consist of detailed design, fabrication, and ground test of a full-scale aircraft. Phase IV will consist of flight testing. The Navy portion of Phase II is funded in this Program Element. Continuation int Phase III and IV is contingent on successful completion of Phase II.

5. (U) Advanced Anti-Radiation Guided Missile (AARGM): Develops advanced missile and seeker technologies to demonstrate a smaller airframe missile suitable for helicopter mounting with capabilities comparable to the larger HARM missile.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W0446 PROJECT TITLE: Advanced Avionics Subsystems

C. (U) DESCRIPTION: This is a multi-faceted program maturing advanced IMA concepts derived from the Joint Integrated Avionics Working Group (JIAWG). Focuses on the common advanced avionics architecture directed by Congress fo all "advanced aircraft." Program thrust is Navy peculiar applications of advanced IMA for current and future Naval aircraft. Tasks are grouped in fi categories: Situation Assessment and Awareness; Shared Aperture Antenna Systems; Digital Technologies; Avionic Photonics; and Avionics Packaging.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Demonstrated enhanced realism photo-texture perspective scene.

b. (U) Initiated prototype Airborne Shared Aperture Program (ASAP) demonstration. Completed Special Airborne Antenna System (SAAS) Preliminary and Critical Design Review; initiated prototype fabrication.

c. (U) Prepared draft Military Standard (MIL-STD) for developing faul tolerant avionics. Developed modular signal processor simulation.

d. (U) Developed very high speed optical switching network control hardware.

e. (U) Initiated immersion cooling techniques for high power density avionics.

2. (U) FY 1993 PROGRAM:

a. (U) Refine perspective scene generation and flight simulation capabilities to demonstrate low-cost mission rehearsal.

b. (U) Continue ASAP and SAAS prototype development contracts.

c. (U) Evaluate avionics fault occurrence simulation/testing techniques. Develop signal processing algorithms for processor simulations.

d. (U) Perform initial demonstration of very high speed optical switching network to connect sensors and processors. Continue optical backplane demo.

e. (U) Demonstrate avionics immersion cooling and heat conducting composites.

3. (U) FY 1994 PLANS:

a. (U) Transition perspective scene and plan view systems into existing ground and training/simulation systems. Continue in-aircraft capability development.

b. (U) Initiate ASAP active aperture development and testing. Begin advanced Transmit/Receive (T/R) module development and multi-function systems demonstrations. Complete SAAS initial prototype demonstration.

c. (U) Investigate signal processing requirements for shared aperture antenna use. Demonstrate clutter processing techniques for rain-chaff differentiation. Initiate fault tolerance MIL-STD application demonstration.

d. (U) Develop flight-line module replacement techniques to protect connectors from environmental hazards.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA, Indianapolis, IN, and Patuxent River, MD; NRL, Washington, DC; WRDC, Dayton, OH; DESA, Albuquerque, NM. CONTRACTORS: Raytheon, Bedford, MA; Texas Instruments, Dallas, TX; Cambridge Research Associates, Vienna, VA; TRW, San Diego, CA; IBM FSD, Manassas, VA; Westinghouse, Baltimore, MD; Unisys, Minneapolis, MN; and Advanced Micro-Circuits Corporation, San Diego, CA.

F. (U) RELATED ACTIVITIES: PE 0602122N, Aircraft Technology; PE 0602234N, Materials, Electronics, and Computer Technology; PE 0603270N, Advanced Technology Electronic Warfare; PE 0603712N, Generic Logistics Technology Development; PE 0602204F, Aerospace Avionics; PE 0603253F, Advanced Avionics Integration; PE 0603203F, Advanced Avionics for Aerospace Vehicles.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W0447 PROJECT TITLE: Electromagnetic Radiation Source Elimination (ERASE) Technology

C. (U) DESCRIPTION: The ERASE program is focused on requirements for both emitter location technology and defense suppression missile technologies as documented in the Navy's Strike Warfare Master Plan and Conventional Munitions Plan. Approach is to demonstrate advanced missile seeker technologies as well as emitter location or targeting technologies to ultimately increase aircraft survivability and improve success probability in a power projection mission.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed development of Passive Radio Frequency (RF) Targeting System hardware; continued Targeting System low-frequency extension effort.
b. (U) Began F/A-18 in-flight technology demo of Passive RF Targeting System.

2. (U) FY 1993 PROGRAM:
a. (U) Complete baseline Passive RF Targeting System in-flight technology demo. Complete test report.
b. (U) Complete Targeting System (low-frequency) receiver/processor integration.
c. (U) Begin laboratory tests of Targeting System (low-frequency).
d. (U) Complete evaluation of candidate Advanced Anti-Radiation Guidance sensors for AMRAAM/HARM-size missile, and begin design and fabrication.

3. (U) FY 1994 PLANS:
a. (U) Complete Targeting System (low-frequency) tests; complete data package for baseline and low-frequency systems; and transition systems to Engineering and Manufacturing Development (EMD).
b. (U) Begin Missile Aim Point Selection demo to investigate and demonstrate selective targeting capability.
c. (U) Complete design/fabrication of Advanced Anti-Radiation Guidance demonstration and begin hardware-in-the-loop test.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: LORAL, Newport Beach, CA; Texas Instruments, Colorado Springs, CO; FALON, Inc. & Questech, San Diego, CA.

F. (U) RELATED ACTIVITIES: PE 0602111N, Surface/Aerospace Surveillance and Weapons Technology; PE 0602122N, Aircraft Technology; PE 0207133F, F-16 Squadrons; PE 0203730A, Chaparral Seeker.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W2014 PROJECT TITLE: Integrated High Performance Turbine Engine Technology (IHPTET)

C. (U) DESCRIPTION: This project covers the Navy share of the demonstrator engine portion of IHPTET, ensuring that unique Navy design and operational requirements are met. Full scale integrated technology demonstration is essential to transition technologies from exploratory development through advanced development and into system demonstration/validation. Without technology demonstrators, system acquisition cost/schedule risk would have an unacceptably higher level or programs would settle for lessor operational capability. As a result development schedules could increase by as much as four to five years. A strong and viable U.S. propulsion program also provide a dual-use benefit to our country by enhancing our competitiveness in the international commercial engine market. The program funds three demonstrator engine classes: (1) fighter/attack (Joint Technology Demonstrator Engine [JTDE]); (2) turboprop/shaft (Joint Turbine Advance Gas Generator [JTAGG]); and (3) missile/expendable engines (Joint Expendable Turbine Concepts [JETEC]).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) PHASE I JTDE: Completed General Electric (GE) and Pratt and Whitney (PW) Phase I Tests. Demonstrated 23% thrust-to-weight improvement over 1987 baseline.
b. (U) PHASE I JTAGG: Began GE, Allied Signal Propulsion Engines (ASPE), and Lycoming (LYC) Phase I JTAGG Tests. Demonstrated 16% fuel burn decrease.
c. (U) PHASE II JTDE: Awarded PW and GE contracts.

2. (U) FY 1993 PROGRAM:
a. (U) PHASE I JTAGG: Continue GE/ASPE and LYC Phase I testing.
b. (U) PHASE II JTDE: Begin design and fabrication of PW and GE Phase II demonstrator engines.
c. (U) PHASE II JETEC: Design and fabricate ASPE, Teledyne (TCAE), and Williams International (WI) Phase II demonstrator engines.

3. (U) FY 1994 PLANS:
a. (U) PHASE I JTAGG: Complete GE/ASPE and LYC Phase I JTAGG Tests. Demonstrate 25% fuel burn and 60% power-to-weight improvement over baseline.
b. (U) PHASE II JTDE: Continue PW and GE fabrication and assembly.
c. (U) PHASE II JTAGG: Review proposals and award contract for turboprop/shaft engine demonstrators. Initiate design of Phase II demonstrator engine with 80% power/weight and 30% fuel burn improvement.
d. (U) PHASE II JETEC: Fabricate and assemble ASPE, TCAE, and WI demonstrator engines.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Trenton, NJ and Warminster, PA. CONTRACTORS: GE, Evendale, OH and Lynn, MA; P&W Aircraft, West Palm Beach, FL; Lycoming, Stratford, CT; ASPE, Phoenix, AZ; Williams Intl., Walled Lake, MI; Teledyne CAE, Toledo, OH; Allison, Indianapolis, IN.

F. (U) RELATED ACTIVITIES: PE 0602122N, Aircraft Technology; PE 0602234N, Materials, Electronics, and Computer Technology; PE 0603216F, Advanced Turbin Engine Gas Generator; PE 0603202F, Aircraft Propulsion Subsystem Integration; PE 0603003A, Aviation Advanced Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W2152 PROJECT TITLE: Advanced Short Takeoff and Vertical Landing (ASTOVL) Demonstrator

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2152	Advanced Short Takeoff and Vertical Landing (ASTOVL) Demonstrator	0	0	11,061	11,000	22,061

B. (U) DESCRIPTION: This new start project validates critical technologies, conducts producibility analysis, and performs preliminary design work necessary to determine the feasibility of building an ASTOVL demonstrator. It is believed that a lightweight ASTOVL aircraft powered by an Advanced Tactical Fighter Engine (ATFE) derivative can meet or exceed performance and survivability goals within the size and weight restrictions imposed for affordability. However, substantial technical risk is prevalent both in major subsystems and in system integration. Efforts conducted under this project will significantly reduce the risks, and will provide sufficient information to allow a decision to proceed to a full-scale demonstrator aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:
   a. (U) Continue ASTOVL Phase II efforts initiated by ARPA, including system design and affordability trade studies.
   b. (U) Conduct ASTOVL unique propulsion component testing.
   c. (U) Conduct configuration tradeoffs, flight control development, and small scale wind tunnel demonstrations.
   d. (U) Initiate large scale wind tunnel demonstrations.

4. (U) PROGRAM TO COMPLETION:
   a. (U) Complete system design and affordability trade studies.
   b. (U) Complete Phase II propulsion component testing.
   c. (U) Complete Phase II wind tunnel testing and flight dynamics simulations.
   d. (U) Update system design based on results of studies, tradeoffs, and demonstrations.
   e. (U) Review Phase II results and make determination to proceed or not proceed to Phase III.
   f. (U) If Phase II results dictate, program will continue into Phase III. Otherwise, program completes in FY 1996.

D. (U) WORK PERFORMED BY: IN-HOUSE: NASA AMES Research Center, Mountain View, CA; NASA LEWIS Research Center, Cleveland, OH. CONTRACTORS: TBD. The following contractors have expressed interest: General Dynamics, Fort Worth, TX; Grumman, Long Island, NY; Lockheed, Palmdale, CA; McDonnell Aircraft, St. Louis, MO; Allison Aircraft Engines, Indianapolis, IN; General Electric Engines, Cincinnati, OH; Pratt & Whitney Engines, West Palm Beach, FL.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Definition Document (NAPDD) being developed.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W2152 PROJECT TITLE: Advanced Short Takeoff and Vertical Landing (ASTOVL) Demonstrator

G. (U) RELATED ACTIVITIES: IHPTET Program in this PE; PE 0603226E, Experimental Evaluation of Major Innovative Technologies.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike, and Air Defense Technology Demos

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2145	Global Surveillance/Precision Strike/ Air Defense Tech Demos	0	9,351	50,999	CONT.	CONT.

B. (U) DESCRIPTION: This program focuses significant science and technology resources in the Global Surveillance and Communications, Precision Strike, and Air Defense thrust areas.

1. (U) The Global Surveillance and Communications thrust develops and demonstrates the capability to provide the tactical user with theater of operations, near-real-time precision targeting information, sensor to shooter target updating, and Battle Damage Assessment (BDA) generated from multiple existing high-altitude resources. The demonstrations exploit the capabilities of evolving advanced joint communications systems, integrating space, air, and ground assets. There are two tasks:

a. (U) REAL TIME SUPPORT TO JOINT POWER PROJECTION OPERATIONS (REAL TIME SUPPORT), which develops an all-source, near-real-time end-to-end system for transporting high volume, time critical data from diverse national, theater, and battle force assets to a joint planning center and associated lower echelon planning centers. Information flow will be controlled by the COPERNICUS concept of "user pull". Architecture will be consistent with DOD Global Grid. This ATD complements the DARPA WARBREAKER initiative.

b. (U) PRECISION SPACEBORNE TARGETING SYSTEM (PSTS): A joint Service/Defense Agency demonstration that exploits existing high altitude resources to provide precision targeting information, specific target identification, and BDA information directly to the tactical user in near real time. Details are available at a higher level of classification.

2. (U) The Precision Strike thrust area integrates surveillance and targeting capabilities developed in the Global Surveillance thrust with high speed processing and precision weapons for rapid response against high-value, short dwell targets over extended ranges. There are three tasks:

a. (U) ADVERSE WEATHER PRECISION GUIDED MUNITIONS (AWPGM): Demonstrates the capability to deliver conventional weapons, day or night, in adverse weather, with precision accuracy, using near-real-time targeting against time critical fixed and mobile targets. Demonstrates advanced airframe manufacturing methods.

b. (U) ADVANCED STRIKE PLANNING TOOL (ASPT): Develops a deployable integrated work station planning aid to allow strike planners to optimize use of available manned and unmanned assets in a near-real-time mode.

c. (U) NAVAL SURFACE FIRE SUPPORT (NSFS): Conducts demonstrations of potential technical approaches to existing capability shortfalls in Naval Surface Fire Support, including demonstration of a Navy variant of the Army Tactical Missile System (NTACMS).

3. (U) The Air Defense thrust develops and demonstrates approaches to countering the advanced sea skimming cruise missile and air to air missile threat. Details are available at a higher level of classification.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike, and Air Defense Technology Demos

2. (U) FY 1993 PROGRAM:

a. (U) REAL TIME SUPPORT -- Perform studies and simulations to validate the technology and operational concept. Conduct a user oriented mission requirements analysis on the communications and surveillance aspects of strike mission planning, in-cockpit visualization, and information transfer.

b. (U) PSTS -- Perform studies and simulations. Details available at a higher level of classification.

c. (U) AWPGM, ASPT -- Analyze the connectivity requirements between unmanned aerial vehicles, Joint Surveillance, Targeting, and Reconnaissance System (JSTARS) and other targeting sources, focusing on the timely transmission of data to in-flight attack aircraft. Transmit this analysis into hardware in the loop simulation of an existing weapon to validate data transmission adequacy for target attack.

d. (U) NSFS -- Initiate studies and simulations focusing on Navy unique issue of adapting NTACMS to fire from an unstable platform, using Global Positioning System (GPS) upgrade, in preparation for FY 1994-start ATD.

e. (U) Air Defense -- Perform studies and simulations. Details available at a higher level of classification.

f. (U) GPS -- Perform studies to evaluate and minimize the technological and operational risks associated with reliance on GPS, including reliability, accuracy, and susceptibility to jamming. Feed results into FY 1994-start ATDs.

g. (U) Zero-Based Studies -- Define and evaluate future technology options based on joint military needs, affordability, and technology availability which could improve operational capabilities of Navy systems and suggest the most important directions for future development in the Global Surveillance, Precision Strike, and Air Defense thrust areas.

3. (U) FY 1994 PLANS:

a. (U) REAL TIME SUPPORT -- Initiate prototype system design including preliminary design of the high performance Local Area Network. Define demonstration approach and interface plan.

b. (U) PSTS -- Initiate precision targeting live fire demonstration in conjunction with NTACMS ATD. Details available at a higher level of classification.

c. (U) AWPGM -- Establish airframe/seeker requirements and tradeoffs, evaluate seeker candidates and start design of manufacturable air frame.

d. (U) ASPT -- Complete requirements analysis of ASPT. Initiate system design and demonstrate human-computer interface.

e. (U) NSFS -- Begin NSFS demonstration, including at-sea demonstration of NTACMS in a Littoral Warfare scenario.

f. (U) Air Defense -- Complete studies and initiate demonstrations.

g. (U) Complete zero-based studies initiated in FY 1993 and conduct associated simulations. Develop plans and perform concept definition for FY 1995-start ATDs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCEN, China Lake, CA; NAVSURFWARCEN, Dahlgren, VA and Silver Spring, MD. CONTRACTORS: MITRE Corporation, Bedford, MA; APL/JHU, Laurel, MD; CNA, Alexandria, VA; Draper Laboratories, Cambridge, MA; MIT Lincoln Laboratories, Cambridge MA; ARL/PSU, State College, PA; Jason Associates, San Diego, CA; and others TBD.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike, and Air Defense Technology Demos

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Definition Documents (NAPDDs) being developed for each task.

G. (U) RELATED ACTIVITIES: PE 0602111N, Surface/Aerospace Surveillance and Weapons Technology; PE 0602122N, Aircraft Technology; PE 0603226E, Experimental Evaluation of Innovative Technologies; PE 0603006A, C3 Advanced Technology; PE 0603401F, Advanced Spacecraft Technology; PE 0603726F, C3I Subsystem Integration; PE 0603772A, Advanced Tactical Computer Science and Sensor Technology; PE 0603238A, Air Defense/Precision Strike Technology Demo; PE 0603238F, Air Defense/Precision Strike Technology Demo; PE 0603245F, Advanced Flight Technology Integration; PE 0603601F, Conventional Weapons Technology; PE 0603270N, Advanced Electronic Warfare Technology; and PE 0603794N, C3 Advanced Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1292	Advanced ASW Sensors and Processors	8,270	10,100	16,088	CONT.	CONT.
V0968 1/	Advanced ASW Target	6,032	13,316	7,043	CONT.	CONT.
W0490 2/	Project BEARTRAP	14,431	15,964	12,107	CONT.	CONT.
	TOTAL:	28,733	39,380	35,238	CONT.	CONT.

1/ Previously funded under P.E. 0603529N
2/ Previously funded under P.E. 0603708N

B. (U) DESCRIPTION: The Anti-Submarine Warfare (ASW) Systems Development program provides for:

The program is responsive to requirements to improve all ASW systems to counter the existing and projected submarine threats and to develop system performance prediction software for all acoustic and non-acoustic ASW systems.

(U) The BEARTRAP project is a high technology Research & Development program providing technology and ASW data for for sensor development, weapon design, signal processing programs, modeling, and immediate operational fleet use for air, surface, and sub-surface ASW platforms.

(U) The ASW sensors and processing provides improved air ASW warfare platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems. This includes sensors, processing, post-processing, data recording and display capabilities to address regional threat scenarios against conventionally powered submarines, represented by the German Type 209, and Soviet developed quiet nuclear submarine, represented by the AKULA.

(U) The Advanced ASW Target Project develops the next generation fleet ASW training target. There are two efforts in this element, the development of the Target MK 30 Mod 2 and the close out of the Fast Deep Target Program. The MK 30 Mod 2 replaces the aging MK 30 Mode 1 ASW Target providing increased target reliability and availability to the Fleet and updates the target's electro-acoustic capabilities.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: H1292 PROJECT TITLE: Advanced ASW Sensors & Processors

PICTURE NOT AVAILABLE

POPULAR NAME: Advanced ASW S&P

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM	AAA				CONT.
MILESTONES	AAS			MS-I 4/94	CONT.
ENGINEERING	AAA		NAPDD SPEC 8/93		CONT.
MILESTONES	AAS			ADM SPEC 6/94	
T&E	AAA				CONT.
MILESTONES	AAS				CONT.
CONTRACT	AAA			1Q/94	CONT.
MILESTONES	EER			1Q/94	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	PROGRAM TOTAL
MAJOR CONTRACT	1.356	2.036	8.644	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	6.914	8.064	7.444	CONT.	CONT.
GFE/ OTHER					
TOTAL	8.270	10.100	16.088	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: H1292 PROJECT TITLE: Advanced ASW Sensors & Processors

B. (U) DESCRIPTION: This program provides improved air Anti-Submarine Warfare platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems. This includes sensors, processing, post-processing, data recording and display capabilities to address regional threat scenarios against conventionally powered submarines, represented by the German Type 209, and Soviet developed quiet nuclear submarine, represented by the AKULA. Key objectives are platform accommodations of advanced active and passive sensors, improved detection, classification, localization, tracking, counter-counter-measures (CCM), and increased capacity and flexibility to handle multi-sensor data loads.

(U) Primary programs being funded during the period identified are the Advanced Active Sonobuoy (AAS), which is a potential replacement for Directional Command Active Sonobuoy System in harsh water, the Airborne Active Adjunct (AAA), which is an air dropped sound source to be used with the Air Deployed Active Receiver (ADAR), and the development of potential enhancements for the Extended Echo Ranging (EER) for P-3C platforms. Through continuing improvements in programs, capabilities in continental shelf and bottom-limited environments typical of regional conflict scenarios will be greatly improved. As projects transition to engineering and manufacturing development other candidates are identified to take their place.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) AAS

(1) (U) Initiated Milestone I (MS-I) analysis and documentation.

(2) (U) Initiated critical component tests.

b. (U) AAA

(1) (U) Continued MS-I analysis and documentation.

(2) (U) Initiated critical component tests.

c. (U) CCM: Evaluated selected non developmental range frequency, CCM systems. Terminated effort due to affordability.

2. (U) FY 1993 PROGRAM:

a. (U) AAS

(1) (U) Continue critical component tests.

(2) (U) Continue concept analysis in support of MS-I in FY 1994.

b. (U) AAA

(1) (U

(2) (U) Continue critical component tests under NAPDD.

(3) (U) Complete specification for NAPDD hardware.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: H1292 PROJECT TITLE: Advanced ASW Sensors & Processors

3. (U) FY 1994 PLANS:

a. (U) AAS

(1) (U) Complete MS-I.

(2) (U) Develop Advanced Development Model (ADM) specification and procurement package.

b. (U) AAA

(1) (U) Award contract for NAPDD hardware.

(2) (U) Initiate bench tests and receipt of power supply hardware.

c. (U) EER

(1) (U)

(2) (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA and Patuxent River, MD; NAVSURFWARCENDIV, Crane and Indianapolis, IN; WPNSTA, Yorktown, VA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NCCOSC RDTE DIV, San Diego, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: MS-I for AAS changed from 4/93 to 4/94 and ADM specification changed from 6/93 to 6/94 in order to incorporate additional technology advancements.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

AAA		AAS	
MNS	4/92	MNS	4/93 (EST)
COEA	12/92	IPS	1/94 (EST)
NAPDD	4/93	ORD/NAPDD	1/94 (EST)
		TEMP	1/94 (EST)
		COEA	2/94 (EST)

G. (U) RELATED ACTIVITIES: Program Element 0604261N, Acoustic Search Sensors (Engineering Development)

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: V0968 PROJECT TITLE: Advanced ASW Target

C. (U) DESCRIPTION: This project develops the next generation fleet Antisubmarine Warfare (ASW) training target. There are two efforts in this project, the development of the Target MK-30 Mod 2 and the close out of the Fast Deep Target (FDT) Program. In March 1992 the Chief of Naval Operations directed the close out of the FDT and redirected emphasis to the MK-30 Mod 2 Target. The MK-30 Mod 2 replaces the aging MK-30 Mod 1 ASW Target providing increased target reliability and availability to the Fleet and updates the target's electro-acoustic capabilities to simulate current threat platforms and to ensure compatibility with the Navy's ASW sensors/weapons. The declining inventory and age of the MK-30 Mod 1 Target requires an immediate start of the MK-30 Mod 2 Program to meet future fleet training requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed technical analysis of Commander in Chief Pacific Fleet (CINCPACFLT) and Commander in Chief Atlantic Fleet (CINCLANTFLT) operational requirements for target.

b. (U) Completed engineering specifications for MK-30 Mod 2 and initiated preparation of Test and Evaluation Master Plan.

c. (U) Initiated preparation of a Request for Proposal (RFP) for MK-30 Mod 2 Demonstration and Validation (D&V) contract.

2. (U) FY 1993 PROGRAM:

a. (U) Achieve Milestone I (MS-1).

b. (U) Award D&V contract for MK-30 Mod 2 prototype system.

c. (U) Complete close out of the FDT Program: archive all drawings and data packages, dispose of all target hardware, properly dispose of all expended Advanced Stored Chemical Energy Propulsion System boilers.

3. (U) FY 1994 PLANS: Conduct system design review and preliminary design review of the MK-30 Mod 2 prototype system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI and Keyport, WA. CONTRACTORS: Loral Systems Group, Akron, OH; Raytheon, Portsmouth, RI; Applied Research Laboratory/Pennsylvania State University, State College, PA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: W0490 PROJECT TITLE: Project BEARTRAP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0490	Project Beartrap	14,431	15,964	12,107	CONT.	CONT.

B. (U) DESCRIPTION: BEARTRAP develops new prototype Anti-Submarine Warfare (ASW) tools by incorporating Office of Naval Research developed advanced technology. This permits BEARTRAP aircraft to collect acoustic and non-acoustic data on diesel and quiet nuclear submarines

BEARTRAP uses developmental and prototype hardware and software installed in specially configured P-3C aircraft to collect intelligence data and ground facilities to conduct post mission analysis of this information. BEARTRAP utilizes an Assistant Secretary of the Navy directed rapid development capability status for developing new prototype acoustic recorders, full spectrum acoustic and non-acoustic signal processing algorithms, acoustic intercept receivers, advanced data displays, automatic calibration, ASW tactics and advanced sensors. BEARTRAP is a leader in the use of Commercial Off The Shelf (COTS) hardware, installing prototype systems in operational aircraft platforms. BEARTRAP is currently installing the COTS based super processor (APEX) utilizing the new Navy standard Futurebus+ architecture and VME interfaces in P-3C Update III aircraft. APEX permits rapid integration of new "plug-in" sensor technology, signal processing algorithms, and operational evaluation of new detection and surveillance capabilities. Project BEARTRAP has had a major and significant impact upon ASW. This is a result of both the and scientific data collection activities, and the initiation of developmental research equipments and concepts later introduced into the ASW community.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U)

b. (U) Awarded contract for procurement of 16 (include 10 initial buy plus 6 additional) digital Magnetic Anomaly Detection (MAD) systems for.

c. (U)

d. (U) Continued software development efforts in signal processing including broadband, chaos, neural networks, and non-acoustics.

2. (U) FY 1993 PROGRAM:

a. (U)

b. (U) Continue signal processing development efforts to include active and passive acoustics, non-acoustics, chaos, and neural networks.

c. (U) Continue acoustic and non-acoustic data collections for sensor development and modeling efforts.

d. (U) Initiate hardware and software development efforts and equip BEARTRAP aircraft

e. (U) Complete delivery and initiate installation of

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development
PROJECT NUMBER: W0490 PROJECT TITLE: Project BEARTRAP

f. (U) Initiate system performance evaluation of advanced MAD systems and processing algorithms.
g. (U) Continue improvement efforts to the

3. (U) FY 1994 PLANS:

a. (U) Complete installation of MAD systems.
b. (U) Complete installation and upgrades

c. (U) Continue acoustic and non-acoustic data collections for sensor development and modeling efforts.
d. (U) Continue signal processing development efforts to include active and passive acoustics, non-acoustics, chaos, and neural networks.
e. (U) Complete improvement efforts to the
f. (U) Continue evaluation of new processing algorithms for advanced MAD systems.
g. (U) Initiate the integration of advanced classification and image processing into APEX for the Synthetic Aperture Radar/Inverse Synthetic Aperture Radar systems.
h. (U) Initiate design definition of the using APEX technology and commercial hardware.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE, NRL, Washington, D.C.; COMPATWINGSPAC, Moffett Field, CA; PATWINGSLANT DET, Jacksonville, FL; NAVAIRWARCENACDIV, Warminster, PA; AAWSO, Patuxent River, MD and Indianapolis, IN; Contractors: Texas Instruments, Inc., Dallas, TX; Sparton Electronics, Jackson, MI; General Scientific Corporation, Arlington, VA; Mitre, McLean, VA; General Physics Corp., Columbia, MD; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.
2. (U) Schedule changes: Not applicable.
3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

NDCP WO-49-AS 6/20/80
NAPDD 076-095 4/15/86

G. (U) RELATED ACTIVITIES: PE 0205620N Surface ASW Combat System Integration; PE 0603553N Surface Anti-Submarine Warfare; PE 0603691N MK 48 ADCAP; PE 0604261N Acoustic Search Sensors; PE 0604221N P-3 Modernization Program; PE 0604212N ASW and Other Helicopter Developments; PE 0603792N Advanced Technology Transition; 0603747N Advanced ASW Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance

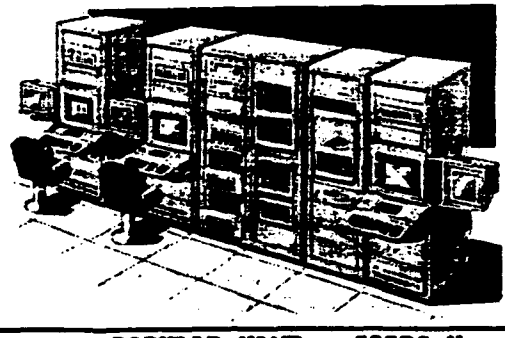
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A2174	JSIP-N	13,776	2,274	3,141	11,863	31,054
W0534	TAC REC SYS	0	12,170	27,217	CONT.	CONT.
	TOTAL	13,776	14,444	30,358	CONT.	CONT.

B. (U) DESCRIPTION: The Tactical Air Reconnaissance Program develops systems to provide timely and highly credible imagery intelligence. Present systems provide such imagery from manned platforms using film based sensors, necessitating a return to base for film processing. Manned reconnaissance, with Electro-Optical, Infrared and Synthetic Aperture Radar sensors can provide both broad coverage and high resolution imagery at extended ranges via data link in near real time. The USMC RF-4Bs were phased out in 1990. A Navy Follow-on Tactical Recce capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System. A Navy shipboard capability, compatible with the Joint Service Imagery Processing System, Navy, will be used for imagery processing, analysis, and storage.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: A2174 PROJECT TITLE: Joint Service Imagery Processing System, Navy (JSIPS-N)



POPULAR NAME: JSIPS-N

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS IIA IOC/DIWSA 1/94	MSIIB/MSIII TIS 4QTR97 IOC/SAR 4QTR99 MSIII/DIWSA 11/94
ENGINEERING MILESTONES	S/W CDR 6/92			
T&E MILESTONES	ATARS DT 9/92	DT/OT IIA DIWSA 8-10/93	DT/OT IIB DIWSA 1-7/94 DT IIC 1/2 TIS 5-12/94	TECH/OPEVAL 2-3QTR97 OT IIC SAR FOT&E 4QTR98 DIWSA 5-8/95 DT/OT IIIA TIS 2-4/95
CONTRACT MILESTONES	EO-LOROPS Integ Contract 9/92 DIWSA/TIS	DIWSA/TIS	DIWSA/TIS	SAR/INTEG

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	8,963	2,220	3,091	11,174	25,448
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	4,128	54	50	689	4,921
GFE/ OTHER:	685	0	0	0	685
TOTAL	*13,776	2,274	3,141	11,863	31,054

* FY 92 & Prior TACAIR RECCE & JSIPS-N shared the same project title

B. (U) DESCRIPTION: The Joint Service Imagery Processing System (JSIPS) is the Joint Department of Defense (DoD) program which receives, processes, exploits, and disseminates time-sensitive imagery from multiple sources, imagery products and imagery-derived intelligence reports. The JSIPS-Navy (JSIPS-N) is the Navy implementation of this architecture using both Navy and joint program hardware/software. Two major hardware components of the JSIPS-N program are the Digital Imagery Workstation Suite Afloat (DIWSA) and the Tactical Input Segment (TIS). The DIWSA serves as the heart of this architecture which receives, processes, exploits & disseminates imagery and reports based on multi-source imagery. The DIWSA receives imagery data on magnetic media, digitized film or electronically. The TIS provides the capability to receive, record and process imagery from Advanced Tactical Air Reconnaissance System (ATARS). The Electro-Optical Long Range Oblique Photography System (LOROPS) and Synthetic Aperture Radar (SAR) are two sensor suites which will provide imagery to JSIPS-N via the ATARS system. JSIPS-N will develop the capability to accept imagery data from these various sources.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: A2174 PROJECT TITLE: Joint Service Imagery Processing System, Navy (JSIPS-N)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued JSIPS-N development. Conducted contractor integration and completed Test and Evaluation (T&E) planning for JSIPS-N's DIWSA segment.

b. (U) Initiated Development Test (DT) of ATARS sensors and data link.

c. (U) Continued integration of EO-LOROPS stand-off sensor.

d. (U) Continued planning for the Navy Follow-On Tactical Air Reconnaissance.

2. (U) FY 1993 PROGRAM:

a. (U) Continue JSIPS-N development. Perform DT/Operational Testing (OT) of JSIPS-N DIWSA.

3. (U) FY 1994 PLANS:

a. (U) Continue JSIPS-N development. Commence DIWSA and TIS integration. Achieve approval for DIWSA Limited Rate of Initial Production (LRIP).

4. (U) PROGRAM TO COMPLETION: Continue JSIPS-N development. Complete DIWSA and TIS integration and conduct initial integrated system DT/OT. Achieve approval for TIS LRIP. Commence development of Afloat SAR processing capability. Conduct DIWSA/TIS integrated system Technical/Operational Evaluation (TECHEVAL/OPEVAL) and DT/OT of the Afloat SAR processing capability. Complete JSIPS-N development.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVELEXSYSENGACT DET, Philadelphia, PA; NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTORS: GDE Systems, San Diego, CA; E-Systems, Garland, TX; Science Application International, Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: TIS Initial Operating Capability (IOC) realigned to FY 1997 to align with other reconnaissance systems.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: JSIPS-N T&E Master Plan: 01/91

G. (U) RELATED ACTIVITIES:

1. (U) PE 0204136N, F/A-18 Squadrons (Project E2065 F/A-18 Radar Upgrade Phase II): Future Common Aperture Multi-Spectral Sensor calls for adding all-weather reconnaissance capability to multi-mission aircraft; adds SAR imagery mode provisions to radar upgrade.

2. (U) PE 0206625M, Marine Corps Intelligence/Electronic Warfare System: Receives EO/IR/SAR imagery.

3. (U) PE 0604710F, Tactical Reconnaissance: Develops common EO/IR sensor suite as a cooperative program with Navy. Air Force is lead service for development of these sensors.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: A2174 PROJECT TITLE: Joint Service Imagery Processing System, Navy (JSIPS-N)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line 164	0	0	3,507	CONT.	CONT.
OPN SPARES Line 239	0	0	2,445	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

	DT	OT	FOT&E
1. (U) JSIPS-N DISWA IIA	8-9/93	10/93	
2. (U) JSIPS-N DIWSA IIB	1-3/94	5-7/94	
3. (U) JSIPS-N TIS IIC	5-12/94	2-4/95	
4. (U) JSIPS-N DIWSA IIIA			5-8/95
5. (U) JSIPS-N TECHEVAL	2QTR/97		
6. (U) JSIPS-N OPEVAL		3QTR/97	
7. (U) JSIPS-N SAR			4QTR/98

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: W0534 PROJECT TITLE: Tactical Reconnaissance Systems

PICTURE NOT AVAILABLE

POPULAR NAME: TACAIR RECCE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			ATARS MS-IIA 4/94	
ENGINEERING MILESTONES		EO-LOROPS Integ CDR 6/93	EO-LOROPS EMD Sensor Delivery (EO) 9/94 EO-LOROPS INTEG CDR 3/94	EO-LOROPS EMD INT DEL 2Q/96 ATARS LRIP DEL 2Q/96
T&E MILESTONES			ATARS OT 12/93	EO-LOROPS EO/IR DT 4Q/96 OT 2Q/97 ATARS FOT&E 3Q/96
CONTRACT MILESTONES			ATARS LRIP 6/94	EO-LOROPS 2Q/98

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	9,590	24,110	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
In-House SUPPORT	0	1,483	1,857	CONT.	CONT.
GFE/ OTHER:	0	1,097	1,250	CONT.	CONT.
TOTAL	0	12,170	27,217	CONT.	CONT.

B. (U) DESCRIPTION: This program provides timely and highly credible imagery intelligence from the F/A-18D(RC) as a replacement for the Marine Corps RF-4B, which was phased out in 1990. The same capability will be incorporated into a Navy Follow-on Tactical Air Reconnaissance (FOTR) capable aircraft to replace the interim F-14 Tactical Air Reconnaissance Pod System (TARPS). These systems include Electro-Optical (EO), Infrared (IR), and Synthetic Aperture Radar (SAR) sensors that provide day and night broad area coverage and high resolution images at short and extended ranges during day, night, and all weather. Vertical and short range stand-off coverage is provided by the Advanced Tactical Air Reconnaissance System (ATARS). Long range day and night stand-off imaging is provided by the Electro-Optical Long Range Oblique Photography System (EO-LOROPS). All weather imaging will be provided by the SAR system. Imagery data from these systems can be transmitted by data link to surface terminals in near real-time.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: W0534 PROJECT TITLE: Tactical Reconnaissance Systems

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) FY 1992 accomplishments are reflected under A2174 in FY 1992.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Developmental Testing (DT) of ATARS sensors and data link.

b. (U) Continue training efforts for F/A-18D(RC).

c. (U) Initiate support equipment acquisition for F/A-18D(RC) and Navy FOTR.

d. (U) Continue integration and plan test of stand-off EO-LOROPS.

e. (U) Continue planning for Navy FOTR.

f. (U) Plan F/A-18 SAR and ATARS integration.

3. (U) FY 1994 PLANS:

a. (U) Initiate Operational Test (OT) of ATARS sensors and data link.

b. (U) Complete ATARS hardware DT/OT in F/A-18D(RC).

c. (U) ATARS Milestone (MS) IIA. Initiate ATARS low rate initial production for F/A-18D(RC).

d. (U) Initiate development of reconnaissance conversions for F/A-18C(RC)

e. (U) Initiate integration of SAR with ATARS

f. (U) Plan training for stand-off EO-LOROPS.

g. (U) Plan support equipment for stand-off EO-LOROPS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA and Patuxent River, MD; NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: Prime for F/A-18D(RC) aircraft and SAR sensor: McDonnell Aircraft Co., St. Louis, MO; Prime for ATARS EO/IR sensors: Martin Marietta Electronics Systems, Orlando, FL; Prime for stand-off EO-LOROPS: Loral Fairchild Systems, Syosset, NY and Science Application International, Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) DON Recce Operational Requirement (022-05-83): 06/84

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance
PROJECT NUMBER: W0534 PROJECT TITLE: Tactical Reconnaissance Systems

2. (U) F/A-18D(RC) Test and Evaluation Master Plan (201-1 Annex B Rev 1): 04/90

G. (U) RELATED ACTIVITIES:

1. (U) PE 0204136N, F/A-18 Squadrons (Project E2065 F/A-18 Radar Upgrade Phase II): Future Common Aperture Multi-Spectral Sensor calls for adding all-weather reconnaissance capability to multi-mission aircraft; adds SAR imagery mode provisions to radar upgrade.

2. (U) PE 0206625M, Marine Corps Intelligence/Electronic Warfare System: Receives EO/IR/SAR imagery.

3. (U) PE 0604710F, Tactical Reconnaissance: Develops common EO/IR sensor suite as a cooperative program with Navy. Air Force is lead service for development of these sensors.

H. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations that include production of tactical reconnaissance systems is F/A-18.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

	DT	OT	FOT&E
1. (U) ATARS	9/92	12/93	6/96
2. (U) EO-LOROPS	9/96	3/97	

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Electronic Warfare Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2194	Electronic Warfare Advanced Technology	0*	22,364	6,806	CONT.	CONT.
U2090	Functional Recognition/Response	4,865	5,549	6,177	CONT.	CONT.
	TOTAL	4,865	27,913	12,983	CONT.	CONT.

*Funds previously shown in PE 0603109N

B. (U) DESCRIPTION: This Program Element is the Navy's core Advanced Technology Development program for Electronic Warfare. There are two projects:

1. (U) Electronic Warfare Advanced Technology (EWAT) - This is a continuation of efforts initiated under the Integrated Navy Electronic Warfare System (INEWS) program. Efforts have been streamlined and focused from prior years into a continuing core program aimed at reducing the integration risk of advanced Electronic Warfare (EW) systems to facilitate the transition of high-payoff EW technologies to the fleet.

2. (U) Functional Recognition and Response - Demonstrates advanced Electronic Warfare technology.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Electronic Warfare Technology
PROJECT NUMBER: W2194 PROJECT TITLE: Electronic Warfare Advanced Technology

C. (U) DESCRIPTION: The Electronic Warfare Advanced Technology (EWAT) project concerns Integrated Modular Avionics (IMA), with emphasis on high-risk, high-payoff modular EW technologies with potential for transition to new platforms or upgrades to existing platforms. This project facilitates transition of EW elements of IMA to acquisition programs by greatly reducing technical and programmatic risk associated with concurrent avionics and airframe development programs. This project will develop the technology and fabricate a limited number of EW components for Demonstration and Validation (DEM/VAL), integrate these components with other IMA elements, demonstrate the performance and technical maturity of these components, and assist in the programmatic transition to Engineering and Manufacturing Development (EMD).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued Advanced Technology Expendables and Dispenser System (ATEDS) development.

b. (U) Generated draft Operational Requirements Document (ORD) for Missile Approach Warning on Navy Tactical Aircraft.

c. (U) Initiated execution of SECNAV/OPNAV directed program to DEM/VAL modular missile approach warning system (MMAWS). Initiated development of ultra-violet (UV) and laser prototype MMAWS sensors.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct flight tests of the Advanced Technology Expendables and Dispenser System (ATEDS) prototype MJU-29 Joint kinematic flare. DEM/VAL Low-Flash squib. Begin development of Joint Advanced Materials flare. Fabricate low radar cross section dispenser components.

b. (U) Complete development of UV MMAWS prototype sensor. Conduct data collection effort with prototype sensor.

c. (U) Fabricate Laser MMAWS prototype sensor. Begin ground and flight data collection of laser detector. Initiate design of integrated Laser/UV sensor.

d. (U) Complete build of UV MMAWS flight test pod.

e. (U) Conduct Navy TACAIR MMAWS effectiveness studies.

f. (U) Terminate efforts related to Shared Aperture Antenna System and Airborne Shared Aperture Program. Transition to other programs.

3. (U) FY 1994 PLANS:

a. (U) Complete UV Advanced Technology development efforts. Complete UV MMAWS integration into flight test pod. Initiate UV MMAWS flight tests.

b. (U) Conduct data collection effort with Laser MMAWS sensor. Integrate laser MMAWS sensor into test pod in preparation for flight test.

c. (U) Incorporate Countermeasures Response Optimization software into UV MMAWS DEM/VAL system.

d. (U) Initiate development of Advance End-Game Countermeasures (AECM) elements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Crane, IN; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NRL, Washington, DC. CONTRACTORS: Westinghouse Corp., Baltimore, MD; Hughes, Santa Barbara, CA.

F. (U) RELATED ACTIVITIES: PE 0602270N, Electronic Warfare Technology; PE 0604223A, COMANCHE; PE 0604270N, Electronic Warfare Development; PE 0604270F, Air Force Advanced Strategic and Tactical Expendables (ASTE).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Electronic Warfare Technology
PROJECT NUMBER: U2090 PROJECT TITLE: Functional Recognition/Response

C. (U) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed introduction of Functional Recognition library loads for AN/SLQ-32, AN/ALR-67, AN/ALR-76.
b. (U) Tested at-sea combined Functional Library Load and Generic Techniques.
c. (U) Identified AN/ALQ-126B Generic Electronic Countermeasures (ECM) Techniques.
d. (U) Completed controlled test of Pulse Modulation providing VQ squadron data report.
e. (U) Completed initial Artificial Intelligence (AI) demonstration.

2. (U) FY 1993 PROGRAM:
a. (U) Verify AN/SLQ-32 Functional Identification (ID) algorithm in laboratory.
b. (U) Integrate airborne generic techniques.
c. (U)
d. (U)
e. (U) Demonstrate AI Product.

3. (U) FY 1994 PLANS:
a. (U) Deliver AN/SLQ-32 Functional ID algorithm to AN/SLQ-32 program.
b. (U) Perform at-sea test of Functional ID with Generic Countermeasures (CM).
c. (U) Demonstrate at-sea, Functional algorithm with improved Decoy Deceptive Electronic Countermeasures Integration (DDI) Generic CM for AN/SLQ-32.
d. (U) Integrate Air Functional ID with Generic CM.
e. (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NAVAIRWARCENWPNDIV, Pt. Mugu, CA; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Locus Inc., Alexandria, VA; Questech, Falls Church, VA; and selected others.

F. (U) RELATED ACTIVITIES: PE 0602270N, Electronic Warfare Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603382N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Combat System Technology
PROJECT NUMBER: K0324 PROJECT TITLE: Advanced Combat System Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
K0324	ADV C/S TECH	0	0	3,750	CONT.	CONT.

B. (U) DESCRIPTION: This is a new start program. Developments in radar technology, advanced display systems, multiple sensor coordination and distributed computer architecture have matured to make them candidates for advanced development under AEGIS Program Office management for introduction into the AEGIS Weapon System. This program will take a disciplined systems engineering approach to find how these advances can be integrated into the AEGIS system, and to plan Combat System baseline upgrade schedules. Advanced Combat System Technology planning has identified three major efforts, which are interrelated and compatible with planned AEGIS system upgrades. The first is Anti-Aircraft Warfare (AAW) System Technology, to concentrate on developing multi-function solid state radar systems to include solid state, active array technology, wide band operation, multiple simultaneous array face operations, new wave forms, and advances in signal processing. The second addresses AEGIS Weapon System Improvements, concentrating on commercial display enhancements and upgrades to the Tactical Graphics System (TGS) to integrate new elements into the Weapon System. AEGIS Fully Distributed Architecture is the third, to implement the results of distributed process computer advances to replace the current AEGIS Combat System architecture with an open, distributed architecture, less dependant on Navy standard computers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Investigate developments in radar technology, advanced display systems, multiple sensor coordination and distributed computer architecture.
b. (U) Perform preliminary system engineering to determine how this new technology can best be integrated into the AEGIS Combat System.
c. (U) Begin preliminary studies of multi-function solid state radars including solid-state active arrays, wide band operation, multiple simultaneous array face operations, new wave forms, and advances in signal processing.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; and ARPA, Arlington, VA. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon Corporation, Wayland, MA; and Johns Hopkins Univ/APL, Laurel, MD.

E. (U) RELATED ACTIVITIES: PE 0604307N, AEGIS Combat System Engineering.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1846	Slow Walker Joint Tactical Ground System (JTAGS)					
		2,678	0	0	177	9,800
X2055	Space Surveillance Development (SSD)					
		1,397	0	2,018	CONT.	CONT.
	TOTAL	4,075	0	2,018	CONT.	CONT.

B. (U) DESCRIPTION:

in ocean areas and related coastal zones where U.S. Naval forces may be employed. Tactical support information will provide for battle force management. Together, these projects allow the fleet to develop and maintain an essential surveillance capability

(U) The National Imagery Support (NIS) project develops a capability to electronically provide real time/near real time original resolution imagery to afloat tactical users. Present systems provide such imagery on a degraded, non-real time basis either electronically or on magnetic media. The system will interface with a shipboard satellite antenna, and the Digital Imagery Workstation Suite Afloat (DIWSA). The NIS will satisfy the requirement to provide national imagery to the Joint Service Imagery Processing System - Navy (JSIPS-N). The JSIPS-N DIWSA serves as the national and tactical imagery processing, analysis, and storage system for afloat TOMAHAWK/TACAIR mission planning, mission rehearsal, and C3I systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations
PROJECT NUMBER: X2055 PROJECT TITLE: Space Surveillance Development (SSD)

PICTURE NOT AVAILABLE

POPULAR NAME: NATIONAL IMAGERY SUPPORT (NIS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT			978	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	1,397		1,040	CONT.	CONT.
GFE/ OTHER					
TOTAL	1,397	0	2,018	CONT.	CONT.

B. (U) DESCRIPTION:

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations
PROJECT NUMBER: X2055 PROJECT TITLE: Space Surveillance Development (SSD)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Established New Start.

b. (U)

c. (U)

d. (U)

e. (U)

2. (U) FY 1993 PROGRAM:

a. (U) Congressional action zeroed FY 93 funds.

3. (U) FY 1994 PLANS:

a. (U)
b. (U) SSD

c. (U)

d. (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NESEC, Philadelphia, PA; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: NIS Development/Integration-USAF contracts DIWS-A integration, GOE Systems, Inc., Rancho Bernando, CA; Science Application Intl, Corp., Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

1. (U) JSIPS-N TEMP 1/91, JSIPS-N APB 6/92

G. (U) RELATED ACTIVITIES: PE 0603261N, Tactical Airborne Reconnaissance, Project A2174 (Joint Service Imagery Processing System - Navy (JSIPS-N).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Tactical Space Operations
PROJECT NUMBER: X2055 PROJECT TITLE: Space Surveillance Development (SSD)

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION:

	DT	OT	FOT&E
DIWSA-NIS	7/94	8/94	
JSIPS-N TECHEVAL	2QTR97		
JSIPS-N OPEVAL		3QTR97	

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle

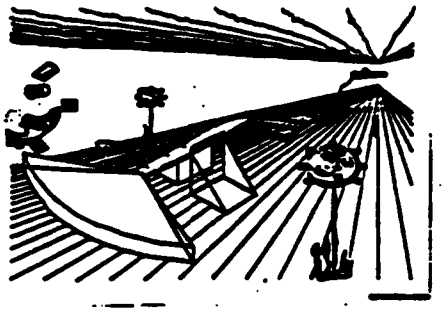
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V2094	Unmanned Undersea Vehicle	22,389	0	23,696	CONT.	CONT.
Q0260	Minehunt	9,931	15,152	17,366	CONT.	CONT.
Q1233	Mine Countermeasures Improvements	10,595	10,202	10,754	CONT.	CONT.
Q2131	Shallow Water MCM	8,590	16,798	13,844	CONT.	CONT.
	TOTAL	51,505	42,152	65,660	CONT.	CONT.

B. (U) DESCRIPTION: The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, channels, choke points, sea lines of communications, and amphibious and other fleet operating areas. It develops: (1) systems and support for systems which will detect, localize, and counter moored, bottom, close-tethered, and buried mines; for use in Mine Countermeasure (MCM) MCM-1 Class, Mine Hunter Coastal (MHC) MHC-51 Class, and other surface ships; (2) systems for detecting, neutralizing and sweeping mines from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: V2094 PROJECT TITLE: Unmanned Undersea Vehicle



POPULAR NAME: Submarine Offboard Mine Search System (SOMSS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	SOMSS MS0 6/92		SOMSS MSI 2/94	SOMSS MSIII 4QTR/02
ENGINEERING MILESTONES	SOMSS BASELINE CONCEPT DESIGN 9/92		SYSTEM RQMTS REVIEW 9/94	
T&E MILESTONES				SOMSS OPEVAL 1QTR/02
CONTRACT MILESTONES			AWARD SOMSS DEM/VAL CONTRACT 6/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	17,109	0	20,040	CONT.	CONT.
SUPPORT CONTRACT	100	0	1,850	CONT.	CONT.
IN-HOUSE SUPPORT	5,180	0	1,806	CONT.	CONT.
GFE/ OTHER					
TOTAL	22,389	0	23,696	CONT.	CONT.

B. (U) DESCRIPTION: This project develops the Submarine Offboard Mine Search System (SOMSS) managed by the Navy's Unmanned Undersea Vehicle (UUV) Program Management Office (PMO403). The objective is to provide SSN-688 class submarines with an organic UUV capability to avoid mines and conduct autonomous/semi-autonomous mine field surveys. The SOMSS concept is in response to the Navy's "FROM THE SEA" initiative and in support of littoral operations by submarines. The SOMSS concept was derived from analysis and tradeoff studies conducted by the Navy in 1991 and 1992 resulting in a program Milestone 0 decision and an Operational Requirement Document (ORD)-Draft. The SOMSS concept calls for a submarine operating in potentially mined waters to deploy a UUV ahead of itself to detect and locate close-tethered and bottom mines. Additionally, the submarine can launch the UUV in either a purely autonomous or semi-autonomous mode to conduct minefield surveys. Information is provided to the submarine in real-time allowing for mine avoidance tactics. The SOMSS is organized into four major subsystems: the shipboard interface (SOMSS equipment aboard the submarine), the UUV, mine search sensors, and the launch and recovery system.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: V2094 PROJECT TITLE: Unmanned Undersea Vehicle

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed a SOMSS Threshold Baseline Concept Design to be used as a basis for developing MS I documentation.

b. (U) Initiated SOMSS Cost and Operational Effectiveness Analysis (COEA)

c. (U) Obtained ASN approval to proceed to Milestone I (MS I) for SOMSS.

2. (U) FY 1993 PLANS:

a. (U) The Navy's FY 1993 request was denied by Congress which cited the joint Navy and DARPA prototype Mine Search System (MSS) program and the need to understand and evaluate the lessons learned from MSS before proceeding with SOMSS. The MSS is scheduled to complete testing in FY 1993 (May). Test results will be evaluated and Congress will be expeditiously informed of the results as requested.

b. (U) With Congressional approval, the Navy will proceed with completing the SOMSS Cost and Operational Effectiveness Analysis (COEA), Milestone I documentation, and MSS evaluation.

3. (U) FY 1994 PLANS:

a. (U) Obtain SOMSS MS I decision - February 1994

b. (U) Conduct industry brief of SOMSS - June 1994

c. (U) Award Phase A DEM/VAL contract for SOMSS preliminary design -June 1994.

d. (U) Support the joint DARPA/Navy UUV program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV NEWPORT RI; NAVSURFWARCEN CARDEROCKDIV BETHESDA MD; NAVSURWARCENCOASTSYSTA PANAMA CITY FL; NAVUNSEAWARCENDIV KEYPORT WA. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; C.S. Draper Laboratory, Cambridge, MA; Applied Research Laboratory/University of Texas, Austin, TX; various competitive contracts.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: SOMSS program has been delayed one year due to FY 1993 Congressional Action.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Memorandum of Agreement, Unmanned Undersea Vehicle Program, signed 29 July 1988 by DARPA and ASN (RE&S) with subsequent update signed 16 March 1992 by DARPA and ASN(RD&A).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: V2094 PROJECT TITLE: Unmanned Undersea Vehicle

2. (U) Operational Requirements Document (draft) for the Submarine Off-board Mine Search System (SOMSS), March 1992.

3. (U) ASN(RD&A) approval to proceed to Milestone I, 8 June 1992.

G. (U) RELATED ACTIVITIES: PE 0603226E, Experimental Evaluation of Major Innovative Technologies: The DARPA portion of the joint UUV program, as described in paragraph B of this RDDS, is funded by Project EE-39 of this PE. PE 0603713N, Ocean Engineering Development, developed in FY 1992 and is developing in FY 1993 applicable technologies, including acoustic communications and supervisory control techniques.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) DARPA commenced MSS testing in May 1992, continuing into FY 1993.

2. (U) SOMSS T&E requirements will be documented in the Test and Evaluation Master Plan (TEMP) for Milestone I. D&V Subsystem test will be conducted in FY 1997; a fully integrated D&V system test will occur in FY 1998. TECHEVAL is projected to occur in FY 2001 and OPEVAL in FY 2002.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q0260 PROJECT TITLE: Minehunt

PICTURE NOT AVAILABLE

POPULAR NAME: MINEHUNT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				CONT.
AN/SQQ-32			MS III 2/94	
Buried Mine Detection		MS I 8/93		
Remote Minehunt			MS I 2/94	
ENGINEERING MILESTONES				CONT.
AN/SQQ-32 Buried Mine Detection			PDR 2/94	
Remote Minehunt				
T&E MILESTONES				CONT.
AN/SQQ-32 Buried Mine Detection		DT-IIG 8/93		
Remote Minehunt				
CONTRACT MILESTONES				CONT.
AN/SQQ-32 Buried Mine Detection			AWARD ADM CONTRACT 12/93	
Remote Minehunt				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1.414	7.266	11.120	CONT.	CONT.
SUPPORT CONTRACT	232	407	522	CONT.	CONT.
IN-HOUSE SUPPORT	7.224	6.629	5.404	CONT.	CONT.
GFE/ OTHER	1.061	850	320	CONT.	CONT.
TOTAL	9.931	15.152	17.366	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q0260 PROJECT TITLE: Minehunt

B. (U) DESCRIPTION: (1) Improvements to AN/SQQ-32 variable depth minehunting sonar for MCM-1 and MHC-51 ships; (2) Buried Mine Detection: System for detection of mines buried in the sea bottom; and (3) Remote Minehunting: Remotely controlled minehunting systems for non-MCM platforms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) AN/SQQ-32:
(1) (U) Continued limited production.
(2) (U) Changed out sonar in MCM-1.
(3) (U) Began Pre-Planned Product Improvement (P^3I) program.

b. (U) Buried Mine Detection: Completed requirements documentation.

c. (U) Remote Minehunting: Continued engineering studies.

2. (U) FY 1993 PROGRAM:

a. (U) AN/SQQ-32:
(1) (U) Conduct Technical Evaluation (TECHEVAL) on MCM-1.
(2) (U) Develop various P^3I.

b. (U) Buried Mine Detection System: Milestone I.

c. (U) Remote Minehunting System: Prepare requirements documentation.

3. (U) FY 1994 PLANS:

a. (U) AN/SQQ-32:
(1) (U) Conduct Operational Evaluation (OPEVAL) on MCM-1.
(2) (U) Milestone III.
(3) (U) Develop various P^3I
(4) (U) Deliver Phase I P^3I.

b. (U) Buried Mine Detection:
(1) (U) Award Advanced Development Model (ADM) contract.
(2) (U) Conduct Preliminary Design Review (PDR).

c. (U) Remote Minehunting: Milestone I.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA Panama City, FL; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Indian Head, MD; NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Raytheon, Portsmouth, RI; Thomson-Sintra, Brest, France; To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: SQQ-32 OPEVAL delayed because of ship non-availability. Buried Mine Detection System milestones changed to reflect current OR. Remote Minehunt milestones changed to reflect current program.

3. (U) Cost changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502 BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q0260 PROJECT TITLE: Minehunt

F. (U) PROGRAM DOCUMENTATION:

AN/SQQ-32: TEMP 005-4 Rev 1 approved 8/12/91 by Director, Navy Test & Evaluation & Technical Requirements
Buried Mine Detection: OR 282-03-92 dated 3/26/91
Remote Minehunting: MNS Approved.

G. (U) RELATED ACTIVITIES: PE 0604373N, Airborne Mine Countermeasures; Remote Minehunting studies and NATO PG26 have remote vehicles and sensors under development or study.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MHC/MCM (SQQ-32)	3/0	2/0	0/0	0/0	
SCN Lines 13/14	42,152	33,066	0	0	267,538
MCM (SQQ-32 backfit)	1	1	2		
OPN Line 86	11,781	11,678	24,200	CONT.	CONT.
MCM (SQQ-32 Replacement Towed Body)	0	0	Var.		
OPN Line 86	0	0	6,837	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) AN/SQQ-32: DT-IIG 4Q/FY93

2. (U) BURIED MINE DETECTION: DT-IA 3Q/FY95
OT-IA 4Q/FY95
DT-IIA 4Q/FY97
DT-IIB 1Q/FY99
OT-IIA 2Q/FY99

3. (U) REMOTE MINEHUNTING: DT-I 3Q/FY97
OT-I 4Q/FY97
DT-IIA 3Q/FY01
OT-II 4Q/FY01

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q1233 PROJECT TITLE: Mine Countermeasures Improvements

Picture Not Available

POPULAR NAME: MCM Improvements

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
AN/SSN-2		III 3/93		
AN/SLQ-53	II 6/92			III 3QTR/96
Mission Package 3 (MP3) for AN/SLQ-48		II 9/93		III 1QTR/96
AN/SSQ-94				Fleet Introduction 2QTR/96
MECH SWEEP UPGRADE				III 3QTR/99
CLOSED LOOP DEGAUSSING (CLDG)			II 10/93	III 4QTR/99
ENGINEERING MILESTONES				
AN/SLQ-53	PDR 9/92	CDR 1/93		
MP3 for AN/SLQ-48			PDR 5/94	CDR 11/94
AN/SSQ-94		MNS PDR/CDR 11/92	SSN-2 PDR/CDR 11/93	SQQ-13/SQQ-32 PDR/CDR 02/95
T&E MILESTONES				
AN/SSN-2		TECHEVAL 10/92 OPEVAL 12/92		
AN/SLQ-53			DT-IIA 2/94-6/94	OT-IIB 11/95 FOT&E 1QTR/98
MP3 FOR AN/SLQ-48				DT-IIB 8/95-9/95 OT-II 4QTR/96
AN/SSQ-94				MCM SYS TEST 1QTR/96 MHC SYS TEST 3QTR/96
MECH. SWEEP UPGRADE				DT-II 4QTR/98 OT-II 3QTR/99
CLDG		DT-I 9/93		DT-IIA 3/95 DT-IIB 2QTR/96 TECHEVAL 4QTR/97 OPEVAL 2QTR/98
CONTRACT MILESTONES				
AN/SSN-2		PRODUCTION TAC DISPLAYS 3/93		
AN/SLQ-53				1st Production 3/95 Final Production 2QTR/96
MP3 for AN/SLQ-48		EDM 2/94		
CLDG		ADM 9/93		EDM 2QTR/96 Production 1QTR/00

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q1233 PROJECT TITLE: Mine Countermeasures Improvements

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,156	1,060	1,929	CONT.	CONT.
SUPPORT CONTRACT	106	235	269	CONT.	CONT.
IN-HOUSE SUPPORT	6,833	8,312	7,155	CONT.	CONT.
GFE/ OTHER	500	595	1,401	CONT.	CONT.
TOTAL	10,595	10,202	10,754	CONT.	CONT.

B. (U) DESCRIPTION: This project develops: (1) AN/SSN-2(V) Precise Integrated Navigation; (2) AN/SLQ-53 modular mechanical Single Ship Deep Sweep (SSDS); (3) AN/SSQ-94 onboard Combat System Trainer for MCM and MHC ships; (4) Closed Loop Degaussing (CLDG) to improve survivability of mine countermeasures ships; (5) Mechanical Sweep Upgrade; and (6) Mission Package 3 (MP3) upgrade to the AN/SLQ-48 to provide destruction of moored mines in place.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) AN/SSN-2(V):
(1) (U) Conducted Phase III system integration and test.
(2) (U) Installed test system in MCM-2.
(3) (U) Began Phase III Technical Evaluation (TECHEVAL).

b. (U) AN/SLQ-53:
(1) (U) Milestone II.
(2) (U) Awarded winch and A/N37U-1 contracts.

c. (U) AN/SSQ-94:
(1) (U) Completed systems design review.
(2) (U) Ordered AN/SLQ-48, AN/SYQ-13, and AN/SQQ32 hardware.
(3) (U) Completed AN/SLQ-48 PDR and scenario controller PDR.

d. (U) CLDG:
(1) (U) Completed program transition from NUNN program.
(2) (U) Conducted engine tests at LANVEOC, France and NSWC CADET in U.S.

2. (U) FY 1993 PROGRAM:

a. (U) AN/SSN-2:
(1) (U) Complete Phase III TECHEVAL and Operational Evaluation (OPEVAL).
(2) (U) Milestone III.

b. (U) AN/SLQ-53:
(1) (U) Continue winch and containers development.
(2) (U) Deliver A/N37U-1.

c. (U) AN/SSQ-94:
(1) (U) Conduct Critical Design Reviews for AN/SLQ-48 module.
(2) (U) Continue coding and testing of AN/SLQ-48 and AN/SSN-2 modules.
(3) (U) Conduct PDR for AN/SSN-2 module.

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface & Shallow Water MCM & Unmanned Undersea Vehicle
PROJECT NUMBER: Q1233 PROJECT TITLE: Mine Countermeasures Improvements

d. (U) CLDG:
(1) (U) Conduct multiple item scale mock-up test at NAVSURFWARCEN WHITE OAK DET.
(2) (U) Decision to transition to Phase II of MOU.
(3) (U) Prepare for MS II.

e. (U) MP3 for AN/SLQ-48:
(1) (U) Begin development.
(2) (U) Milestone II.

3. (U) FY 1994 PLANS:

a. (U) AN/SLQ-53:
(1) (U) Deliver winch and containers.
(2) (U) Complete DT-IIA TECHEVAL.

b. (U) AN/SSQ-94:
(1) (U) Conduct PDRs AN/SQQ-32 and AN/SYQ-13 modules and CDR AN/SSN-2.
(2) (U) Install and test AN/SLQ-48 and AN/SSN-2 modules.

c. (U) CLDG:
(1) (U) Milestone II.
(2) (U) Develop CLDG system detail requirements.
(3) (U) Award CLDG Hardware contracts.

d. (U) MP3 for AN/SLQ-48:
(1) (U) Award development contracts.
(2) (U) Continue development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCEN MINEWARENGACT, Yorktown, VA; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN DET WHITE OAK, Silver Spring, MD. CONTRACTORS: To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
AN/SSN-2: OR-1026-CC dated 4 NOV 1977; TEMP 005-2 Rev 2 dated 25 APR 1989
AN/SLQ-53: ORD APPROVED 5/11/92; TEMP #884 in signature cycle
AN/SQQ-94: NAPDD of 20 September 1990
CLDG: OR 060-03-88 dated 19 December 1985
Mechanical Sweep Upgrade: OR-S-1163-MW dated 8 March 1983
MP3: Lessons Learned Desert Storm; ORD and TEMP under preparation

G. (U) RELATED ACTIVITIES: PE 0604373N, Airborne Mine Countermeasures is developing the NAVAIR A/N37U-1 controlled depth helicopter sweep which is to be adapted for AN/SLQ-53.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q1233 PROJECT TITLE: Mine Countermeasures Improvements

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN (SSN-2) Line 86	(6)	(6)	(4)		(16)
backfit	7,931	7,366	5,260	0	20,557
OPN (SSDS)	0	0	0	0	(12) 19,726
OPN (SSQ-94) Line 86	0	0	Var. 2,760	5,827	8,587

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO Comparative Testing (NCT) programs on AIOS (AN/SSN-2 Phase III Tactical Displays); Signed MOU with France on CLD 4 December 1990.

J. (U) TEST AND EVALUATION: AN/SSN-2 - TECHEVAL 10/92, OPEVAL 12/92; AN/SLQ-53 - DT-IIA 02/94-06/94, DT-IIB 08/95-09/95; OT-IIB 11/95, FOT&E 1QTR/98; MP3 FOR AN/SLQ-48 - OT-II 4QTR/96; AN/SSQ-94 - MCM SYS TEST 1QTR/96, MHC SYS TEST 3QTR/96; CLDG - DT-I 09/93, DT-IIA 03/95, DT-IIB 2QTR/96, TECHEVAL 4QTR/97, OPEVAL 2QTR/98; MECH SWEEP UPGRADE - DT-II 4QTR/98, OT-II 3QTR/99

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q2131 PROJECT TITLE: Shallow Water MCM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q2131	Shallow Water MCM	8,590	16,798	13,844	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for a combination of joint US Marine Corps and US Navy projects planned to counter the threat to amphibious landing forces from known and projected foreign land and sea mines and obstacles in the shallow water, very shallow water and surf zone approaches to amphibious assault areas. It also includes the craft landing zone for the amphibious assault vehicles. It develops systems for mine reconnaissance, mine hunting, mine sweeping and explosive mine clearance. Included are the Semi-Autonomous Under Sea Vehicles (SAUV), High-Speed Remote Influence Sweep (SAM II), Distributed Explosives Technology (DET), Shallow Water Assault Breach System (SABRE), Obstacle Breaching System (OBS) and Breached Lane Navigation System (BLNS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) MCM Study conducted by National Academy of Science Naval Studies Board.

b. (U) SAM II: Initiated Concept Exploration.

c. (U) DET:
(1) (U) Initiated Concept Exploration.
(2) (U) Completed test plan and hardware procurement to support explosive selection tests.

d. (U) SABRE:
(1) (U) Initiated Concept Exploration .
(2) (U) Initiated fuse and warhead preliminary designs.

e. (U) OBS:
(1) (U) Initiated Concept Exploration.
(2) (U) Initiated weapon effect analysis of existing Navy/USMC precision guided munitions
(3) (U) Defined obstacle clearance requirements.

f. (U) BLNS:
(1) (U) Initiated Concept Exploration.
(2) (U) Defined alternative concepts.

2. (U) FY 1993 PROGRAM:

a. (U) SAM II:
(1) (U) Complete concept exploration.
(2) (U) Milestone I; Initiate Demonstration and Validation.

b. (U) DET: Milestone I; Initiate Demonstration and Validation.

c. (U) SABRE: Milestone I; Initiate Demonstration and Validation.

d. (U) OBS:
(1) (U) Milestone I.
(2) (U) Initiate Demonstration and Validation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM and Unmanned Undersea Vehicle
PROJECT NUMBER: Q2131 PROJECT TITLE: Shallow Water MCM

e. (U) BLNS:
(1) (U) Evaluate feasibility of alternative concepts.
(2) (U) Define electronic system interface requirements.
(3) (U) Milestone I.

3. (U) FY 1994 PLANS:

a. (U) SAM II: Continue Demonstration & Validation.
b. (U) DET: DT-I Testing; Continue Demonstration and Validation.
c. (U) SABRE: Milestone II; Initiate Engineering and Manufacturing Development.
d. (U) OBS: Continue Demonstration and Validation.
e. (U) BLNS:
(1) (U) Initiate Engineering and Manufacturing Development.
(2) (U) NDI procurement and modification.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN MINEWARENGACT, Yorktown, VA; NAVSURFWARCEN DET WHITE OAK, Silver Spring, MD; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes:

a. (U) SAM II: Milestone I/II FY-94 changed to MSI FY-93 and MSII FY-95.

b. (U) OBS: Milestone II changed from FY-93 to FY-95.

c. (U) BLNS: Milestone I/II FY-93 changed to MSI FY-93 and MSII FY-94.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Shallow Water (Overall) :	TOR	3/89
	DOP	5/91
	MNS	3/92

Following ORDs are in Staffing in OPNAV:
ORD SWMCM Reconnaissance and Detection (SAUV)
ORD SWMCM Marking (BLNS)
ORD SWMCM Mine/Obstacle Clearance (SAM II, DET, SABRE, AND OBS)

G. (U) RELATED ACTIVITIES: PE 0603555N for Mine Detection Laser Technology. SAUV Technology at Woods Hole Oceanographic Institute (WHOI); Unmanned Underwater Vehicle (UUV) program at DARPA; Royal Swedish Navy Self-propelled Acoustic Magnetic Sweep (SAM) remote controlled influence sweep program; German Navy Troika influence sweep systems, NAVAIR PE 0604373N for Airborne Mine Countermeasures. USMC PEs 0603640M and 0602131M Distributed Explosive Mine Neutralization System (DEMNS); USMC MK58 line charges.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: SAM II MOU with Sweden awaiting Congressional approval.

J. (U) MILESTONE SCHEDULES: Individual MS III: SAUV FY 2005, SAM II FY 1998, DET FY 1998, SABRE FY 1996, OBS FY 1997, BLNS FY 1997.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development
PROJECT NUMBER: V0223 PROJECT TITLE: Submarine Combat Systems Improvement (Adv)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0223	Submarine Combat Systems Improvement (Adv)	39,697	32,137	20,341	CONT.	CONT.

B. (U) DESCRIPTION: This program supports the advanced development and testing of improvements to present and future sonar and combat control systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Advanced Combat Control. Conducted sea tests of Target Motion Analysis Improvement (TMAI) Advanced Development Model (ADM) that included automatic propagation path determination, dual tow Target Motion Analysis (TMA) and automated solution quality assessment. Conducted laboratory based testing of Multi-Target Management ADM.

b. (U) Advanced Hull Array Systems. Conducted lake test of one-quarter scale Advanced Mine Detection System (AMDS) high frequency sonar. Completed algorithm development for adaptive noise cancellation technologies. Initiated Low Cost Wide Aperture Array (LC WAA) studies. Completed design trade off and initiated procurement actions for the Very Low Frequency Sound Source (VLFSS) electronics.

c. (U) Advanced processing.

d. (U) Advanced Towed Arrays. Completed contract awards for procurement of telemetry system, handling system, array processors, sensors, and mechanical components of the Multiline Towed Array (MLTA) system. Finalized conceptual design of a universal submarine towed array handling system.

e. (U) Test and Evaluation. Conducted performance analysis for both cost and operational effectiveness assessments of advanced submarine sonars. Provided supporting analysis for the Cost and Operational Effectiveness Analysis (COEA) for the Submarine Offboard Mine Search System (SOMSS) program. Conducted RANGEX 1-92 and commenced data analysis.

f. (U) Detection, Classification, and Localization Acoustic Signal Processor (DCLASP). Initiate actions for competitive procurement of DCLASP prototype. Program completes with the award of the prototype.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development
PROJECT NUMBER: V0223 PROJECT TITLE: Submarine Combat Systems Improvement (Adv)

2. (U) FY 1993 PROGRAM:

a. (U) Advanced Combat Control. Complete integration of Advanced Data Fusion modify module with TMAI ADM; modify TMA algorithms to account for ray bending; conduct auto TMA sea test.

b. (U) Advanced Hull Array Systems. Conduct AMDS hydrodynamic receive array sea test. Conduct Extended Sensor at-sea testing. Receive micro-mechanical hydrophones for lab evaluation. Complete development of LWPA technology. Complete VLFSS space allocation study.

c. (U) Advanced Processing. including Advanced Two Dimensional Auto Detection Algorithm. Continue MRADE III development.

Investigate active sonar improvements.

d. (U) Advanced Towed Arrays. Finalize towed array handling system specification. Conduct VDTAC sea test. Test towed array heading sensors.

e. (U) Test and Evaluation. Continue system performance and cost analysis in support of both COEA efforts for advanced submarine sonars. Finalize plans and conduct RANGEX 1-93.

3. (U) FY 1994 PLANS:

a. (U) Advanced Combat Control. Initiate and conduct laboratory tests of multisensor single leg TMA algorithm. Investigate multisource Data Fusion (DF) techniques and participate in Battlegroup Exercise.

b. (U) Advanced Hull Arrays. Complete land-based testing of AMDS inboard electronics systems. Complete transition of Extended Sensor development. Initiate trade-off studies and analyses for hull mounted line array development. Complete VLFSS installation and sea test.

c. (U) Advanced Processing.

d. (U) Advanced Towed Arrays. Complete MLTA ATD joint effort. Conduct sea tests of dry-end processing improvements, provide to 6.4.

e. (U) Test and Evaluation. Complete post exercise analysis of RANGEX 1-93. Initial test planning for RANGEX 1-95.

4. (U) PROGRAM COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY; IN-HOUSE; NAVUNSEAWARCENDIV NEWPORT RI; NAVUNSEAWARCEN DET NEW LONDON CT; NRL WASHINGTON DC; NRL/USRD ORLANDO FL; NAVSURFWARCEN CARDEROCKDIV BETHESDA MD; Naval Post Graduate School, Monterey, CA. CONTRACTORS: Analysis & Technology Inc., North Stonington, CT; Sonalysts Inc., Waterford, CT; ARL/University of Texas, Austin, TX.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine Combat Systems Development
PROJECT NUMBER: V0223 PROJECT TITLE: Submarine Combat Systems Improvement (Adv)

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD #237-02, May 90

G. (U) RELATED ACTIVITIES: PE 0603562N, Project V1739, Submarine Arctic Warfare Development, Project F0770, Advanced Submarine Support Equipment Program; 0604524N, Project N1941, AN/BSY-2; and PE 0604503N, Project F0219, Submarine Sonar Improvement (Engineering).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

(U) AMDS Receive Array Sea Test	3QFY93
(U) VDTAC Sea Test	2QFY93
(U) Extended Sensors Sea Test	3QFY93
(U) AD/AC Sea Test	4QFY93
(U) RANGEX 1-93	4QFY93
(U) Advanced Combat Control Battlegroup Exercise	2QFY94
(U) TAP ADM Sea Test	3QFY94
(U) Multiline Surface Ship Sea Test	4QFY94
(U) VLFSS Sea Test	2QFY94

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0225	Surface Ship Torpedo Defense	26,473	2,954	8,852	4,447	205,780
V2045	Joint US/UK SSTD	30,056	24,131	25,630	CONT.	CONT.
TOTAL		56,529	27,085	34,482	CONT.	CONT.

B. (U) DESCRIPTION: The Surface Ship Torpedo Defense (SSTD) Program is comprised of the US National SSTD Program and the US/UK SSTD Joint Project:

(U) (V0225) DESCRIPTION: The US National SSTD Program will initially provide torpedo defense for CV/CVN, LHD, and LHA Class ships against the . Phase I of the National Program is a softkill countermeasure which adds a to the existing AN/SLQ-25 (NIXIE) System. Phase I has been expanded to include all NIXIE equipped ships. Phase II of the National Program will provide torpedo detection employing a towed array sensor, and a

(U) (V2045) DESCRIPTION: The US/UK SSTD Joint Project is a collaborative program to design, develop and produce a 360° anti-torpedo self-defense capability for US Navy and Royal Navy (RN) combatant, amphibious and auxiliary surface ships. It expands upon the US National SSTD Program in that counter salvoes of all anti-ship torpedo threats (straight running, acoustic launched from either submarine or surface craft, and will be fitted on a wide range of USN and RN platform types. The US/UK SSTD system will provide advanced detection, classification, localization and countermeasure capabilities. It will be a layered defense system composed of softkill and hardkill countermeasures to provide defense in depth. The US/UK SSTD system will maximize the use of existing ship equipment and be modular to readily fit the US/UK ship market. Every country in the world has access to the global arms export market, which offers sophisticated weaponry and advanced combat systems. Currently, twenty-four Rest-of-the-World (ROW) countries have been identified as having submarines (ranging from obsolescent CIS and Chinese-built ROMEO classes to the modern German Type 209 and CIS KILO classes). Nineteen countries have been identified as having patrol craft capable of firing US-, CIS- and European-built anti-ship torpedoes. Since shallow, confined and congested waters with poor acoustic conditions are prevalent in many Third World Regions, ASW defenses alone are inadequate to protect naval units. Naval surface combatants, their supporting units and merchant ships engaged in maritime trade are vulnerable to attack from anti-ship torpedoes during global or limited war, local confrontations, or while in proximity of a regional conflict. The ability to project, maintain and protect Naval Forces in these regional conflicts has also increased in importance due to Fleet reductions and closure of military bases overseas. With shrinking numbers of surface ships, decreasing emphasis on ASW and intensified focus on operations in littoral waters, an anti-torpedo self-defense capability is essential.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V0225 PROJECT TITLE: Surface Ship Torpedo Defense

POPULAR NAME: SURFACE SHIP TORPEDO DEFENSE (SSTD)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			SSTD MSIII 3/94	CONT.
ENGINEERING MILESTONES	Detec/MOD 7 PCA 4/92			
T&E MILESTONES	DTII 1/92 OTII 7/92			
CONTRACT MILESTONES		SSTD PROD AWARDS	3/94	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	8,374	650	200	0	58,896
SUPPORT CONTRACT	788	60	150	725	9,756
IN-HOUSE SUPPORT	17,161	2,169	8,427	3,632	131,390
GFE/ OTHER	150	75	75	90	5,738
TOTAL	26,473	2,954	8,852	4,447	205,780

B. (U) DESCRIPTION: The US National SSTD Program will initially provide torpedo defense for CV/CVN, LHD, and LHA Class ships against the Phase I of the National Program is a softkill countermeasure which adds a to the existing AN/SLQ-25 (NIXIE) System. Phase I has been expanded to include all NIXIE equipped ships. Phase II of the National Program will provide torpedo detection employing a towed array sensor, and a

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Commenced SSTD TECHEVAL.
b. (U) Conducted preliminary Physical Configuration Audits (PCA) on the SSTD Detection system and MK 46 ,ORDALT.
c. (U) Completed Production Readiness Review.
d. (U) Conducted the maintenance demonstration of the SSTD system.
e. (U) Conducted Logistic Review Audit of the SSTD system.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V0225 PROJECT TITLE: Surface Ship Torpedo Defense

2. (U) FY 1993 PROGRAM:

a. (U) Complete SSTD TECHEVAL.
b. (U) Complete certification for OPEVAL.

3. (U) FY 1994 PLANS:

a. (U) Conduct SSTD OPEVAL.
b. (U) Receive Milestone III approval for SSTD system.
c. (U) Award production contracts.

4. (U) PROGRAM TO COMPLETION:

a. (U) Conduct performance enhancement efforts for the SAS to convert from analog to digital technology.
b. (U) Conduct AN/SLR-24 efforts in PM/FD/FL for enhanced logarithms ensuring minimum false alerts.
c. (U) Begin development of AN/SLR-24 sector detecting capability to work with the Phase III ocean coverage.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVUNSEAWARCEN DET, New London, CT; NAVUNSEAWARCEN DET, Norfolk, VA; NCCOSC RDT&E DIV, San Diego, CA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVUNSEAWARCEN DIV, Keyport, WA. CONTRACTORS: General Electric, Syracuse, NY; Alliant Techsystems, Hopkins, MN.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: MS III rescheduled 2 Qtr FY 94.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

ASP	7/84
OR	4/80
AP	6/89
DCP	1/90
TEMP	1/90

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 59 SSTD	13,400	36,900	14,900	117,508	285,285
(U) WPN Line 35	0	37,847	0	42,725	81,891

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) CST MK 1 MOD 0: TECHEVAL began in the 2nd Qtr FY 92. Reinstallation on the TECH/OPEVAL ship (USS CARL VINSON CVN-70) is in progress. OPEVAL is scheduled to begin in the 1st Qtr FY 94.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V2045 PROJECT TITLE: Joint US/UK SSTD

POPULAR NAME: JT US/UK SSTD

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			MS I 11/93	D&V LABS	MS II 3RD/97
ENGINEERING MILESTONES	RM LABS	SRR		SDR 3RD/96	PDR 4TH/97 CDR 1ST/98
T&E MILESTONES	RM D&V TESTING	RM TESTING COMPLETE 2/93	D&V TESTING	D&V TESTING	TECHEVAL 3RD/00 OPEVAL 4TH/00
CONTRACT MILESTONES	RM AWARD 1/92		D&V AWARD 12/93	EMD RFP 3RD/96	EMD AWARD 3RD/97

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	10,782	3,733	13,800	CONT.	CONT.
SUPPORT CONTRACT	752	995	1,075	CONT.	CONT.
IN-HOUSE SUPPORT	18,021	19,403	10,755	CONT.	CONT.
GFE/ OTHER	501	0	0	CONT.	CONT.
TOTAL	30,056	24,131	25,630	CONT.	CONT.

B. (U) DESCRIPTION: The US/UK SSTD Joint Project is a collaborative program to design, develop and produce a 360° anti-torpedo self-defense capability for US Navy and Royal Navy (RN) combatant, amphibious and auxiliary surface ships. It expands upon the US National SSTD Program in that

launched from either submarine or surface craft, and will be fitted on a wide range of USN and RN platform types. The US/UK SSTD system will provide advanced detection, classification, localization and countermeasure capabilities. It will be a layered defense system composed of softkill and hardkill countermeasures to provide defense in depth. The US/UK SSTD system will maximize the use of existing ship equipment and be modular to readily fit the US/UK ship market. Every country in the world has access to the global arms export market, which offers sophisticated weaponry and advanced combat systems. Currently, twenty-four Rest-of-the-World (ROW) countries have been identified as having submarines (ranging from obsolescent CIS and Chinese-built ROMEO classes to the modern German Type 209 and CIS KILO classes). Nineteen countries have been identified as having patrol craft capable of firing US-, CIS- and European-built anti-ship torpedoes. Since shallow, confined and congested waters with poor acoustic conditions are prevalent in many Third World Regions, ASW defenses alone are inadequate to protect naval units. Naval surface combatants, their supporting units and merchant ships engaged in maritime trade are vulnerable to

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V2045 PROJECT TITLE: Joint US/UK SSTD

attack from anti-ship torpedoes during global or limited war, local confrontations, or while in proximity of a regional conflict. The ability to project, maintain and protect Naval Forces in these regional conflicts has also increased in importance due to Fleet reductions and closure of military bases overseas. With shrinking numbers of surface ships, decreasing emphasis on ASW and intensified focus on operations in littoral waters, an anti-torpedo self-defense capability is essential.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: The program is nearing completion of Risk Mitigation (RM) studies and is going forward for a Milestone I decision.

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Awarded RM studies contracts to two consortia.
b. (U) Continued RM tasks.
c. (U) Continued investigations.
d. (U) Continued fuze risk reduction efforts.
e. (U) Continued vulnerability/internal component damage testing.
f. (U) Continued Hardkill Countermeasure (HKCM) cavitation risk reduction.
g. (U) Continued Torpedo Classification algorithm effort.
h. (U) Developed EMD Acquisition Strategy Plan.
i. (U) Conducted Detection, Classification, and Localization (DCL) Trials and analysis.
j. (U) Commenced transition of SSTD laboratory tasking pursuant to SECNAV RDT&E consolidation.
k. (U) Supported development of Mission Needs Statement (MNS).
l. (U) Commenced Launched Expendable Acoustic Decoy (LEAD) feasibility studies.
m. (U) Commenced Cost and Operational Effectiveness Analysis (COEA).

2. (U) FY 1993 PROGRAM:

a. (U) Complete RM effort.
b. (U) Conduct System Effectiveness/Trade-Off Studies.
c. (U) Conduct trials.
d. (U) Continue Torpedo Classification algorithm effort.
e. (U) Support program sponsor/PEO in development of Operational Requirements Document (ORD) and Integrated Program Summary (IPS).
f. (U) Complete DCL Trials and analysis.
g. (U) Update Plan of Action and Milestones (POA&M), Integrated Logistic Support Plan (ILSP), Logistic Resource Funding Summary (LRFS), and Life Cycle Cost (LCC) estimate.
h. (U) Update Threat Definition and Common Performance Requirement (CPR).
i. (U) Complete EMD Cost-Share negotiations.
j. (U) Continue transition of SSTD laboratory tasking pursuant to SECNAV RDT&E consolidation.
k. (U) Complete COEA.
l. (U) Continue LEAD studies.
m. (U) Support NAVMIC in development of System Threat Assessment Report (STAR).
n. (U) Update Test and Evaluation Master Plan (TEMP).
o. (U) Develop Acquisition Program Baseline Agreement (APBA).
p. (U) Complete Mission Needs Statement (MNS).
q. (U) Prepare for and complete a Logistics Review Group (LRG) Audit.
r. (U) Support Independent Cost Estimate (ICE).

3. (U) FY 1994 PLANS:

a. (U) Complete UK Equipment Approval Committee (EAC) process; UK Milestone I.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V2045 PROJECT TITLE: Joint US/UK SSTD

b. (U) Complete US Milestone I approval process.
c. (U) Complete transition of SSTD laboratory tasking pursuant to SECNAV RDT&E consolidation.
d. (U) Commence Demonstration and Validation (D&V) Phase.
e. (U) Conduct initial development testing.
f. (U) Conduct laboratory simulation work.
g. (U) Conduct System Effectiveness/Trade-Off Studies.
h. (U) Design SSTD Advanced Development Models (ADMs).
i. (U) Complete LEAD studies.
j. (U) Support Cost Analysis Improvement Group (CAIG).

4. (U) PROGRAM TO COMPLETE: This is a continuing program.

D. (U) WORK PERFORMED BY: (United States) IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NCCOSC RDT&E DIV, San Diego, CA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVUNSEAWARCENDET, New London, CT; NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCENDIV, Keyport, WA. CONTRACTORS: GE, Syracuse, NY; Alliant, Hopkins, MN; Westinghouse, Sykesville, MD; AT&T, Whippany, NJ; Librascope, Glendale, CA. (United Kingdom) IN-HOUSE: DGUW(N); DRA Maritime; Director of Intelligence. CONTRACTORS: Dowty Maritime Systems; Marconi Underwater Systems Limited; Ferranti-Thomson; Ferranti Naval Systems; British Aerospace.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technical changes: Not applicable.

2. (U) Schedule changes: Incorporation of Risk Mitigation, as directed by ASN, resulted in D&V commencing in FY 94 vs FY 92.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement (OR)	4/80
Memorandum of Understanding (MOU)	10/88
System Specification	6/90
Common Performance Requirement (CPR)	7/90
Test and Evaluation Master Plan (TEMP)	3/91

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) A US/UK SSTD Joint Project Memorandum of Understanding (MOU) was signed on 26 October 1988 by the Under Secretary of Defense (Acquisition) for the US and the Chief of Defence Procurement for the UK. It covers all four project phases (CE, D&V, EMD and Production/Deployment) as well as other issues such as cost share, exchange rates and industry participation. The MOU requires each country to seek national approvals and to formally declare its intent to continue with the program prior to each phase.

2. (U) Jointly funded costs will be shared as follows:
a. (U) For CE and D&V, the cost of the Joint Project Office (JPO), its direct support, and industry contracts will be shared equally.
b. (U) For EMD, the costs of the JPO and its direct support will be shared equally.
c. (U) Cost shares for the EMD contract will be established by the Participants by 3rd Qtr FY 93.

J. (U) TEST AND EVALUATION: RM Testing FY 92; RM Testing Complete 2/93; D&V Testing FY 94/95; D&V Testing Complete FY 96.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603508N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Ship Propulsion System
PROJECT NUMBER: S1848 PROJECT TITLE: Gas Turbine Engine Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1848	GTET	4,445	3,914	3,439	CONT.	CONT.

B. (U) DESCRIPTION: Develops and demonstrates improved components and systems for Naval surface ship gas turbine engines. Goals are to increase safety and reliability, improve performance and fuel efficiency, and reduce maintenance cost. Technologies demonstrated include advanced ceramic coatings for high-temperature engine components; active magnetic bearings to reduce wear, simplify lubrication, and reduce acoustic signature; and fuel and control system improvements to reduce exhaust gas emissions. Technologies are demonstrated on current generation engines: G.E. LM2500, Allison 501, and Lycoming TF40B.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) LM2500 -- Completed demonstration of fire safety and turbine improvements.
b. (U) 501 -- Commenced vibration modeling. Began demonstration of improved combustor liner.
c. (U) TF40B -- Completed development of compressor coating improvements.

2. (U) FY 1993 PROGRAM:
a. (U) LM2500 -- Analyze turbine hot corrosion and investigate high temperature performance problems. Develop turbine section coatings and blade life enhancements and control modifications to correct problems. Begin development of modifications to reduce fuel usage and nitrous oxide emissions (NOx).
b. (U) 501 -- Continue vibration modelling.
c. (U) TF40B -- Begin work on improved combustor and turbine coatings and initiate demonstration of compressor coatings.

3. (U) FY 1994 PLANS:
a. (U) LM2500 -- Begin rig test demonstration of new turbine airfoil geometry coatings and blade life enhancements. Implement performance evaluation software. Continue fuel efficiency/low NOx development.
b. (U) 501 -- Complete and validate vibration model.
c. (U) TF40B -- Complete demonstration of compressor coatings, and continue development of improved combustor and turbine coatings.
d. (U) Initiate new efforts to improve LM2500, 501, and TF40B reliability and maintainability.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAVSURFWARCEN, Carderock and Annapolis, MD. CONTRACTORS: General Electric, Cincinnati, OH and Daytona, FL; Allison, Indianapolis, IN; Textron Lycoming, Stratford, CT; and Westinghouse MTD, Pittsburgh, PA.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0517	CV ASW Module	3,909	3,437	411	0	81,220
W1722	CV Weapons Elevator Improvements	1,081	1,176	872	CONT.	CONT.
W1723	CV Launch and Recovery Systems	16,001	16,059	9,938	CONT.	CONT.
	TOTAL	20,991	20,672	11,221	CONT.	CONT.

1/ Previously funded under Program Element 0603228N, S0517.

B. (U) DESCRIPTION: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

1. Development of computer and equipment improvements to the Aircraft Carrier Antisubmarine Warfare Module (CV-ASWM).

2. Development of standardized, supportable and maintainable aircraft carrier weapons elevators components.

3. Development of all systems required to provide approach and landing guidance and control, recover, service, support and launch aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and fleet modernization.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development
PROJECT NUMBER: S0517 PROJECT TITLE: CV ASW Module

C. (U) DESCRIPTION: This project provides for the advanced development of computer program and equipment improvements required to upgrade the CV-ASWM. An integral part of the carrier Advanced Combat Direction System (ACDS), CV-ASWM provides mission support for embarked S-3 aircraft and CV helicopters, Anti-Submarine Warfare (ASW) sensor data processing/analysis and primary command, control and communications connectivity between air ASW weapon systems, ACDS, the ASW commander and other battle force components. Critical direction systems and the continued capability to support both new and upgraded ASW aircraft software programs. The baseline in designated Model 4.2. Under Model 4.3, all Model 4.2 capabilities are retained, functions are added and the exchange of data with ACDS is expanded. The functions added are: processing of Joint Message Test Format (JMTF) messages and processing of meterological and oceanographic data and tactical decision aids provided by the Tactical Environmental Support System (TESS).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Successfully completed Model 4.2H Technical Evaluation (TECHEVAL) (DT-IIE) and Operational Evaluation (OPEVAL) (OT-IIB).

b. (U) Received from Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN(RD&A)):

(1) (U) Approval to deliver the Model 4.2H computer program to CV/CVN.

(2) (U) Permission to pursue further system development under the procedures for evolutionary acquisition.

c. (U) Continued development of Model 4.3 program.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct a Critical Design Review of Model 4.3.

b. (U) Conduct a Combat System Integration Test of Model 4.3 at the Integrated Combat System Test Facility in February 1993.

c. (U) Conduct Model 4.3 TECHEVAL in August 1993.

3. (U) FY 1994 PLANS:

a. (U) Conduct Model 4.3 OPEVAL.

b. (U) Receive approval for Fleet introduction of Model 4.3.

4. (U) PROGRAM TO COMPLETION: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVUNSEAWARCENDIV, Keyport, WA.

F. (U) RELATED ACTIVITIES: PE 0604518N CIC Conversion, the CV-ASW Module exchanges tactical data with ACDS.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development
PROJECT NUMBER: W1722 PROJECT TITLE: CV Weapons Elevator Improvements

C. (U) DESCRIPTION: This project provides for the advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevator components such as control systems, doors and hatches, safety devices and platform and hoist machinery. Emphasis is placed on the improvement of safety, maintainability, watertight integrity and weight reduction.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed shock tests of Elevator Ballistic Watertight Door (EBWTD) at NAVSURFWARCEN SHIPSYSENGSTA Land Based Engineering Site (LBES).

b. (U) Completed concept drawings and proof of concept models of Elevator Ballistic Watertight Hatch (EBWTH).

c. (U) Completed fabrication of prototype Hydraulic Fluid Compression Ignition Test Machine (HFCITM).

d. (U) Completed evaluation of non-asbestos brakes for elevators.

2. (U) FY 1993 PROGRAM:

a. (U) Complete operability tests of EBWTD at LBES.

b. (U) Complete detail drawings of EBWTH.

c. (U) Complete prototype tests of HFCITM and establish standardized procedure for operation.

d. (U) Award contract to fabricate wire rope test devices.

3. (U) FY 1994 PLANS:

a. (U) Develop ship installation drawings for EBWTD.

b. (U) Fabricate and install EBWTH at LBES.

c. (U) Initiate Programmable Logic Elevator Controller (PLEC) program.

d. (U) Conduct shipboard evaluation of wire rope test devices.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAVSURFWARCEN DET, Annapolis, MD. CONTRACTORS: Rosenblatt, New York, NY; Westinghouse MTD, Pittsburgh, PA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development
PROJECT NUMBER: W1723 PROJECT TITLE: CV Launch and Recovery Systems

PICTURE NOT AVAILABLE

POPULAR NAME: LAUNCH AND RECOVERY SYSTEMS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLET
PROGRAM MILESTONES				
ALRCS				MS II:06/9
EMALS				ADM:GO/NO GO:06/9
SMATCALS		TEMP:06/93		MS II:03/9
ICOLS				
LRLS		MS II:06/93		
IFLOLS				MS II:06/9
VSTOL OLS		MS III:06/93		
ISIS		MS I:09/93		MS II:06/9
ENGINEERING MILESTONES				
EMALS	UPDATE:06/92			
SMATCALS			CDR:11/93	ADM DELIV:09/9
ICOLS				
LRLS	ADM DELIV:03/92			
IFLOLS			ADM DELIV:09/94	
VSTOL OLS	ADM DELIV:06/92			
ISIS			ADM DELIV:09/94	
T&E MILESTONES				
ALRCS		ALRCS DEMO:03/93		
EMALS			CCD END:12/94	
SMATCALS				ASHORE DEMO:09/9
ICOLS				
LRLS	AT-SEA DEMO:07/92			
IFLOLS				AT-SEA DEMO:10/9
VSTOL OLS		AT-SEA DEMO:06/93		
ISIS				AT-SEA DEMO:01/9
CONTRACT MILESTONES				
EMALS		CCD:12/92		
SMATCALS	ADM:09/92			
ICOLS				
LRLS	ADM:02/92			
IFLOLS		ADM:10/92		

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development
PROJECT NUMBER: W1723 PROJECT TITLE: CV Launch and Recovery Systems

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5,499	6,235	3,772	CONT.	CONT.
SUPPORT CONTRACT	N/A				
IN-HOUSE SUPPORT	10,065	9,824	6,166	CONT.	CONT.
GFE/ OTHER	437	0	0	CONT.	CONT.
TOTAL	16,001	16,059	9,938	CONT.	CONT.

B. (U) DESCRIPTION: This project addresses the advanced development of systems to meet Navy unique shipboard operational requirements for: (1) advanced development and modernization of catapults and arresting gear and their control systems, and (2) advanced development of air traffic control, approach and landing and air operations reporting systems. The first area is developing the Electromagnetic Aircraft Launch System (EMALS) including its associated power generation/storage/distribution system and closed loop control system. The Advanced Launch and Recovery Control Systems (ALRCS) are developing digital control systems for existing catapults and arresting gear replacing the antiquated, manpower intensive control systems of the 1950's. Also being developed is the Automated Data Acquisition and Monitoring System (ADAMS) to track useage of the catapults and arresting gear and alert the ship's crew of required repairs and replacements. The second area is developing advanced optical and electronic tracking, approach and landing control and guidance systems. The Improved Carrier Optical Landing System (ICOLS) and the Vertical/Short Take-Off and Landing Optical Landing System (VSTOL OLS) will provide optical displays so that the pilot can take early corrective actions in order to prevent landing accidents and increase the aircraft boarding rate. The Signature Managed Air Traffic Control, Approach and Landing Systems (SMATCALS) will apply low probability of intercept (LPI) techniques to electronic air traffic control and approach and landing systems in order to achieve around-the-clock, all-weather operations on ships during radio frequency emission control (EMCON) conditions. The Integrated Shipboard Information System (ISIS) will provide automated air operations information to decision makers via electronic status boards, replacing the current manpower intensive, hand-written status boards in all of the air operations work areas.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed update of EMALS advanced development model (ADM) preliminary design to reflect redefined EMALS requirements, evaluated reports and proposals leading to contract award.

b. (U) Awarded the SMATCALS Air Traffic Control Systems (ATCS) ADM contract.

c. (U) Completed ashore and at-sea demonstrations of ICOLS Long Range Lineup System (LRLS) ADM.

d. (U) Completed qualification testing of VSTOL OLS ADM.

2. (U) FY 1993 PROGRAM:

a. (U) Award one EMALS Critical Components Demonstration (CCD) program contract to design, fabricate and test critical EMALS components.

b. (U) Initiate fabrication of SMATCALS ATCS ADM.

c. (U) Award contract for design and fabrication of ICOLS IFLOLS ADM.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Carrier Systems Development
PROJECT NUMBER: W1723 PROJECT TITLE: CV Launch and Recovery Systems

d. (U) Initiate ICOLS Improved Fresnel Lens Optical Landing System (IFLOLS) ADM.

e. (U) Complete at-sea demonstration of VSTOL OLS ADM.

f. (U) Initiate fabrication of ISIS ADM.

g. (U) Complete test site demonstration of ALRCS.

3. (U) FY 1994 PLANS:

a. (U) Complete demonstration of critical EMALS components.

b. (U) Initiate acceptance testing of SMATCALS ATCS ADM.

c. (U) Initiate acceptance testing of ICOLS IFLOLS ADM.

d. (U) Complete fabrication of ISIS ADM and initiate shipboard installation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, INDIANAPOLIS, IN; NAVAIRWARCENACDIV, LAKEHURST, NJ; NAVAIRWARCENACDIV, PATUXENT RIVER, MD; NCCOSC RDTE DIV, SAN DIEGO, CA; NESEA, ST. INIGOES, MD; NRL, WASHINGTON, DC; NAVSURFWARCEN DET, ANNAPOLIS, MD. CONTRACTORS: EML Research, Hudson, MA; Humbug Mountain Research Laboratories, Duarte, CA; E-Systems, Salt Lake City, UT.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Completion of SMATCALS ATCS and ICOLS IFLOLS ADMs will be extended approximately six months from previously shown schedules.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	ORD	AP	TEMP	COEA	LRC
ALRCS	122-05-88:12/86	06/95	06/95	10/94	02/95
EMALS	TOR:10/87	09/89	12/96	12/96	09/98
SMATCALS	162-05-90:06/87	02/92	06/93	12/96	03/96
ICOLS	195-05-88:12/87				
LRLS		06/93	06/93	02/93	12/92
IFLOLS		06/95	06/95	N/A	12/94
VSTOL OLS	172-05-88:08/87	N/A	N/A	N/A	03/93
ISIS	09/93	03/95	03/95	N/A	03/95

G. (U) RELATED ACTIVITIES: 0604512N Shipboard Aviation Systems related to the advanced development effort; 0604504N Air Control related to the carrier based air traffic control efforts.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
VSTOL OLS:					
OPN Line 157	0	14,542	0	0	14,542

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
ELEMENT TITLE: Shipboard Systems Component Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382	Shipboard Auxiliary Systems Development	23,754	26,594	23,103	CONT.	CONT.
S1712	Hull, Mechanical & Electrical Improvement	3,895	3,635	4,721	CONT.	CONT.
	TOTAL	27,649	30,229	27,824	CONT.	CONT.

B. (U) DESCRIPTION: This program develops affordable non-propulsion machinery systems, components, and improvements for current and future surface fleet Hull, Mechanical and Electrical (HM&E) systems. It includes auxiliary machinery, hull and deck machinery, fiber optic systems, shipboard corrosion control, HM&E materials, Underway Replenishment (UNREP), and ship salvage systems. Fiber optics development includes the distributed combat systems under the Integrated Interior Communication and Control ((IC)2) total shipwide network engineering, Fiber Optic Data Multiplexing System (FODMS (1) & (2)), Fiber Optic Integrated Voice Communication System (FOIVCS), fiber optic shipboard cable topology, analog and digital optoelectronic interfaces, passive optical sensors, High Speed Optical Network concept (HSON), and CVN-73 local area network installation.

(U) The program is closely coordinated with Advanced Ship Machinery System (ASMS), formerly Integrated Electric Drive. The program does not duplicate any efforts and is independent of ASMS.

(U) System developments in the Shipboard Auxiliary Systems Development Project (S0382) are usually ACAT IVT or IVM. The HM&E Improvement Project (S1712) is non-ACAT, resulting primarily in new specifications, standards, and operating procedures. The program uses technology from industry and Navy exploratory development programs, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Thrusts are directed towards improved affordability, performance, producibility, service life, reliability and maintainability, signature reduction, safety, commonality, and standardization, and towards reduced life cycle and acquisition costs, and reductions in weight, volume, and manning. Systems generally apply to all ships and many components may be backfitted during overhauls or equipment replacements, or implemented relatively late in a new ship design cycle. This presents many windows of opportunity to transition technology to the current and future fleet.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382	Shipboard Auxiliary Systems Development	23,754	26,594	23,103	CONT.	CONT.

B. (U) DESCRIPTION: Develops shipboard auxiliary components and systems to improve affordability, performance, reliability, and maintainability and result in size, weight, and/or life cycle cost savings.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed LABEVAL of prototype Electrolytic Disinfectant Generator (EDG); awarded contract for TECHEVAL units. Awarded contract for shipboard production prototype Reverse Osmosis (RO) unit and initiated MS IIIB qualification tests. Completed TECHEVAL of gaseous nitrogen generator (GNG) and obtained MS III approval. Awarded contract for standard family centrifugal pumps design. Completed LABEVAL of Variable Capacity Centrifugal Pump (VCCP); installed for SHIPEVAL. Restarted contract for advanced High Pressure (HP) air compressor. Validated requirement for 400 Hz Current Limiter Device. Completed evaluation of Super Saft Ultrasonic Test system. Continued Impressed Current Cathodic Protection (ICCP) physical and model studies for Underwater Hull ICCP Systems. Began development of spring tow hawser computer program and prototype hardware, testing of shallow water lift system, procedures and hardware for underwater paint system, and testing of underwater welding electrodes. Sized Fiber Optic (FO) (IC)2 network. Developed Baseline Communications Matrix and Top Level Functional Interface Requirements definition documents and Interface Design Specifications. Completed coordination for FO Specifications, FO Logistic Support, FO Global Positioning Satellite remote antenna design, FO International Marine Satellite remote antenna design study, SAFENET FO Transmitter/Receiver Specification, FO Geometry measurement technique, and FO reliability study. Drafted distributed FO system design standard. Commenced FO component qualification and sensor testing. Completed HSON Asynchronous Transfer Mode switch and Synchronous Optical Network Interface. Contract awarded for FODMS(1) continued development. Continued detailed FOIVCS hardware design. Completed installation of CVN-73 Local Area Network.

2. (U) FY 1993 PROGRAM: Continue development of advanced HM&E systems and components and materials, and shipboard salvage systems. Complete testing of shipboard production prototype RO unit and finalize drawings. Obtain MS II approval for EDG and complete tests of EDM. Complete design and begin fabrication of standard family composite centrifugal pumps to demonstrate that both R.O. and standard family of pumps reduce maintenance man hours. Complete VCCP SHIPEVAL and issue technology package. Support GNG production drawing, validation. Continue development of advanced HP air compressors, and complete LABEVAL slow speed booster air compressor. Complete development of ICCP physical scale model, computer model and initiate ICCP design manual for Hull ICCP Systems. Identify and develop coatings, Non-Destructive Evaluation (NDE) techniques and environmentally compatible paints for metallics and non-metallics. Conduct testing of spring tow hawser, and shallow water lift system. Develop Propeller Inspection System, and remote operated vehicle umbilical field repair techniques and procedures. Continue development of FO (IC)2 system including distributed combat systems, HM&E data network, logistics and administrative network, FODMS(1), FOIVCS, HSON, passive optical sensors, and analog and digital optoelectronic interfaces. Complete development of HSON concept and FODMS(1). Begin final-stage development of FO shipboard cable topology design.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

3. (U) FY 1994 PLANS: Continue development of advanced HM&E systems, components, materials, corrosion control techniques, coatings and shipboard salvage systems. LABEVAL HP air compressors and prototype standard composite centrifugal pumps, award Phase III contract, and prepare for SHIPEVAL. Start EDG SHIPEVAL, prepare for TECHEVAL and Acquisition Review Board. Initiate development of improved machinery for auxiliary modules. Complete ICCP design manual and extend ICCP techniques for major piping system, voids, and internal hull structures. Complete NDE technology development coatings. LABEVAL selected paints and coatings. Develop fly-away deep ocean salvage system, propeller-inspection system, underwater paint system, and friction welding system. Continue development of the FO (IC)2 system. Obtain MS III Decision IV FODMS(1).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NESEC, Vallejo, CA; NIST, Boulder, CO; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, D.C.; NAVSURFWARCEN DIV, Dahlgren, VA; NWS, Yorktown, VA; NAVSURWARCEN DIV, Crane, IN; NAVSEAWARCEN DIV, Newport, RI; NCCOSC RDTE DIV DET, Warminster, PA; NAVAIR WARCENACDIV, Lakehurst, NJ; NWAC, Corona, CA; NSCSES, Norfolk, VA. CONTRACTOR: American Systems Corp., Arlington, VA; Gibbs & Cox Inc., Arlington, VA; Planning Research Corp., Reston, VA; Rockwell International, Anaheim, CA; Dresser-Rand, Painted Post, NY; Westinghouse MTD, Pittsburgh, PA; GEO-CENTERS Inc., Fort Washington, MD; M. Rosenblatt & Sons, Arlington, VA; Labarge Electronics, Tulsa, OK; Rix Industries, San Francisco, CA; ElTech, Cleveland, OH; Mantech, Arlington, VA; Village Marine, Gardina, CA; Ingersoll Rand, Allentown, PA; Aurora Technology, East Aurora, NY; Hydropac, Erie, PA; Brunswick Corp., Lincoln, NE; Fibertek, Springville, UT; HLA Engineering, Dallas, TX; Specialty Plastics, Baton Rouge, LA. MIT, Boston, MA; G.P.C., Alexandria, VA; Battele Lab, Columbus, OH; Seward Marine, Norfolk, VA; TRW Inc., Cambridge, MA; Oceaneering Int'l, Morgran City, LA; Sperry Marine, Charlottesville, VA; Hughes Aircraft, Fullerton, CA; Atlantic Research Corp., Washington, D.C.; PRC, Washington, D.C.; Synetics, Washington, D.C.; Dynamic Systems Inc., Alexandria, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

F. (U) PROGRAM DOCUMENTATION:

OR	06/91285-03-92 Electrolytic Disinfectant Generator
OR	09/89S0382 Gaseous N2 Generator
OR	09/88S0382-31 400 Hz Current Limiting Device
NAPDD	11/86S0382-27 Shipboard Electrical System Ground Fault Locator
NAPDD	06/86S0382-18 Shipboard Corrosion Control
TEMP	11/85485-3 Variable Capacity Centrifugal Fire Pump
TEMP	11/85718-1 HP Single Screw Air Compressor
TEMP	11/85485-01 Standard Family Positive Displacement Pumps
TEMP	06/86106-5 Standard Family of Composite Pumps
TEMP	10/881156-01 Shipboard Salvage
OR	01/91277-03-91 FODMS(1)
OR	08/91289-03-91 FODMS(2)
OR	08/91288-03-91 Fiber Optic IVCS
NAPDD	06/90241-03 Shipboard FO Topology Development
NAPDD	02/91254-03 FO Sensor Standards/Specification
NAPDD	03/91255-03 (IC)2

G. (U) RELATED ACTIVITIES:

PE 0602121N, Surface Ship Technology
PE 0603721N, Environmental Protection - Heating, Ventilation and Air Conditioning system efforts to develop non-ozone depleting refrigerants transitioned to PE 0603721N in FY92.
PE 0603573N, ASMS - Closely coordinated to avoid redundant efforts for new systems and architectures.
PE 0603712N - Generic Logistics R&D Technology Demonstration - Biodegradable, non-polluting, anti-fouling, hull coating transitioned in FY93.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Category III (AFRP/AFLP) milestones for the following programs are as follows:

EDG	2QTR/94
VCCP Fire Pump	2QTR/94
HP Single Screw Compressor	2QTR/97
Standard PD Pump	2QTR/96
Standard Family of Composite Pumps	2QTR/96
Shipboard Salvage Systems	Various
Gaseous N2 Generator	4QTR/92
400 Hz Current Limiter	1QTR/97
Shipboard Corrosion Control	Various
FODMS(1)	4QTR/94
FODMS(2)	3QTR/96
Fiber Optics IVCS	4QTR/94
(IC)2 (NAPDD)	3QTR/97
Shipboard FO Topology (NAPDD)	4QTR/95
FO Sensor Stds/Spec (NAPDD)	2QTR/97
HSON Concept (NAPDD)	4QTR/93

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S1712 PROJECT TITLE: Hull, Mechanical & Electrical Improvement

C. (U) DESCRIPTION: This project develops improved equipments which are small but critical components of non-propulsion HM&E systems. The program is directed toward improved affordability, performance reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and manning reductions for existing and future fleet.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Analyze standard Positive Displacement (PD) pump family technical logistics requirements. LABEVAL Low Pressure (LP) membrane dehydrator engineering development model. Fabricated HP standard dehydrator. Initiated Glass Reinforced Plastic (GRP) valve fire and erosion tests. Identified GRP piping and valve fire coating insulation system, and established shock design guidance. Completed preliminary design for distributed firemain system analysis for advanced surface ship air system and HM&E aquisition life cycle cost affordability analysis. Initiated testing of non-asbestos friction material, helo hanger door, torpedo sealing system and other hull and deck machinery. Completed logistics analysis of integral horsepower motors, and safety approvals for maintenance free batteries. Completed SHIPTEST of TAG-195 power quality and LABEVAL of Permanent Magnet (PM) motors. Initiated Condition-Based Maintenance (CBM) concepts in auxiliaries. Designed and began fabrication of scale physical ship model for magnetic signature validation.

2. (U) FY 1993 PROGRAM: Continue development of Navy standard PD pump family, LP and HP membrane dehydrators, HP desiccant dehydrator SHIPEVAL, fire and shock hardened GRP piping and valves, advanced architectures, firemain and air systems. Support development of alternative gas turbine starting unit and improved machinery for modules. Continue development of helo hangar door and hull and deck machinery. Continue development and evaluation of ship magnetic model, composite shaft, PM motor, fuel cells and electrical auxiliaries.

3. (U) FY 1994 PLANS: Continue development of improved, standardized affordable HM&E equipment including standard PD pump family, membrane dehydrators, GRP fire and shock hardened piping valves, and machinery, advanced HM&E system architectures, machinery for modules, gas turbine starting technology, hull and deck machinery, advanced degaussing systems, composite shafts, fuel cells, TAG power quality and electrical auxiliaries.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCK DIV, Bethesda, MD; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCEN DIV, Crane, IN; NAVSURFWARCEN DIV, Port Hueneme, CA; NAVSURFWARCEN COASTSYSSTA, Panama City, FL. CONTRACTORS: Bend Research, Bend, OR; Sepeda Associates, Louisville, KY; NKF Associates, Arlington, VA; Aeroquip, Jackson, MI; Smith Fiberglass, Little Rock, AR; Gibbs & Cox, Arlington, VA; M. Rosenblatt & Son, Washington, D.C.; Westinghouse MTD, Pittsburgh, PA.

F. (U) RELATED ACTIVITIES: Program Element 0602121N Surface Ship Technology

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384	SHIP SURVIVABILITY (ADVANCED)	9,778	8,239	2,496	CONT.	CONT.
S1121	PERSONNEL PROTECTION	4,165	3,608	3,353	CONT.	CONT.
S1565	SHIP DAMAGE CONTROL (ADVANCED)	7,144	7,379	8,739	CONT.	CONT.
S2053	CBR DEFENSE	3,154	3,380	2,727	CONT.	CONT.
	TOTAL	24,241	22,606	17,315	CONT.	CONT.

B. (U) DESCRIPTION: The advanced development of equipment/systems/engineering data and full scale weapons effects simulation will provide protection of ships and their personnel from conventional, chemical, and biological weapon effects, and enable the ship to continue performing assigned missions at an effective level. This program is also concerned with the effects of fire, smoke, and lethal environments created by peacetime accidents and the development of fire protection and damage control capabilities necessary to limit, control, and correct wartime and peacetime casualty situations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S0384 PROJECT TITLE: Ship Survivability (Advanced)

C. (U) DESCRIPTION: This project undertakes development of protection concepts and specifications to meet the objectives that combatants be able to deal with the degrading effects of damage from torpedoes, and mines. Additionally, the lessons learned from the recent Persian Gulf experience demonstrated the need to: (1) improve the resistance of the hull girder and equipment/systems against underwater explosion (UNDEX) shock and whipping effects, and (2) provide uninterruptible shipboard power to ensure continuous combat capability.
(U) The Live Fire Test and Evaluation which requires realistic survivability testing of a fully configured system benifits through the development of these validated design procedures.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U)

b. (U) Initiated system check-out of dynamic armor test facility.
c. (U) Initiated development of UNDEX whipping resistant future surface combatant hull girder design options; began construction of scaled static models.
d. (U) Prepared for CG-68 Electromagnetic Pulse (EMP) trial.
e. (U)

2. (U) FY 1993 PROGRAM:
a. (U)

b. (U)

c. (U) Continue development of UNDEX whipping resistant future surface combatant hull girder design options; conduct scaled static model tests.
d. (U) Complete initial full scale testing of LIC armor systems.
e. (U) Complete EMP trial of CG-68.
f. (U) Initiate option definition for rapid fault clearing system which isolate multiple, simultaneous short circuits caused by ASM threats, providing for uninterruptible power.
3. (U) FY 1994 PLANS:
a. (U) Develop blast hardened door design requirements to minimize longitudinal propagation of internal blast, smoke, and fire from ASM threats.
b. (U) Complete assessment of UNDEX scaled static model test results. Finalize UNDEX resistant future surface combatant hull girder design options and begin construction of scaled whipping (dynamic) verification test models.
c. (U) Complete option definition for rapid fault clearing system; initiate advanced development of selected option.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, BETHESDA, MD; NAVSURFWARCENDIV Dahlgren, VA; U.S. Army Combat Systems Test Activity, Aberdeen Proving Grounds, Aberdeen, MD; CONTRACTORS: Gibbs & Cox, Arlington, VA.

F. (U) RELATED ACTIVITIES: Program Element 0604516N, Project S1828, Ship Survivability (Engineering).

G. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1121 PROJECT TITLE: Personnel Protection

C. (U) DESCRIPTION: Provides for design/development of shipboard personnel protective clothing and equipment to protect ship's complement from the effects of hostile actions and peacetime accidents.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Reached Milestone II on Firefighter's Breathing Apparatus (FFBA).
   b. (U) Transferred Auto-inflators for the MK-I life preserver on aircraft carriers to procurement phase for fleet outfitting.
   c. (U) Awarded an Engineering and Manufacturing Development Contract for Firefighter's Breathing Apparatus.
   d. (U) Transferred Surface Rescue Swimmer Safety Harnesses to procurement phase for fleet outfitting.
2. (U) FY 1993 PROGRAM:
   a. (U) Transfer Portable Breathing Air Device (PBAD) to procurement phase for fleet outfitting.
   b. (U) Transfer Auto-Inflatable Utility Life Preserver, Supplied Air Respirator, Naval Battle Helmets, and Naval Flak Vest to procurement phase for fleet outfitting.
   c. (U) Transfer Surface Rescue Swimmer Dry Suit and Supplementary Emergency Escape Device to procurement phase for fleet outfitting.
   d. (U) Reach Milestone II for Special Applications Firefighting Helmet with integral thermal imager.
3. (U) FY 1994 PLANS:
   a. (U) Conduct Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) for Firefighters Breathing Apparatus.
   b. (U) Begin engineering and manufacturing development of Special Application Firefighting Helmet with integral thermal imager.
   c. (U) Reach Milestone III on Fire Fighter's Breathing Apparatus (FFBA).
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NCTRF, Natick, MA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAMRL, Pensacola, FL. CONTRACTORS: G. Sharp, Inc., Arlington, VA; American Systems Engineering Corp., Alexandria, VA; Weidlinger Associates, New York, NY and Arlington, VA; JJH, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) Cosal Outfitting OPN LINE 239	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
	1,734	16,148	12,659	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565 PROJECT TITLE: Ship Damage Control (Advanced)

C. (U) DESCRIPTION: The Persian Gulf experience demonstrated the damaging effects of unexpended missile fuel causing compartment fire flashover and the difficulty in confining and extinguishing such fires. This project addresses solutions to wartime and peacetime fire and other damage control (DC) scenarios through the advanced development of improved equipment, devices, systems, materials, tactics and doctrine for rapid DC and recovery during peacetime operations and for mission retention in a post-hit situation. Specifically, by (1) conducting full scale tests of weapons induced fire damage, (2) developing passive and active systems, equipment and materials to rapidly contain and control damage, (3) developing improved DC sensors that provide enhanced data quality and quantity, (4) developing damage information collection, analysis and display systems that will assist in rapidly identifying the situation, prioritizing responses and allocating resources, and (5) developing reliable/survivable data communications between on-scene personnel, DC Central and repair lockers, and ship's command and control.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS

a. (U) Initiated land-based testing of multi-station Integrated Survivability Management Systems (ISMS) advanced development model.

b. (U) Initiated small scale and full scale fire tests to assess the organic fire hazard of shipboard materials.

c. (U) Completed development and initiated fleet introduction of 5 single-station ISMS systems.

d. (U) Conducted smoke and heat stress management full scale tests on the ex-USS SHADWELL.

2. (U) FY 1993 PROGRAM:

a. (U) Initiate at-sea evaluation of multi-station ISMS.

b. (U) Continue installation of single-station ISMS on existing ships.

c. (U) Continue assessment of organic fire hazard of shipboard materials.

d. (U) Complete testing of Non-Developmental Item portable firefighting pumps.

e. (U) Initiate assessment of metallic-sheathed electric cable for fuel load elimination.

3. (U) FY 1994 PLANS:

a. (U) Validate operation of single-station ISMS on selected ships.

b. (U) Invoke fire-tolerant shipboard materials improvements based on FY 93 assessment.

c. (U) Conduct large scale tests of fixed fine water mist fire extinguishing system; initiate preparation of specification.

d. (U) Initiate development of structural damage fire growth prediction/management, software, isolation, routing and personnel module for ISMS.

e. (U) Initiate design/development of continuous reading, individually addressable damage control sensors (fire, smoke, flooding).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN DET, Annapolis, MD; NCCOSC RDT&E DIV, San Diego, CA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia PA. CONTRACTORS: Hughes Associates, Inc., Wheaton, MD; Westinghouse MTD, Pittsburgh, PA; Weidlinger, Arlington, VA; M. Rosenblatt & Son, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: P.E. 0604516N - Project S2054 (Ship Damage Control (Engineering)).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S2053 PROJECT TITLE: CBR Defense

C. (U) DESCRIPTION: Conduct advanced development for demonstration and validation of Chemical, Biological and Radiological (CBR) defensive systems and concepts for surface ships to support the requirement to sustain operations in a CBR threat environment (Defense Planning Guidance (FY92-2007)). Systems developed will counter predicted new and novel threats into the next century as validated by NAVMIC CBR Threat Assessment (TA# 004-092).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued analysis and completed initial lab testing of a catalytic oxidation Advanced CBR Filtration System.

b. (U) Continued study of inherent contamination effects on Collective Protection System (CPS) filters and development of filter life prediction model.

c. (U) Completed initial studies and Cost & Operational Effectiveness Analysis (COEA) of Shipboard Automatic Liquid Agent Detector (SALAD).

d. (U) Completed initial hardware design of Interim Biological Agent Detection System (IBADS).

e. (U) Evaluated Individual Chemical Agent Detector (ICAD) for shipboard use.

f. (U) Completed review of revised requirements for Advanced Chemical Protective Garment (ACPG) and initiated joint program planning.

2. (U) FY 1993 PROGRAM:

a. (U) Continue design options analysis and lab testing for Advanced CBR Filtration Systems.

b. (U) Continue inherent contamination analysis of CPS filters.

c. (U) Complete MS I and conduct Technical Evaluation (TECHEVAL) of SALAD.

d. (U) Conduct TECHEVAL for IBADS.

e. (U) Complete evaluation of ICAD.

f. (U) Conduct review of operational requirements and initiate Cost and Operational Effectiveness Analysis (COEA) for Biological Agent Detection System (BADS).

g. (U) Review operational requirements and initiate COEA for Chemical Agent Remote Detection System (CARDS).

h. (U) Formalize a joint program for development of ACPG; support on-going TECHEVAL.

3. (U) FY 1994 PLANS:

a. (U) Complete design analysis and testing for Advanced CBR Filtration System.

b. (U) Complete CPS filter life prediction model.

c. (U) Complete MS I for BADS.

d. (U) Continue TECHEVAL for ACPG.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN DET, Annapolis, MD. CONTRACTORS: Battelle, Columbus, OH; Solar Turbine, San Diego,CA; Science and Technology, Corp., Hampton, VA; Brunswick Corp, Clearwater, FL; Environmental Tech. Group, Inc., Baltimore, MD;

F. (U) RELATED ACTIVITIES: Program Elements 0604516N, Project S0410, BR/CW, Countermeasures, and 0602233N, Mission Support Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603528N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Non-Acoustic ASW
PROJECT NUMBER: H0967 PROJECT TITLE: Non-Acoustic ASW

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0967	NAASW	0	0	13,999	4,663	18,662

B. (U) DESCRIPTION: The purpose of this program is to ensure that NAASW concepts are properly evaluated and exploited. The current scaled-down program focuses only on one technology which can be developed in the near term and promises to be effective against very quiet submerged diesel submarine independent of target speed, and other submerged objects. The technology is a (Project ATD-111).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable: (The President's FY-92 Budget Submit for PE 0603528N/X097 ($26.2M) was zeroed by Congress. Congress directed that PE 0603714D (the OSD NAASW program) provide funding for one effort within X0967, Project ATD 111. Efforts within X0967 other than Project ATD 111 were all terminated during FY-92

(PE 0603714D provided $10M in FY-92 to Project ATD 111, leading to the following accomplishments.

a. (U) All efforts other than Project ATD 111 terminated. SPAWAR Program Office disestablished, and Project ATD 111 transferred to NAVAIRSYSCOM.
b. (U) Integration of all Project 111 configuration items completed at contractor site.
c. (U) Initiated Project 111 component upgrades necessary for technology evaluation.)

2. (U) FY-93 Program: Not applicable. (The President's FY-93 Budget Submit for PE 0603528N/X0967 (12.9M) was zeroed by Congress. Congress again directed PE 0603714D to provide funding for Project ATD 111. OSD provided $12.9M of FY-93 funds, which supports the following program:

a. (U) Contractor testing of two Project ATD 111 demonstration systems.
b. (U) Government acceptance of two demonstration systems.
c. (U) Begin proof-of-concept testing.
d. (U) Continue development and begin integration of component upgrades.)

3. (U) FY 1994 PLANS:
a. (U)
b. (U)
c. (U)

4. (U) PROGRAM TO COMPLETION:
a. (U)
b. (U)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603528N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Non-Acoustic ASW
PROJECT NUMBER: H0967 PROJECT TITLE: Non-Acoustic ASW

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCENACDIV, Warminster, PA; NRL SSC, Stennis Space Center, MS; NSWCCOASTSYSTA, Panama City, FL. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; Lockheed Sanders Inc., Nashua, NH; ARETE Associates, Sherman Oaks, CA; Lawrence Livermore National Laboratory, Livermore, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: ATD-111 is on an accelerated schedule to be completed in FY-95.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Non-Acquisition Program Definition Document #033-02 (REV 1) dated 05 November 1991.

2. (U) Tentative Operational Requirements (TOR) for LAMPS SH-2F/G and SH-60B Light Detection and Ranging (LIDAR) dated 14 September 1990.

G. (U) RELATED ACTIVITIES:

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) MILESTONE SCHEDULE:

1. (U) Initial ATD-111

2. (U) Fleet ASW exercises for Project ATD-111

3. (U) Integrate Project ATD-111 Upgrades

4. (U) Project ATD-111 Upgrades field test

5. (U) Project ATD-111 Engineering and Field Test.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Radiological Control

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1825	Radiological Controls	192	212	75	CONT.	CONT.
S1830	RADIAC Development	2,665	3,387	3,216	CONT.	CONT.
TOTAL		2,857	3,599	3,291	CONT.	CONT.

B. (U) Description: Project S1825 supports two major Navy-wide radiation protection efforts. The first is development of a computer modeling program for estimating potential radiation exposures in and around nuclear weapons and other radiation sources suitable for personal computers. The program Mathematical Radiation Environment Model for Ships (MREMS) utilizes all known radiation parameters particular to a weapons system as well as composition and arrangement of intervening structures. Although initially intended for use as a shipboard radiation exposure prediction system, MREMS has a significantly more important role today as a valid means for estimating potential radiation exposures received from weapons systems, and other sources of ionizing radiation, in radiation injury claims. MREMS has applicability to other sources of ionizing radiation (enter the intrinsic radiation data and composition of the surrounds) as well as for use by other military services. This project also concerns refinement of neutron measurement from weapons and other industrial sources involving scientific laboratory/field testing. The importance of this effort is that the relative risk from neutron exposure is still a question of concern and uncertainty within the scientific community. Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. The Laser Heated Thermoluminescent Dosimetry (LHTLD) System will be able to meet draft NRC regulations and will provide sensitive measurements down to the levels required to meet all new and imminent health and safety requirements. The Multifunction RADIAC will cut calibration costs by up to 75% and reduce the requirements for spare parts by 85% when all older technology equipment is replaced. New requirements for the measurement of lower tritium and neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service applicability.

1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1825 PROJECT TITLE: Radiological Controls

C. (U) DESCRIPTION: Development of computer modeling program "Mathematical Radiation Environment Model for Ships" (MREMS) for estimating radiation exposure levels from nuclear weapons onboard ships (past and present), in shore storage, and from sources other than weapons. Refine neutron measurement capabilities of Navy dosimetry from weapons and other industrial sources.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Provided requested correction factors for DT648 dosimeter.

b. (U) Completed Trident II study.

c. (U) Developed "parallel architecture" to run MREMS on personal computer.

2. (U) FY 1993 PROGRAM:

a. (U) Verify transport parameters and weapons output database for MREMS.

b. (U) Continue development/refinement of "parallel architecture" for MREMS.

c. (U) Initiate evaluation of small neutron fields in high gamma fields associated with linear accelerator/x-ray machines.

d. (U) Initiate evaluation of unique neutron measurement methodologies (i.e., "bubble" dosimetry).

3. (U) FY 1994 PLANS:

a. (U) Complete verification of transport parameters and weapons output data base for MREMS.

b. (U) Continue limited study of linear accelerator radiation field characterization.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: NAVSURFWARCEN WHITE OAK DET SILVER SPRING MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1830 PROJECT TITLE: RADIAC Development

C. (U) Description: Project S1830 involves the development of micro-processor based instrumentation. The Laser Heated Thermoluminescent Dosimetry (LHTLD) System will provide better capability, sensitivity and accuracy than current systems. The Multifunction RADIAC will consolidate the Navy's RADIAC survey meter requirements by using a general purpose display box with a number of calibrated probes instead of buying numerous special purpose instruments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed evaluation of Dem/Val models for the Multifunction RADIAC (MFR) System.

b. (U) Awarded option for Engineering and Manufacturing Development (EMD) Phase for MFR System.

c. (U) Completed evaluation of EMD Phase I model for LHTLD System.

2. (U) FY 1993 PROGRAM:

a. (U) Complete development of basic MFR System (display unit and gamma/beta probe).

b. (U) Continue development of other MFR probes.

c. (U) Build 125 field models of basic MFR System.

d. (U) Complete EMD Phase II and start EMD Phase III of LHTLD System.

3. (U) FY 1994 PLANS:

a. (U) Resume development of Underwater RADIAC field prototype.

b. (U) Resume development of EOD Personal Dosimeter.

c. (U) Resume development of Neutron Dosimetry System.

d. (U) Complete Phase III of LHTLD System

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; Oak Ridge National Labs, Oak Ridge, TN; and NAVSEASYSCOM, Washington, D.C. CONTRACTORS: IST, Inc., Spokane, WA; SAIC, San Diego, CA; and Sorrento Electronics, San Diego, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATIONS FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0229	Surface Ship Silencing	6,831	5,927	0	0-	71,798
V1704	ASW Advanced Development	59,082	40,679	21,150	CONT.	CONT.
	TOTAL	65,913	46,606	21,150	CONT.	CONT.

B. (U) DESCRIPTION: This program develops surface anti-submarine warfare combat system. The ASW Advanced Development Project develops technology for surface ship ASW systems improvements, supporting sea tests for AN/ SQQ-89 sensor and combat control improvements and development/evaluation of a Stand Alone Low Frequency Active Sonar (SALFAS) prototype.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare
PROJECT NUMBER: V1704 PROJECT TITLE: ASW Advanced Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1704	ASW Advanced Development	59,082	40,679	21,150	CONT.	CONT.

B. (U) DESCRIPTION: This project provides for the advanced development and validation of technology for ongoing surface ship ASW system improvement programs and emerging ASW combat systems such as Stand Alone Low Frequency Active Sonar (SALFAS). It supports the continuing development of:

submarine threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed SALFAS subsystem specifications.

b. (U) Completed array interaction and cavitation assessments.

c. (U) Initiated Multi-Line Towed Array (MLTA) performance improvements, i.e.,

d. (U) Completed Multistatic Sonar System (MSS) Advanced Development Model (ADM) transducer prototype.

e. (U) Conducted MSS Proof of Principle (POP) Convergence Zone (CZ) and USNS GLOVER/USS STUMP Side x Side Sea Trials.

f. (U) Initiated clutter reduction and Pseudo Random Noise (PRN) waveform analysis.

g. (U) Completed mid-frequency active classification processor sea trial aboard USS ALWYN.

h. (U) Completed integration of multiplatform data fusion algorithm and conducted shore-based and at-sea demonstrations.

i. (U) Completed fabrication of mechanical system and test enclosure development for the Long Line Hydrophone Calibration (LLHC) system.

2. (U) FY 1993 PROGRAM:

a. (U) Initiate fabrication of SALFAS transmitter subsystem transducers.

b. (U) Conduct MSS POP Duct and Convergence Zone Sea Trial.

c. (U) Conduct Phase II contact management ADM sea trial demonstration.

d. (U) Initiate LLHC system/facility integration.

e. (U) Integrate combined Single Target Classifier software into mid-frequency active classification processor test bed for at-sea evaluation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare
PROJECT NUMBER: V1704 PROJECT TITLE: ASW Advanced Development

f. (U) Conduct Reconfigurable Multiline Evaluation System (RMES) shallow water modifications and evaluation.

g. (U) Conduct hydrodynamic prototype tow body tests.

3. (U) FY 1994 PLANS:

a. (U) Continue design and development of SALFAS transmit, receive, and display/control subsystem prototypes.

b. (U)

c. (U)

d. (U) Award contracts for the 3 SALFAS subsystem; transmitter, receiver, display/control.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET, New London, CT; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC and Orlando, FL. CONTRACTORS: Johns Hopkins University, Laurel, MD; University of Texas, Austin, TX; Martin Marietta, Glen Burnie, MD; Orincon Inc., La Jolla, CA; ESL Inc., Sunnyvale, CA; Hughes Ground Systems, Buena Park, CA; EDO Inc., NYC, NY; Raytheon, Portsmouth, RI; Instruments Inc., Los Angeles, CA; Alliant Techsystems, Mukilteo, WA; TRW, Fairfax, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Technology developments in the following areas will be deferred indefinitely: Multistatic Sonar, Long Line Hydrophone Calibration, upgrades to the RMES array, Low Frequency Transmit (LFT) Component development, LFT array modeling and mid-frequency active classification. A project for the development of a Stand Alone Low Frequency Active Sonar Prototype was initiated.

2. (U) Schedule changes: Sub-project deferments listed in paragraph E.1.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD 154-03 of 20 July 1992.

G. (U) RELATED ACTIVITIES: PE 0602314N Undersea Surveillance and Weapons Technology, undersea warfare exploratory development block programs.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare
PROJECT NUMBER: S0229 PROJECT TITLE: Surface Ship Silencing

C. (U) DESCRIPTION: Surface ship acoustic quieting provides for the development and at-sea demonstration of quieting techniques to reduce ASW surface ship active and passive sonar self-noise, ship radiated noise, and shipboard machine-generated airborne noise. Projects are directed toward increasing own ship survivability against a variety of acoustic threats, including acoustic quieting as a mine countermeasure and improving sensor performance by reducing the interference impact on our own force's sensors due to platform and battle force generated noise.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed plans for diagnostic evaluation of CG 47 Class Ship.

b. (U)

c. (U)

2. (U) FY 1993 PROGRAM:

a. (U)
combatant.

b. (U)

3. (U) FY 1994 PLANS: Not applicable.

4. (U) FY 1995 PLANS: Not applicable.

5. (U) PROGRAM TO COMPLETION: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVUNSEAWARCEN DET, New London, CT;. CONTRACTORS: ARL/PSU, State College, PA; Epoch Engineering, Gaithersburg, MD; BBN, Cambridge, Mass.

F. (U) RELATED ACTIVITIES: PE 0604561N, SSN-21 Development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603555N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Undersea Superiority Technology Demonstration
PROJECT NUMBER: R2142 PROJECT TITLE: Undersea Superiority Technology Demo

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2142	Sea Control and Littoral Warfare Technology Demo	0	61,029	95,438	CONT.	CONT.

B. (U) DESCRIPTION: This program focuses significant science and technology resources in the Undersea Warfare thrust area, conducting Advanced Technology Demonstrations (ATDs) in three major areas:

1. (U) MINE COUNTERMEASURES: Demonstrates high payoff technologies for mine avoidance and neutralization, with emphasis on shallow water and surf/beach zone areas in support of amphibious operations. FY 1993-start ATDs are: EXPLOSIVE NEUTRALIZATION - Integrated distributed explosive nets and improved line charges to neutralize surf/beach zone mines from sea-borne platforms instride; ADVANCED LIGHTWEIGHT INFLUENCE SWEEP GEAR - Modular, lightweight, high speed influence sweep system to neutralize mines using payload limited platforms; ADVANCED DEGAUSSING TECHNOLOGY - Improved ship magnetic signature control. Planned FY 1994-start ATDs are: (1) SEMI-AUTONOMOUS UNDERSEA VEHICLE (SAUV) - uses advanced vehicle and sensor technologies to provide clandestine shallow water reconnaissance and remote marking/neutralization of mines and obstacles; and (2) AIRBORNE MINE RECONNAISSANCE - Tests advanced image acquisition and processing technologies to detect mines/obstacles in very shallow water and beach zone. Initial focus will be test of baseline Magic Lantern Adaptation (ML-A) system developed in PE 0603782N.

2. (U) SHALLOW WATER ANTI-SUBMARINE WARFARE: Demonstrates new approaches to detecting submarines, including unconventional acoustic and non-acoustic sensors. The principal objective is to significantly enhance shallow water Anti-Submarine Warfare (ASW) capabilities associated with potential regional conflicts. Ongoing ATDs are: AIRBORNE PERISCOPE DETECTION, ACTIVE CLASSIFICATION AND PROCESSING, and SHIPBORNE PERISCOPE DETECTION. Planned FY 1994-start ATD is UNMANNED UNDERSEA VEHICLE (UUV) SURVEILLANCE SYSTEM.

3. (U) AFFORDABLE SUBMARINE TECHNOLOGY: Develops and demonstrates technologies which will significantly reduce cost and increase capability of future submarines. The effort will focus on the highest payoff areas of hull, mechanical, and electrical (HM&E) systems and new construction techniques which require demonstration before they can be considered in a submarine design. Major emphasis will be placed on technologies providing affordable signature reduction. The ongoing ATD is ADVANCED VIBRATION REDUCER (AVR). Planned FY 1994-start ATD is SUBMARINE MACHINERY CRADLE.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM:

a. (U) EXPLOSIVE NEUTRALIZATION -- Initiate development of explosive arrays, deployable from Amphibious craft for surf zone and beach clearance. Perform motion and control testing of demonstration platform (LACV-30). Develop end-to-end effectiveness model. Acquire test platform.

b. (U) ADVANCED LIGHT WEIGHT INFLUENCE SWEEP GEAR -- Conduct mission/threat analysis. Prepare system analysis and trade-off plan. Award contracts for acoustic and magnetic components.

c. (U) ADVANCED DEGAUSSING TECHNOLOGY -- Initiate ATD to develop advanced magnetic signature reduction techniques for both Mine Countermeasures (MCM) ships and steel hulled combatants.

d. (U) AIRBORNE PERISCOPE DETECTION -- Initiate advanced non-acoustic ASW sensor development efforts to exploit the greatest vulnerability of the threat diesel submarine, mast/periscope exposure. Modify profile radar test bed for collection of clutter and target data. Collect data from shore site. Initiate data analysis and radar system modeling.

e. (U) ACTIVE CLASSIFICATION AND PROCESSING -- Initiate acquisition of Automated Situationally Adaptive Classifier (ASAC) from industry. Initiate development of high fidelity acoustic model. Initiate special studies from industry, Advanced Research Project Agency (ARPA) and Navy 6.2 and 6.3 communities via Broad Agency Announcement (BAA) and other means.

f. (U) SHIPBORNE PERISCOPE DETECTION -- Initiate ATD, complementary to Airborne Periscope Detection, but exploiting alternative technical approaches suitable for low grazing angle surface ship application. Laser and infrared sensors will be used in addition to radar.

g. (U) AVR -- Complete final design of AVR hardware/system. Begin fabrication of full scale AVR hardware/system and Land Based Test Facility (LBTF).

h. (U) Begin planning for FY 1994 start ATDs. Initiate modelling and simulation efforts to evaluate warfighting payoff of current and planned ATDs.

3. (U) FY 1994 PLANS:

a. (U) EXPLOSIVE NEUTRALIZATION -- Deploy inert explosive arrays and fuzing. Deliver finalized rocket designs. Bench test fire control hardware. Initiate launch control algorithm development.

b. (U) ADVANCED LIGHT WEIGHT INFLUENCE SWEEP GEAR -- Fabricate and test acoustic and magnetic components. Start acoustic and magnetic subsystem procurement packages.

c. (U) ADVANCED DEGAUSSING -- Continue work on reduced ship magnetic signatures.

d. (U) AIRBORNE PERISCOPE DETECTION -- Collect data from P-3 aircraft in littoral areas. Complete data analysis. Initiate brassboard system development.

e. (U) ACTIVE CLASSIFICATION AND PROCESSING -- Award ASAC contract to industry. Initiate concept development phase. Complete high fidelity acoustic model. Continue development in special studies areas to be completed in FY 1995.

f. (U) SHIPBORNE PERISCOPE DETECTION -- Complete prototype system design and component selection.

g. (U) AVR -- Complete fabrication of AVR system/hardware and LBTF.

h. (U) SAUV -- Initiate ATD to develop advanced unmanned underwater vehicle for clandestine mine detection and neutralization in shallow water.

i. (U) AIRBORNE MINE RECONNAISSANCE -- Perform test site preparation, including a variety of realistic beach environments. Initiate testing of ML-A baseline system. Initiate algorithm and signal processing development needed for advanced surf zone mine detection systems.

j. (U) UUV SURVEILLANCE SYSTEM -- Initiate development of system for covert deployment of surveillance array from UUV.

k. (U) MACHINERY CRADLE -- Initiate demonstration of new submarine construction techniques to achieve affordable signature control and shock resistance.

l. (U). Select and begin planning for FY 1995 start ATDs. Continue modelling and simulation efforts to evaluate warfighting payoff of current and planned ATDs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN, Norfolk, VA; NAVAIRWARCENACDIV, Warminster, PA; NAVUNSEAWARCEN, Newport, RI and New London, CT; NAVSURFWARCEN, Bethesda, MD/Annapolis, MD/Silver Spring, MD/ Panama City, FL/Dahlgren, VA/Indian Head, MD; NRL, Washington, DC; NAVAIRWARCEN, Warminster, PA/Patuxent River, MD/China Lake, CA. CONTRACTORS: ERIM, Ann Arbor, MI; Rockwell International, Location TBD; Marquest Corp, Location TBD;

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603555N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Undersea Superiority Technology Demonstration
PROJECT NUMBER: R2142 PROJECT TITLE: Undersea Superiority Technology Demo

MITRE Corp., Reston, VA; Woods Hole Oceanographic Institute, Woods Hole, MA; ARL University of Texas, Austin, TX; AT&T, Washington, DC/Whippany, NJ; Newport News Shipbuilding, Newport News, VA; APL/JHU, Laurel, MD; Sandia National Laboratory, Albuquerque, NM; ARINC, Panama City, FL; Tetra Corporation, Albuquerque, NM; Lawrence Livermore National Laboratory, Palo Alto, CA; others TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Definition Documents (NAPDDs) are being prepared for each task.

G. (U) RELATED ACTIVITIES: PE 0602131M, Marine Corps Landing Force Technology; PE 0603569E, Advanced Submarine Technology; PE 0603226E, Experimental Evaluation of Major Innovative Technologies; PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602315N, MCM, Mining and Special Warfare Technology; PE 0602323N, Submarine Technology; PE 0602435N, Oceanographic and Atmospheric Technology; PE 0603502N, Undersea Warfare and MCM Development; PE 0603528N, Non-Acoustic ASW; PE 0603561N, Advanced Submarine System Development; PE 0603747N, Advanced ASW Technology; PE 0603782N, Shallow Water MCM Demos, PE 0604784N, Distributed Surveillance System.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:
1. (U) EXPLOSIVE NEUTRALIZATION - Initiates FY 1993
2. (U) ADVANCED LIGHT WEIGHT INFLUENCE SWEEP GEAR - Initiates FY 1993
3. (U) ADVANCED DEGAUSSING TECHNOLOGY - Initiates FY 1993
4. (U) AIRBORNE PERISCOPE DETECTION - Initiates FY 1993
5. (U) ACTIVE CLASSIFICATION AND PROCESSING - Initiates FY 1993
6. (U) SHIPBORNE PERISCOPE DETECTION - Initiates FY 1993
7. (U) AVR - Transition to Navy from ARPA in FY 1993
8. (U) SAUV - Initiates FY 1994
9. (U) MINE RECONNAISSANCE - Initiates FY 1994
10. (U) UUV SURVEILLANCE SYSTEM - Initiates FY 1994
11. (U) MACHINERY CRADLE - Initiates FY 1994

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2033	Adv Sub Sys Dev	17,660	11,633	23,754	- CONT.	CONT.
F2034	R&D Sub	17,318	25,660	28,146	CONT.	CONT.
F2177	New Design SSN EM&E	23,000	90,800	90,168	CONT.	CONT.
	TOTAL	57,978	128,093	142,068	CONT.	CONT.

B. (U) DESCRIPTION: This program supports revolutionary research and developments in submarine technologies and their evaluation and demonstration on a submarine platform. This program will increase the application of the submarine technology base and provide subsystem design options not currently feasible. Project F2033 identifies the most promising and emerging technologies and transitions them into specific advanced development efforts. The program transitions technologies developed by Navy technology bases, the private sector, and the ARPA Undersea Warfare Office; and conducts an SSN Security Program (SSP) to develop techniques and devices that decrease the detection vulnerability of attack submarines. All advanced systems developed under this program have potential to support SSN systems improvements or a future new design. The emphasis is directed toward affordability, acoustic and non-acoustic signature control technology (stealth) and/or safety alternatives for attack submarines. Project F2034 provides resources to convert an attack submarine to a dedicated R&D platform without loss of mission capability. This will provide for a dedicated at-sea platform for testing and evaluating advanced systems technologies applicable to existing and the next generation SSN.

(U) Project F2177 has been formally broken out from F2033 for the new attack submarine (NAS) (CENTURION). The primary goal of the program will be to develop an affordable yet capable submarine by evaluating a broad range of system technology alternatives and examining cost reduction, producibility improvement and technical risk reduction.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2033	Adv Sub Sys Dev	17,660	11,633	23,754	CONT.	CONT.

B. (U) DESCRIPTION: This program supports revolutionary research and developments in submarine technologies, increases the application of the submarine technology base and provides subsystem design capabilities not currently feasible. The project transitions the most promising and emerging technologies developed by Navy technology bases, the private sector, and the Advanced Research Projects Agency (ARPA) Maritime Systems Technology Office into specific advanced development efforts; and conducts SSP to develop techniques and devices that decrease the detection vulnerability of attack submarines. All systems developed in this program have potential to support emerging requirements and systems technology insertions into new submarine designs. The emphasis is directed toward affordability, acoustic and non-acoustic signature control technology (stealth) and/or safety alternatives for attack submarines.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated: transition of ARPA & Office of Naval Technology (ONT) Submarine Advanced Electric Drive technologies (current collector motor and hydrodynamic flow test articles) leading toward a large scale prototype demonstration.

b. (U) Continued: demonstration of SUPRELITE Phase I (aft item) at-sea; utilization and support for the Large Scale Vehicle (LSV).

c. (U) Completed: two critical sea trials for Low Frequency Active Acoustics (LFAA) under SSP.

2. (U) FY 1993 PROGRAM:

a. (U) Initiate: fatigue test efforts associated with SUPRELITE Phase II; concept integration studies (e.g., integrated stern).

b. (U) Continue: design of submarine advanced electric drive system and critical components (including contracting for component manufacturing); utilization and support for the LSV.

c. (U) Complete: transition of ARPA Submarine Hydro Tech Center (SH/HTC); one Pacific and one Mediterranean extended echo range test of LFAA under SSP (target strength sea trials); transitioned all NAS systems development to F2177.

3. (U) FY 1994 PLANS:

a. (U) Initiate: development of design and modeling procedures to address hydrodynamic issues integral to submarine modernization and future ship designs (e.g., code certifications and design tool integration); development of automated submarine operational control; development of low signature sail; concept development studies of affordable advanced propulsor technologies; development of a scaled electrical distribution system and computer models to demonstrate and validate various applications of Mos Controlled Thyrister technology (e.g., circuit breakers, bus transfer switches, power converters and

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

conditioners); begin advanced planning for LSV overhaul; development of advanced shaftless pump technology; develop shallow water oceanography tactical module under SSP.

b. (U) Continue: LSV utilization and support (testing candidate propulsors for NAS, acoustic/non-acoustic detectability, and SEAWOLF propulsor performance validation; development and manufacturing of submarine advanced electric drive critical components (including completion of ship system impact assessment); fatigue test efforts associated with SUPRELITE phase II; use of SH/HTC to develop improvements to current and future submarine designs; concept integration studies.

c. (U) Complete: one extended echo range test of LFAA under SSP; replacement of LSV main propulsion battery.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN CARDEROCKDIVDET, Bayview, ID; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVUNSEAWARCENDIV, Newport, RI; PNSY, Portsmouth, NH; CONTRACTORS: General Dynamics, EBDiv, Groton, CT; Newport News Shipbuilding, Newport News, VA; ARL/Penn State, State College, PA; APL/Johns Hopkins Univ., Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: The following programs were deferred until FY 1994: hydrodynamic modeling, composite applications (formerly composite stern/bow), shaftless pump, advanced electrical distribution system, advanced propulsors technology transition (formerly advanced propulsor ATD transition), and submarine operational automation system. The advanced submarine electric drive program continued with an FY 1993 descoped effort.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Decision Document for Advanced Submarine Systems Development (NAPDD Ser 912I/2U537839 of 15 May 92).

G. (U) RELATED ACTIVITIES:
PE 0603569E, ARPA Advanced Submarine Technology Program
PE 0604558N, New Design SSN Development
PE 0603504N, Advanced Submarine Combat Systems Development
PE 0603562N, Submarine Tactical Warfare Systems
PE 0603570N, Advanced Nuclear Power Systems
PE 0603502N/V2094, Unmanned Undersea Vehicle
PE 0603555N, Undersea Superiority Technology Demonstration
PE 0603792N, Advanced Technology Demonstrations.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:
Transitioned ARPA SH/HTC to Navy Management (Jan 93)
SSN LFA operational processor at-sea demonstration (Sep 95)
Advanced submarine electric drive 3000 hp prototype performance tests (Jul 97)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: F2034 PROJECT TITLE: R&D Submarine

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2034	R&D Sub	17,318	25,660	28,146	CONT.	CONT.

B. (U) DESCRIPTION: This project provides resources to convert an attack submarine to a dedicated R&D platform without loss of mission capability. This will provide for a dedicated at-sea platform for testing and evaluating advanced systems technologies applicable to existing and the next generation SSNs. Developments from Navy, ARPA, and industry will be accommodated. Additionally, the attack submarine will be modified to significantly enhance its ability to accommodate multiple, high payoff technologies. Modifications include a turtleback to house external components, a reconfigurable stern, a large access opening, an instrumentation system and test center and penetrations to support project equipment installations. The R&D submarine will maintain its warfighting capability in addition to a principal mission of supporting submarine R&D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated: prefabrication of the following modifications: large diameter torpedo tube and control system, large diameter weapon handling system, bolted stern section, special advanced rheological fluid system, outboard assembly of the large diameter torpedo tube, and large access hatch.

b. (U) Continued: procurement of long lead time material; prefabrication of the instrumentation system; integration of the modifications into overhaul work package; R&D project evaluations as part of the R&D Submarine Program.

c. (U) Completed Critical Design Review in Mar 92.

2. (U) FY 1993 PROGRAM:

a. (U) Continue: submarine modification detailed design effort as modified by the termination directive; procurement of remaining long lead time material; prefabrication of modifications in progress; R&D project evaluations as part of the R&D Submarine Program.

b. (U) Complete: prefabrication of the large access hatch and ship it to Portsmouth Naval Shipyard (PNSY); integration of the modifications into overhaul work package.

c. (U) Terminate fabrication and delete installation of large diameter torpedo tube, large diameter weapon handling system and the special rheological fluid systems.

3. (U) FY 1994 PLANS:

a. (U) Initiate overhaul and modification installation.

b. (U) Continue R&D project evaluations as part of the R&D Submarine Program.

c. (U) Complete: detailed design of the modifications; procurement of modification material; prefabrication of all modifications except for the In-port enclosure.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: P2034 PROJECT TITLE: R&D Submarine

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVUNSEAWARCEN DET, New London, CT; NAVUNSEAWARCENDIV, Newport, RI; PNSY, Portsmouth, NH; NNSY, Portsmouth, VA; SUBMEPP, Portsmouth, NH; CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Rosenblatt, NY, NY; J.J. McMullen, Arlington, VA; CASDE, Arlington, VA; Westinghouse Machinery Technology Division (MTD), Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Installation of the large diameter torpedo tube, large diameter weapon handling system and the advanced rheological fluid system were terminated.

2. (U) SCHEDULE CHANGES: Ship modification completion date of July 1996 vice January 1997 due to technology changes.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
CNO letter ser 00/8UR00204 of 11 May 1988.

G. (U) RELATED ACTIVITIES:
PE 0603569E, ARPA Advanced Submarine Technology Program
PE 0603504N, Advanced Submarine Combat Systems Development
PE 0603570N, Advanced Nuclear Power Systems
PE 0604503N, Submarine System Equipment Development
PE 0604561N, SSN-21 Development
PE 0604562N, Submarine Tactical Warfare System
PE 0604567N, Ship Contract Design/Live Fire T&E

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:
Commenced modification prefabrication (Jun 91)
Conducted critical design review (Mar 92)
Commence ship modification (Jan 94)
Design data delivered (Mar 94)
Complete prefabrication (Dec 94)
Complete ship modification (Jul 96)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: F2177 PROJECT TITLE: New Design SSN HM&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2177	New Design SSN HM&E	23,000	90,800	90,168	CONT.	CONT.

B. (U) DESCRIPTION: This project provides critical alternative technologies to the CENTURION Submarine design to enable an affordable, capable submarine. Efforts in FY 1992 and 1993 focused on platform concept and technology evaluations and cost effectiveness studies to identify where substantial affordability gains could be achieved. In addition, submarine systems with long lead time developments initiated concept studies and preliminary testing to establish a technical basis for ship designs and major system development. Efforts in FY94 and outyears are directed at maturing the promising technology alternatives to existing submarine systems to permit transition to Engineering Development (6.4). These efforts are highly integrated with industry, shipbuilder and related DoD R&D programs to provide technical confidence in HM&E technologies being selected during the CENTURION design process.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated: concept design/technology option studies (for Milestone 0) and cost and operational effectiveness analysis (COEA) for NAS; engineering trade off studies for NAS propulsor & main propulsion unit (MPU).

b. (U) Continued: development of prototype composite main propulsion shaft; development of advanced non-acoustic silencing technologies.

c. (U) Completed: Milestone 0 for NAS (8/92); transition and demonstration of ARPA Non-Penetrating Periscope (NPP); canceled Electromagnetic Launch Advanced Technology Demonstration (EML ATD).

2. (U) FY 1993 PROGRAM:

a. (U) Initiate: advanced development of NAS HM&E systems (e.g., MPUs; propulsors; modularized deck structures; acoustic signature and hydrodynamic modeling technologies; non-chlorofluorocarbon (CFC) air conditioning and refrigeration plant development; evaluation of pressure hull design criteria and no forward planes concept; automated safety systems feasibility; reduced cost auxiliary systems); validation of analytical modeling techniques for hull dynamic strength; transition of ARPA, ONR, and other R&D initiatives for hull coatings into an integrated development plan; evaluation of alternative ship control technologies; shock isolation devices development; reverse osmosis distilling unit demonstration.

b. (U) Continue: development of gas generator emergency main ballast tank blow system; development of advanced non-acoustic silencing technologies; procurement of electromagnetic (EM) signature portable range in support of the non-acoustic silencing program; development of prototype composite main propulsion shaft; evaluation of enhanced tube condensers

c. (U) Complete: concept design studies and performance/cost tradeoffs for NAS in cooperation with industry, shipyards and Navy laboratories to support Milestone I approval; demonstration of NPP on the R&D Submarine.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1739	Submarine Arctic Warfare Development	6,882	7,006	5,882	CONT.	CONT.
F0770	Advanced Submarine Support Equipment Program (ASSEP)	*4,588	*3,940	3,636	CONT.	CONT.
TOTAL		11,470	10,946	9,518	CONT.	CONT.

B. (U) DESCRIPTION: The Submarine Tactical Warfare Systems program element is comprised of the Submarine Arctic Warfare Development Program and the Advanced Submarine Support Equipment Program. The overall goal of the program is to improve submarine operational effectiveness through the development of advanced Research and Development (R&D) and Electronic Support Measures (ESM) technologies.

Improvements in ESM technology are of vital importance to counter the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex communications, navigation, and radar equipment provided to potential adversaries.

*NOTE: F0770 funded under PE 0603522N in FY 1992 and FY 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: V1739 PROJECT TITLE: Submarine Arctic Warfare Development

C. (U) DESCRIPTION: This program responds to the continuing threat of through the development of advanced submarine capabilities and concepts. It places particular emphasis in the areas of

Efforts include assessment of

This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the Arctic region.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Conducted Ice Exercise (ICEX) 1-92 and planned ICEX 1-93.
   b. (U) Tested
   c. (U) Developed
   d. (U) Began Ice Penetration Model Two (IPM-2) testing at Cold Regions Research and Engineering Laboratory (CRREL).

2. (U) FY 1993 PROGRAM:
   a. (U) Conduct ICEX 1-93 and plan ICEX 1-94.
   b. (U) Conduct
   c. (U) Conduct
   d. (U) Complete IPM-2 testing.
   e. (U) Evaluate concepts for
   f. (U) Begin development of

3. (U) FY 1994 PLANS:
   a. (U) Conduct ICEX 1-94 and plan ICEX 1-95.
   b. (U) Complete and test ETS Phase Ia (ice thickness capability).
   c. (U) Continue development of
   d. (U) Develop EXUS integrated IT transducer.
   e. (U) Develop experimental RDS System and prepare for ICEX-95 RDS tests to define propagation ranges and underway ship to ice plate coupling.
   f. (U) Complete ICEX 1-93 analysis of platform response data and validate finite element procedures.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, KEYPORT, WA; NAVUNSEAWARCENDIV, NEWPORT, RI; NAVUNSEAWARCEN DET, NEW LONDON, CT; NAVSURFWARCEN CARDEROCKDIV, BETHESDA, MD; NRL, WASHINGTON DC. CONTRACTORS: APL-University of Washington, Seattle, WA; Analysis and Technology, Inc., North Stonington, CT; ARL-University of Texas, Austin, TX.

F. (U) RELATED PE ACTIVITIES: (a) PE 0602323N Submarine Technology and PE 0602435N Ocean and Atmosphere Support Technology provide technologies for advanced development efforts; (b) PE 0604561N SSN 21 Development and PE 0604524N Submarine Combat System incorporate Arctic specific improvements.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support Equipment Program (ASSEP)

PICTURE NOT AVAILABLE

POPULAR NAME: ASSEP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ASTECS Program	1/92-MS 0		11/93-MS I	3Q/96-MSII 2Q/01-MSIII 2Q/02-IOC
ENGINEERING MILESTONES				
ASTECS Program		9/94-DEM/VAL PDR		3Q/95-DEM/VAL CDR 2Q/97-EMD PDR 1Q/98-EMD CDR
T&E MILESTONES				
ASTECS Program			12/93-TEMP	3Q/98-DT/OTIIA(LAND) 1Q/00-DT/OTIIB(LAND) 1Q/01-DT/OTIIC(SEA)
CONTRACT MILESTONES				
ASTECS CED CONTRACTS DEM/VAL Contract	9/92-AWARD		4/94-AWARD	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2.885	1.731	2.799	CONT.	CONT.
SUPPORT CONTRACT	634	630	242	CONT.	CONT.
IN-HOUSE SUPPORT	1.069	1.579	595	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	*4.588	*3.940	3.636	CONT.	CONT.

* Budget submitted under P.E. 0603522N

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support Equipment Program (ASSEP)

B. (U) DESCRIPTION: This program develops submarine Electronic Support Measures (ESM) equipment and electronic warfare technology. A continuing need exists to improve submarine capabilities in these areas in order to enhance operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Enhanced electronic warfare capabilities are necessary for optimum submarine execution of missions in support of joint surveillance, intelligence gathering, joint strike, littoral warfare, maritime protection and space and electronic warfare (SEW). Specific efforts include development for: the Advanced Submarine Tactical ESM Combat System (ASTECS), Radar Cross Section Reduction (RCSR) techniques, and Periscope Mounted Monopulse Direction Finding (DF). The ASTECS program is the next generation ESM system that will be used on the new attack submarine and potentially be adapted for backfit to the SEAWOLF and SSN-688 class submarines. Existing submarine tactical ESM systems are antiquated and costly to maintain, cannot process all of todays threat signals, and will be totally inadequate to handle future complex electronic signals. ASTECS will provide significant advancements in signal processing to solve these shortfalls and will reduce submarine space and manning requirements. RCSR and Periscope Monopulse DF are advanced ESM development programs that support other submarine ESM efforts, including ASTECS.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Received Milestone (MS) 0 approval and began Concept Exploration and Demonstration of ASTECS. Awarded five study contracts to obtain recommended alternatives from industry. Initiated acquisition documentation required for MSI approval, including a Cost and Operational Effectiveness Analysis (COEA), a Test and Evaluation Master Plan, a Life Cycle Cost Estimate, etc.
b. (U) Generated an Engineering Change Proposal (ECP) to the Type 18 Periscope to modify it to accept the Monopulse DF antenna system.
c. (U) Continued investigation of innovative RCSR techniques and materials.

2. (U) FY 1993 PROGRAM:
a. (U) Complete ASTECS Concept Exploration/Demonstration and COEA. Continue generation of acquisition documentation required for MS I approval.
b. (U) Continue investigation of innovative RCSR techniques and materials.
c. (U) Contract for Monopulse DF Feasibility Development Model.

3. (U) FY 1994 PLANS:
a. (U) Complete ASTECS acquisition documentation, obtain MS I approval and begin Demonstration/Validation phase.
b. (U) Continue investigation of innovative RCSR techniques and materials.
c. (U) Continue development of Monopulse DF Feasibility Development Model.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: ASTECS - General Electric Company, Syracuse, NY; Lockheed Sanders INC., Nashua, NH; Engineering Research Associates, Vienna, VA; GTE Government Systems Corporation, Mountain View, CA; Watkins Johnson Company, San Jose, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support Equipment Program (ASSEP)

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

ASTECS Operational Requirement Document 10/91

G. (U) RELATED ACTIVITIES: PE 0604503N/F0775, Submarine System Equipment Development continues ASSEP projects through the Engineering and Manufacturing Phase.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: ASTECS land-based DT/OT IIA is planned for FY 98. ASTECS land-based DT/OT IIB is planned for FY00. ASTECS at-sea DT/OT IIC is planned for FY 01.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603563N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design
PROJECT NUMBER: S2196 PROJECT TITLE: Design Tools, Plans and Concepts

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2196	Design Tools, Plans and Concepts	3,710*	8,033*	18,820	CONT.	CONT.

*FY 1992 and 1993 funds were appropriated in PE 0603564N, Project S2036.

B. (U) DESCRIPTION: This project has the following objectives: (1) Identifies future surface ship requirements and characteristics necessary to meet future threats; (2) Investigates new, affordable ship concepts and evaluates potential technologies necessary to support these concepts; (3) Provides design methods/tools to develop and evaluate ship concepts; (4) Supports early ship design and solves pressing fleet engineering problems; (5) Develops design criteria and common standards to improve affordability; (6) Reduces the cost of fixing problems after the ships reach the fleet by improving quality in the design phases; (7) Develops investment strategies for new concepts and technologies; and (8) Supports development of Mission Need Statements (MNS) for future ships. This is a continuation of work previously funded in PE 0603564N, Project S2036.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed POM 94 ship characteristics and cost estimates in support of the Shipbuilding and Conversion, Navy (SCN) plan. Supported the development of MNS for Auxiliary Dry Cargo Ship (ADC(X)). Developed database that identifies, characterizes, and provides ship impact assessments for new and emergent technologies.

b. (U) Developed improved design methods including improvement of amphibious and auxiliary ship synthesis modeling, ship motions criteria for crew performance, and statistical weight estimation techniques.

c. (U) Began reliability based structural design criteria/methods development. Instrumented the USS WASP (LHD 1) for full scale structural trials. Built ship model for towing tank testing in FY 93. Supported Ship Structures Committee (SSC) research on ship structures.

d. (U) Completed Baseline I computer-based Electromagnetic (EM) Engineering Model. The model embeds electromagnetic interference (EMI) prevention in the early stage design of shipboard topside installations for combat systems and equipment operating at high frequency (HF) and microwave frequencies. Initiated Baseline II enhancements in the area of multiple source emission and EMI impact assessments.

e. (U) Analyzed the potential for increasing ship affordability through commonality of Hull, Mechanical, and Electrical (HM&E) systems.

2. (U) FY 1993 PROGRAM:

a. (U) Integrate new technologies into total ship concepts. Develop ship concepts for potential ships in the future SCN plan, (e.g., 21st Century Destroyer, MCS(X),etc.). Support the development of MNSs for future ships. Identify, characterize, and assess new technologies and update the HM&E technology database. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies supporting future ship development.

b. (U) Continue development/improvement of ship design methods, criteria, standards, and data bases. Continue improvements to auxiliary and amphibious ship synthesis models.

c. (U) Continue development of reliability based structural design methods/criteria. Begin work on structural strength determination of ship structures. Conduct hydrodynamic loads trials on LHD 1 and complementary towing tank hydrodynamic loads model testing. Build grillage strength test fixture, and slamming strength models. Support SSC research on ship structures.

d. (U) Extend EMI prevention design tool improvements to encompass multiple EMI sources and below decks installation engineering. Extend the topside installation modeling and design capability to millimeter wave (MMW) and electro-optical (EO) frequencies. Provide a Computer Aided Design II interface to improve electronic data transfer between EM engineering and total ship design.

e. (U) Continue identification of commonality among ships to improve affordability and producibility. Conduct systems engineering efforts, including cost/benefit evaluations, to identify ship architectures which enable the use of common modules. Common modules are comprised of standard components and/or components with standard interfaces, and support the build strategy of rapid assembly of large ship subassemblies.

3. (U) FY 1994 PLANS:

a. (U) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-7 years out in the SCN plan, including ship size, configuration, capabilities, and rough order of magnitude ship costs. Identify, characterize, and assess new and emergent technologies and update the HM&E technology database. Develop new R&D investment strategies which provide cost/benefit comparisons of new concepts and technologies.

b. (U) Continue development and improvement of design methods, criteria, standards, and data bases. Continue improvements to auxiliary/amphibious and other ship synthesis models. Include capabilities to use more advanced ship performance analysis methods addressing minimum required shipboard manning and increased producibility/commonality. Efforts will focus on improving affordability and personnel safety.

c. (U) Continue development of reliability based structural design methods/criteria including prediction of seaway hydrodynamic loads, building grillage strength models, and testing slamming strength models. Support SSC research work on ship structures.

d. (U) Complete EM Engineering tool and database improvements for topside and below decks for both single and multiple EMI sources and extended frequency ranges. Develop EM Engineering tool capabilities to predict the effects of anti-jam systems on the topside electromagnetic environment. Validate EM Engineering tool by ship design applications/measurements.

e. (U) Continue identification of commonality among ships to improve affordability and producibility. Continue to identify/develop the family of modules which will be the building blocks for future navy surface ships, including configuration control requirements. Increased FY 1994 funding provides investment in future affordable ship design architectures and develops prototype modules to demonstrate design, fabrication, shipbuilding process, and operational utility. Continue development of generic and engineered build strategies for naval ships that foster product oriented ship construction processes and incorporate alternative distributed ship systems architectures and modules. The focus of this effort is to assist in development of a new low cost destroyer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Norfolk NSY, Norfolk, VA; NAVSURFWARCEN Bethesda, MD; Annapolis, MD; Philadelphia, PA; and Dahlgren,VA. CONTRACTORS: J.J. McMullen Assoc. (JJMA) Inc., Arlington, VA; Advanced Marine Enterprises (AME), Arlington, VA; Rockwell International Corp., Arlington, VA; Westinghouse MTD, Pittsburgh,PA; Gibbs & Cox, Inc., Arlington, VA; NKF Engineering, Arlington VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology changes: Not applicable
2. (U) Schedule changes: Not applicable
3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
NAPDD #238-03 - Ship Design Methods, Plans and Concepts
NAPDD #248-03 - Electromagnetic Engineering of Ships and Shipboard Systems

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603563N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design
PROJECT NUMBER: S2196 PROJECT TITLE: Design Tools, Plans and Concepts

G. (U) RELATED ACTIVITIES: PE 0602121N, Surface Ship Technology; PE 0602323N, Submarine Technology; PE 0603513N, Shipboard System Component Development; PE 0603514N, Ship Combat Survivability; PE 0603564N, Ship Preliminary Design and Feasibility Studies.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE:

ADC(X) MS 0	4Q 1993
21st Century Destroyer MS 0	4Q 1993

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0408	Ship Development (Advanced)	1,240	253	1,904	CONT.	CONT.
S2202	Preliminary Design	0	0	4,128	CONT.	CONT.
S2087	Fast Sealift Technology Development	0	12,690	0	0	12,690
F2200	New Design SSN	0	0	52,732	4,733	57,465
	TOTAL	1,240	12,943	58,764	CONT.	CONT.

B. (U) DESCRIPTION: The primary objective of the Ship Preliminary Design Project is to design more capable warships at reduced cost with reduced manning and increased producibility utilizing the latest technologies. This program directly supports the Navy's Shipbuilding (SCN) Plan by performing ship Feasibility Studies and developing Preliminary Designs for new ships in the SCN Plan.

(U) Project S0408, Ship Development (Advanced), supports post Milestone 0 ship Feasibility Studies that provide the technical definition and initial cost estimates for various ship alternatives being considered in the Cost and Operational Effectiveness Analyses (COEA). This project develops the primary supporting documentation for Milestone I decisions.

(U) Project S2202, Preliminary Design, develops all technical and programmatic documentation required after Milestone I approval for a ship acquisition program and serves as baseline engineering documentation to support the Contract Design Phase (funded by PE 0604567N). The major development work during Preliminary Design includes the systems engineering and tradeoff studies necessary to define the principal ship characteristics needed to meet the approved military requirements in the ship Operational Requirements Document (ORD). The ship characteristics are developed with sufficient specifics to permit the development of a budget quality ship cost estimate required to support SCN budgeting.

(U) Project S2087, Fast Sealift Technology Development, will investigate and assess technologies suitable for the mid-term sealift ships (year 2000 and beyond).

(U) Project F2200 supports the Preliminary Design development for the New Design SSN (CENTURION).

(U) In FY 1994 the work in Project S2036 (Ship Design Methods, Plans and Concepts), previously under PE 0603564N, is transferred to a 6.3A Program Element/Project (PE 0603563N/S2196) in order to clearly identify the separate funding of the Pre-Milestone 0 (MS 0) efforts from the ship Feasibility Studies (MS 0 to MS I) and the ship Preliminary Design efforts (after MS I).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: S0408 PROJECT TITLE: Ship Development (Advanced)

PICTURE NOT AVAILABLE

POPULAR NAME: Ship Feasibility Studies

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES	See individual ship acquisition program documentation				
ENGINEERING MILESTONES	TBD - Milestone Schedule is established at MS I				
T&E MILESTONES	Not applicable.				
CONTRACT MILESTONE	Not applicable.				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT					
SUPPORT CONTRACT	1,057	198	1,236	CONT.	CONT.
IN-HOUSE SUPPORT	183	55	668	CONT.	CONT.
GFE/ OTHER					
TOTAL	1,240	253	1,904	CONT.	CONT.

B. (U) DESCRIPTION: Ship concepts, identified in PE 0603563N (Ship Concept Advanced Design) are transitioned to and further developed by this project after an approved Milestone 0 (MS 0) decision. This project performs the ship Feasibility Studies required after MS 0 to address a specific Mission Needs Statement (MNS) and supports the Cost and Operational Effectiveness Analyses (COEA) for new surface ships in the Navy's Shipbuilding Program. Performs impact studies of warfare, hull, machinery and electrical subsystems on advanced ship designs. Develops the initial documentation and the design methodology required by government for the design of surface ships in the Shipbuilding Program in accordance with the requirements of the DoD 5000 directives/instructions. Supports the development of the Operational Requirements Documents (ORD) and other documentation required at Milestone I. Develops and evaluates conventional and unconventional hull form alternatives suitable for future acquisition in support of a Milestone I decision. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Preliminary Design project, S2202.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: S0408 PROJECT TITLE: Ship Development (Advanced)

(U) Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems; principal hull dimensions and form coefficients; area/volume summaries; manning estimates; speed and range predictions; weight estimates; general arrangement sketches; technical risk assessments; and Class F cost estimates. The objective is to provide the decision makers with feasible, affordable alternatives.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued amphibious ship L(X) feasibility studies (reported in a Development Options Paper (DOP)) and supported COEA preparation. Supported the L(X) ORD preparation and all MS I reviews, including presentations to the Warfare Requirements Board (WRB), Joint Requirements Oversight Council (JROC), etc.

2. (U) FY 1993 PROGRAM: Conduct ship Feasibility Studies, support COEA studies and support ORD preparation for ships in the SCN plan which reach MS 0: Complete L(X) Feasibility Studies and COEA support and all documentation for the Milestone I decision Defense Acquisition Board (DAB), completed in January 1993.

3. (U) FY 1994 PLANS: Conduct ship Feasibility Studies, COEA studies and support ORD preparation for ships in the SCN plan which reach MS 0: Combat Logistics Force (CLF) requirements have identified a need for additional ships to transport various cargoes. ADC(X) and T-AO ship conversions are potential solutions that will be evaluated during the COEA process, pending MS 0 approval.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN Bethesda, MD, Annapolis, MD, Philadelphia, PA. & Dahlgren, VA; NCCOSC RDTE DIV, San Diego, CA. CONTRACTOR: J. J. McMullen Assoc. (JJMA) Inc., Arlington, VA; Advanced Marine Enterprises (AME), Arlington, VA; Westinghouse Marine Technology Division, Pittsburgh, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0603563N, Ship Concept Advanced Design; PE 0604567N, Ship Contract Design/ Live Fire T&E; PE 0603508N, Ship Propulsion System; PE 0603513N, Shipboard Systems Component Development; PE 0602121N, Surface Ship Technology; PE 0603573N, Advanced Surface Machinery Systems.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design Project and Feasibility Studies
PROJECT NUMBER: S2202 PROJECT TITLE: Preliminary Design

PICTURE NOT AVAILABLE

POPULAR NAME: Ship Preliminary Design

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES	See individual ship acquisition program documentation.				
ENGINEERING MILESTONES	TBD - Milestone schedule established at MS I.				
T&E MILESTONES	Not applicable.				
CONTRACT MILESTONE	Not applicable.				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT SUPPORT CONTRACT	0	*0	2,684	CONT.	CONT.
IN-HOUSE SUPPORT	0	0	1,444	CONT.	CONT.
GFE/ OTHER					
TOTAL	0	*0	4,128	CONT.	CONT.

* Preliminary Design efforts for the amphibious ship LX are funded by PE 0604567N in FY 1993.

B. (U) DESCRIPTION: This project develops all technical and programmatic documentation required after a Milestone I decision and before Contract Design initiation for new surface ships in the Navy's Shipbuilding Plan. The ship Feasibility Studies, completed in Project S0408, Ship Development (Advanced), are transitioned to this Project (S2202) after an approved Milestone I (MS I) decision and are further developed during this Preliminary Design phase. The objectives of the ship Preliminary Design phase are to reduce or eliminate major risks, to quantify ship performance in accordance with the approved Operational Requirements Document (ORD), to refine earlier design estimates, to provide budget quality Class C cost estimates and to support continuing COEA work. The assumptions made during the Feasibility Study phase are validated, subsystems are defined in more detail, model tests are conducted, mockups of major spaces are constructed (usually combat systems spaces) and the design begins the translation into shipbuilding requirements (i.e., initial specifications and drawings are developed.) The completed ship Preliminary Design transitions to the Contract Design phase funded by PE 0604567N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design Project and Feasibility Studies
PROJECT NUMBER: S2202 PROJECT TITLE: Preliminary Design

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: No Preliminary Designs were conducted.

2. (U) FY 1993 PROGRAM: Amphibious ship LX Preliminary Design is funded by PE 0604567N.

3. (U) FY 1994 PLANS: Combat Logistics Force (CLF) requirements have identified a need for additional ships for carrying various cargoes. ADC(X) and T-AO ship conversions are a potential solution. Preliminary Designs will be conducted pending Milestone I approval.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN Bethesda, MD, Annapolis, MD, Philadelphia, PA. & Dahlgren, VA; NCCOSC RDTE DIV, San Diego, CA. CONTRACTOR: J. J. McMullen Assoc. (JJMA) Inc., Arlington, VA; Advanced Marine Enterprises (AME), Arlington, VA; Westinghouse Marine Technology Division, Pittsburgh, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0603563N, Ship Concept Advanced Design; PE 0604567N, Ship Contract Design/ Live Fire T&E; PE 0603508N, Ship Propulsion System; PE 0603513N, Shipboard Systems Component Development; PE 0602121N, Surface Ship Technology; PE 0603573N, Advanced Surface Machinery Systems.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: F2200 PROJECT TITLE: New Design SSN

PICTURE NOT AVAILABLE

POPULAR NAME: CENTURION

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES	MS 0 (08/92)	MS I (08/93)			
ENGINEERING MILESTONES	TBD - MILESTONE SCHEDULE WILL BE ESTABLISHED AT MILESTONE I				
T&E MILESTONES	Not applicable.				
CONTRACT MILESTONES	Not applicable.				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	44,168	4,206	48,374
SUPPORT CONTRACT	0	0	401	73	474
IN-HOUSE SUPPORT	0	0	8,163	454	8,617
GFE/ OTHER	0	0	0	0	0
TOTAL	0	0	52,732	4,733	57,465

B. (U) DESCRIPTION: This project encompasses the preliminary ship design efforts for CENTURION. The general thrust of these efforts will be to develop an affordable attack submarine using technologies with acceptable risk levels including existing systems or components from SSN-688I, TRIDENT, and SEAWOLF. This approach to technology innovation will carefully balance military capability, development and acquisition cost, impact on ship weight and volume, and technical risk. Varying degrees of re-engineering of existing systems may be required to adapt them to the new submarine's requirements. Newly developing technologies will be utilized where doing so will offer potential payoffs in system size (volume and/or weight) or affordability without sacrificing military capability. This effort is necessary in FY 1994 for a FY 1998 lead ship construction contract award.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable. This Project will be initiated in FY 1994. Funding for CENTURION in FY 1992 is located in PE 0603561N, Project F2177.

2. (U) FY 1993 PROGRAM: Not applicable. This Project will be initiated in FY 1994. Funding for CENTURION in FY 1993 is located in PE 0603561N, Project F2177.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: F2200 PROJECT TITLE: New Design SSN

3. (U) FY 1994 PLANS:

a. (U) Preliminary Design - Overall Plans

(1) (U) Develop a preliminary design which implements a cost based methodology at all levels of design.

(2) (U) Establish a decision making process that carefully balances systems performance, risk and schedule with affordability.

(3) (U) Foster a coordinated design that fully integrates the producibility and technological capabilities of the industrial base (shipbuilders and vendors) with technical and performance requirements.

(4) (U) Develop a system definition process to ensure seamless transition from preliminary design to engineering specification development of Contract Design.

b. (U) Preliminary Design - Detailed Plans

(1) (U) Determine structural design, hull configuration and internal compartment arrangements utilizing existing state of the art Computer Aided Design tools that enable 2 dimension and 3 dimension evaluation.

(2) (U) Perform hull survivability assessment.

(3) (U) Conduct system performance versus cost trade-off studies and select sub-system configurations.

(4) (U) Develop system arrangement drawings.

(5) (U) Perform acoustics requirements trade-off studies as compared with cost and weight.

(6) (U) Perform detailed analyses of ship and system performance as the preliminary design matures.

(7) (U) Investigate Hull, Mechanical & Electrical (HM&E) technology option effectiveness in operational scenarios.

(8) (U) Conduct technology assessment and cost reduction studies over the range of system alternatives, and assess option effectiveness in operational scenarios.

(9) (U) Develop technical requirements for and evaluate radiated, self noise, and target strength performance to ensure proposed system approaches will not compromise the cornerstone of submarine performance, STEALTH.

(10) (U) Prepare ship characteristics.

(11) (U) Establish volume and weight allocations for all ship structures, systems, and equipment and evaluate ship manning requirements, habitability, and maintenance concepts.

(12) (U) Develop ship control system performance goals.

(13) (U) Define and evaluate damage control capabilities.

(14) (U) Identify support systems requirements for weapon handling, stowage and launching installations.

(15) (U) Design and evaluate anchoring, mooring, towing, and towed array hydraulic system.

(16) (U) Prepare system diagrams and preliminary system description.

(17) (U) Determine requirements for air conditioned and refrigerated spaces and select air conditioning and refrigeration plants.

(18) (U) Determine life support and atmosphere monitoring requirements and select life support and atmosphere monitoring equipment.

(19) (U) Evaluate weight margins to allow shipbuilder greater opportunity to capitalize on cost effective construction techniques.

(20) (U) Review submarine specifications to identify requirements which are significant cost drivers. Evaluate for possible cost reduction.

(21) (U) Evaluate ship performance under various mission scenarios.

(22) (U) Continue support of engineering efforts to improve and integrate critical submarine systems, subsystems, and components.

(23) (U) Develop and document engineering requirements.

(24) (U) Initiate ship preliminary design.

(25) (U) Develop Class "D" cost estimate based upon all technical data.

(26) (U) Digitally transfer reports, drawings and specifications between Navy and Shipbuilders to reduce administrative costs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: F2200 PROJECT TITLE: New Design SSN

4. (U) PROGRAM TO COMPLETION: The majority of preliminary design for the Centurion program is to be completed in FY 1994. In FY 1995, Centurion preliminary design will complete as the design process transitions to contract design. It is necessary for preliminary design to be completed and transitioned to contract design in FY 1995 so that the lead ship construction contract can be awarded in FY 1998.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCEN DET, New London, CT; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; CONTRACTORS: General Dynamics/Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; Johns Hopkins University, Baltimore, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Mission Needs Statement	10/91
Milestone 0 Acquisition Memorandum	08/92

G. (U) RELATED ACTIVITIES: Preliminary design is related to CENTURION completing advanced development in PE 0603561N (Advanced Submarine Systems Development). CENTURION Hull, Mechanical & Electrical and Combat Systems engineering development efforts are in PE 0604558N (New Design SSN Development). Development of the CENTURION propulsion plant is continuing in PE 0603570N (Advanced Nuclear Power Systems).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1914	S6W Nuclear Propulsion Plant	30,027	28,653	24,370	10,578	431,038
S1258	Nuclear Technology Development	58,668	63,473	46,239	CONT.	CONT.
S2158	S9G Nuclear Propulsion Plant Development	0	0	66,042	CONT.	CONT.
TOTAL		88,695	92,126	136,651		

B. (U) DESCRIPTION: Work is directed toward the design, development and test of new and improved components and their related systems for use in nuclear propulsion plants. The intent is to develop safe, reliable, high-performance, long-life nuclear propulsion plants, systems, and components. Work includes development of a nuclear propulsion plant for the SEAWOLF attack submarine. Work in other areas includes development of propulsion plant arrangements, components, and materials, as well as plant analysis or future fleet application.

(U) Plant arrangement work is aimed at developing optimal configurations for new propulsion plants. Significant heat transfer technology improvements are being developed;

New instrumentation and control and power generation equipment is needed

this equipment will also be developed for future ship classes.
better components/systems are being developed to
improve performance in new and existing nuclear ship types.

(U) Beginning in FY 1994, ongoing studies and developments coalesce into significant design efforts on components and systems for a new SSN propulsion plant. Advanced Nuclear Power Systems has been reorganized to categorize new SSN-related design efforts in one project (S2158) and generic developments in another (S1258). However, many developments in nuclear propulsion are generic in nature and may apply to many ship types.

(U) The ability to accomplish the work described is contingent upon the existence of a viable Naval nuclear industrial base.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1914 PROJECT TITLE: S6W Nuclear Propulsion Plant

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1914	S6W Nuclear Propulsion Plant	30,027	28,653	24,370	10,578	431,038

B. (U) DESCRIPTION: This effort develops aspects of the nuclear propulsion plant for the SEAWOLF (SSN 21) attack submarine. Work is directed toward design, development, and test of pumps, instrumentation and control equipment, valves, heat transfer equipment, and plant arrangements. A key objective is to meet stringent goals giving the SEAWOLF attack submarine an advantage over potential adversaries well into the next century. Accomplishing requires applying new features throughout the plant, especially to large rotating equipment. Also, the propulsion plant will be increased to achieve the overall displacement and performance goals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Evaluated and tested reactor plant components such as pumps, valves, and heat transfer equipment.
b. (U) Performed check-out and compatibility testing of instrumentation and control systems.

c. (U) Qualified plant components, systems and arrangements:

(1) (U) Continued detailed fluid system, shielding, and component design to meet equipment procurement and ship construction schedules; analyzed designs
(2) (U) Prepared and reviewed system drawings and operating and acceptance test procedures.
(3) (U) Tested components and systems

2. (U) FY 1993 PROGRAM:

a. (U) Complete evaluating reactor plant components.
b. (U) Continue compatibility testing of instrumentation and control systems

c. (U) Quality plant components, systems, and arrangements:

(1) (U) Complete detailed component design and evaluation to meet equipment procurement schedules; complete fluid systems and shielding design and evaluation, and continue drawing production to support ship construction schedule.
(2) (U) Continue preparing and revising systems drawings, develop and verify operating and acceptance test procedures.
(3) (U) Continue integrated systems and components tests

3. (U) FY 1994 PLANS:

a. (U) Continue compatibility testing of instrumentation and control systems
validate design modifications/improvements resulting from tests.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1914 PROJECT TITLE: S6W Nuclear Propulsion Plant

b. (U) Qualify plant components, systems, and arrangements:

(1) (U) Update fluid systems and shielding design and evaluation, and drawings for ship construction.
(2) (U) Update systems drawings and plant manuals; complete development and verification of operating and acceptance test procedures.
(3) (U) Conduct integrated system and component tests.

(4) (U) Develop test procedures and drawings for the propulsion plant.
(5) (U) Resolve any system performance or installation problems.

4. (U) PROGRAM TO COMPLETION: This program completes in FY 1995. The FY 1995 effort will complete development of the SEAWOLF propulsion plant, and was previously part of PE 0603570N Nuclear Technology Development (S1258).

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: Westinghouse Electric Corp., Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Co., Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element is related to PE 0205675N, Operational Reactor Development. There is no duplication of effort within the Navy or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1258	Nuclear Technology Development	58,668	63,473	46,239	CONT.	CONT.

B. (U) DESCRIPTION: The purpose is to design, develop, and test new and improved nuclear propulsion plant materials, components, and systems, and the means to assess them, for use in all types of naval nuclear propulsion plants. These efforts apply to future applications as well as backfit equipment for existing nuclear ship classes.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued to develop advanced heat transfer technology; Completed preliminary design concepts for a heat exchanger application, Conducted propulsion plant optimization work; developed and assessed improved components and plant configurations;

b. (U) Developed advanced design power supplies; Developed better transmission means.

c. (U) Designed and developed advanced instrumentation and control equipment.

d. (U) Developed improved fluid transfer and control and electrical equipment.

e. (U) Developed plant designs.

2. (U) FY 1993 PROGRAM:

a. (U) Continue testing to confirm design concepts. Finalize conceptual designs to begin application.

b. (U) Conduct propulsion plant optimization work; further develop and evaluate improved components and plant configurations;

c. (U) Test and evaluate advanced power supplies; Begin development of advanced power generation equipment.

d. (U) Conduct tests of advanced instrumentation and control equipment aimed at improving operator response time, and test alternate preproduction hardware configurations to confirm improved accuracy, performance, reliability, and efficiency.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

e. (U) Develop improved fluid transfer and control and electrical equipment; initiate design of an advanced main coolant pump.

f. (U) Continue to develop plant designs. Develop computational models of plant systems and components to analyze and predict

3. (U) FY 1994 PLANS:

a. (U) Conduct tests of instrumentation and control equipment and test preproduction hardware configurations to confirm improved accuracy, performance, reliability, and efficiency. Incorporate the latest in electronic technologies into development of future propulsion plant instrumentation and control equipment and associated software. Develop sensors and rod control equipment to improve reliability and performance of propulsion plant instrumentation and control equipment.

b. (U) Continue development and initiate qualification of military-grade preproduction versions of advanced power supplies. Develop advanced power generation and distribution technology to improve power system efficiency, reliability, safety, and harmonics (power quality and acoustic resonance).

improve electrical system performance.

c. (U) Continue to develop means to lessen and analyze the effects of shock, vibration, high temperature and pressure on plant and component designs and incorporate these characteristics into designs to ensure safe, efficient, and reliable plant operation. Continue to develop computational models of plant systems and components to analyze and predict performance. Evaluate materials in previously untried applications, and explore innovative uses of materials and fabrication processes for high performance, lightweight, advanced nuclear propulsion plant applications.

d. (U)

e. (U) Examine materials to determine their ability to withstand irradiation, corrosion, high temperatures, and shock and to resolve emergent materials issues.

, continue long-term testing to confirm design concepts.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: Westinghouse Electric Corp., Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Co., Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element is related to PE 0205675N, Operational Reactor Development. There is no duplication of effort within the Navy or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2158	S9G Nuclear Propulsion Plant Development	0	0	66,042	CONT.	CONT.

B. (U) DESCRIPTION: This effort develops the components and systems applicable to the nuclear propulsion plant for a new design SSN. Work is directed toward design, development, and testing of plant arrangements, heat transfer equipment, fluid systems, instrumentation and control equipment, and power distribution systems, with emphasis on simplifying and exploiting existing technology and current developments.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Perform preliminary design of propulsion plant arrangements; design and build mockups of plant configurations to ensure feasibility of construction and validate acoustic features. Design propulsion plant mounting rafts which will support all components to facilitate ship construction and improve acoustic characteristics and shock resilience.

Develop simplified radiation shielding while maintaining standards of containment.

b. (U) Develop heat transfer technology; begin preliminary design

Develop advanced steam separators to optimize steam generator output. Develop improved heat exchangers, such as the propulsion plant freshwater/seawater heat exchanger.

c. (U) Develop improved fluid transfer and control equipment; begin reference designs of propulsion plant fluid and steam systems and associated components, such as an advanced main coolant pump, coolant loops, main seawater pump, and valves, with emphasis on simplification

d. (U) Begin design of future propulsion plant instrumentation and control equipment and associated software, such as primary nuclear instrumentation and reactor plant and electric plant control panels,

e. (U) Develop advanced power generation/distribution equipment and systems, including power supply and conversion modules and circuit breakers, taking advantage of ongoing electrical developments and aiming at improved power systems efficiency, reliability, safety, and harmonics (power quality and acoustic resonance).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARFCENDIV, Dahlgren, VA. CONTRACTORS: Westinghouse Electric Corp., Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Co., Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program element is related to PE 0205675N, Operational Reactor Development. There is no duplication of effort within the Navy or the Department of Defense.

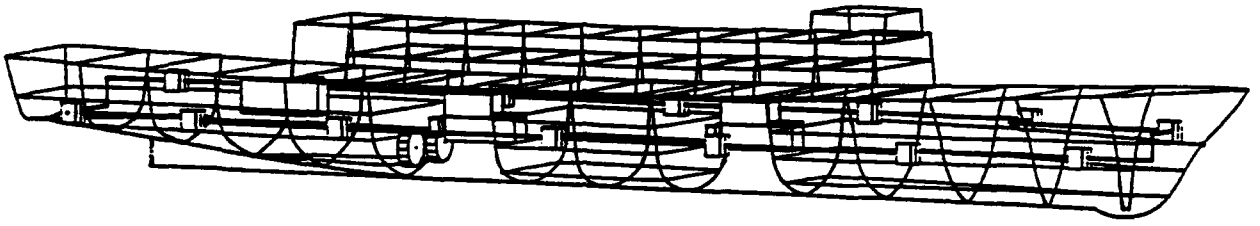
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems
PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Sys



POPULAR NAME: Advanced Surface Machinery (ASM) Programs

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			ICR LLM OPTION 3Q/94	ICR MS II 3Q/96
ENGINEERING MILESTONES		ICR DR1 3Q/93 ED HDWR 4Q/93		
T&E MILESTONES			COMMENCE ED TEST 1Q/94 BEGIN AD MODEL DEMO OF SMCS 4Q/94	ICR TECHEVAL/OPEVAL 98/99
CONTRACT MILESTONES	AWARD ICR 1Q/92	AWARD SMCS 2Q/93		AWARD PM ED 1Q/96 AWARD SSIM 2Q/96

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACTS	33,943	67,455	82,378	CONT.	CONT.
SUPPORT CONTRACTS	-	-	-	CONT.	CONT.
IN-HOUSE SUPPORT	5,054	6,155	9,950	CONT.	CONT.
GFE/ OTHER	-	-	-	CONT.	CONT.
TOTAL	38,997	73,610	92,328	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element (PE) supports the Advanced Surface Machinery (ASM) Programs which develop advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements. The name of this program has been changed from the Integrated Electric Drive Program to better reflect program content and emphasis. The Navy has recently reassessed and reprioritized Surface Navy requirements and investment strategy considering the rapidly changing world situation and increased emphasis on affordability. The current investment strategy stresses affordability, flexibility and the ability to reconstitute capabilities. The Navy has recommended the InterCooled Recuperated (ICR) gas turbine engine, Standard Monitoring and Control System (SMCS), and the "zonal" electrical distribution system for Initial Operational Capabilities beginning in FY 98. The following are ship introduction plans for elements of ASM Programs:

Element	Ship Target	IOC
Electrical distribution	FY 94 DDG 51	FY 99
Element	Ship Target	IOC
Control System	FY 96 DDG 51	FY 01
Modules	FY 94 DDG 51	FY 99

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems
PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Sys

ICR will be evaluated for fleet introduction between FY 1997-FY 1999 on DDG-51. The restructured ASM Programs emphasize near-term deliverables, particularly ICR and SMCS, develop Integrated Power System (IPS) technology, and complete the existing Electric Drive (ED) contract. The programs emphasize concurrent engineering and systems engineering to develop a top-down architecture; technology development to advance critical machinery components; and industrial processes to shorten duration, and reduce manhours associated with the design and construction of naval ships.

(U) Program efforts and funding are focussed on the ICR engine advanced development (AD), SMCS, improved electrical distribution system, IPS, and completion of the ED contract:

(1) (U) ICR Gas Turbine Engine. ICR will significantly reduce life cycle fuel cost and provide a minimum-impact alternative to increase range. The contract for ICR AD was awarded to Westinghouse Electric Corporation in Dec 91.

(2) (U) Standard Monitoring and Control System (SMCS). This system will integrate the sensing, transmission, interpretation and display of Hull, Mechanical & Electrical parameters necessary for machinery control, condition monitoring/assessment, signature control and damage control management. SMCS offers significant potential to reduce acquisition cost and introduce a standard system for application across multiple platforms taking maximum advantage of open-system architecture and industry/military standards. This project will develop both hardware and software necessary for the Advanced Demo Model.

(3) (U) Zonal Electrical Distribution System (ZEDS). Initial electrical distribution plans will focus on a new standard architecture for electrical distribution designed to improve ship producibility and reduce ship cost. Future improvements will address rapid reconfiguration and automated control in response to incipient faults and casualty conditions.

(4) (U) Integrated Power System (IPS). An IPS concept, as part of the 21st Century Destroyer efforts, was evaluated. IPS consists of permanent magnet (PM) electric drive (ED) with a ship service rectifier feeding a zonal electrical distribution system with dc buses, dispersed dc/ac inverters and zonal ac load centers. IPS was identified as a cornerstone machinery architecture and technology. In the restructured program the Navy is proceeding with 3000 HP PM electric drive and prototype ship service invertor module (SSIM) small scale demonstrations before a commitment decision for Full Scale Development (FSD). The decision to proceed into FSD will be made as part of the DD21 studies.

(5) (U) Electric Drive (ED). The basic electric drive development is completing its fourth year under contract with General Electric (GE). The restructured program will complete the current contract and associated performance-verification testing. A final report will document this phase of the program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed design of zonal electrical distributional system and transitioned it to AEGIS Shipbuilding Program for FY 94 DDG 51.

b. (U) Conducted Critical Design Review on the ED contract.

c. (U) Awarded ICR engine contract to Westinghouse on 26 Dec 91.

d. (U) Completed ship service distribution, SMCS, and auxiliary distribution architecture studies and initiated development.

e. (U) Completed Systems Analysis/engineering tradeoff report.

f. (U) Distributed Request For Proposal (RFP) for SMCS.

g. (U) Awarded 3MW PM generator and rectifiers to Newport News Shipbuilding.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Surface Machninery Systems
PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Sys

2. (U) FY 1993 PROGRAM:

a. (U) Complete check-out of electric drive (ED) shaft set at GE.

b. (U) Deliver electric drive (ED) shaft set.

c. (U) Conduct Design Review 1 on ICR engine contract.

d. (U) Award SMCS contract.

e. (U) Begin set up for a laboratory demo of control system and electrical distribution system.

f. (U) Intiate Ship Service Inverter Module (SSIM) Development.

3. (U) FY 1994 PLANS:

a. (U) Conduct advanced development model laboratory demonstration of the SMCS hardware and software.

b. (U) Initiate setup of SMCS hardware and software at operational test site.

c. (U) Interface Zonal Electrical Distribution System (ZEDS) with SMCS.

d. (U) Award ZEDS contract for component design and hardware development with emphasis on affordability and survivability.

e. (U) Exercise ICR Long Lead Material option.

f. (U) Initiate ICR AD system testing.

g. (U) Take delivery of 3MW generator and NNS 3 KHP PM motor and initiate system testing.

h. (U) Begin ICR land based testing at NSWC (NAVSSES) Philadelphia, PA detachment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVSEASYSCOM, Washington, DC; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN SHIPSYSENGSTA Philadelphia, PA; others as required. CONTRACTORS: General Electric, Fitchburg, MA; Westinghouse Electric Corp., Pittsburgh, PA and Sunnyvale, CA; Teledyne, Inet., Torrance, CA; PDI, Annapolis, MD; Henschel Engrg., Boston, MA; Purdue Univ., West Lafayette, IN; Texas A&M Univ., Austin, TX; and others selected.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Transition ICR engine development and SMCS to ACAT status. Transition IPS to ACAT following 21st Century Destroyer decision.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
Electric Drive and ICR Acquisition Plans and ICR RFP were revised in FY 91 to reflect program restructuring.
SSMCS Acquisition Plan dated Aug 92.
NAPDD # 259-03 dated 03 Feb 92.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems
PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Sys

G. (U) RELATED ACTIVITIES: PE 0602121N, Surface Ship Technology; DARPA, Submarine Electric Drive Program.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) Commence ED Test.

2. (U) Begin AD Model demonstration of SMCS hardware and software.

3. (U) Perform ICR systems test.

4. (U) Perform ICR TECHEVAL/OPEVAL.

5. (U) Perform systems test on PM generator and motor.

6. (U) Perform systems test on DC distribution system.

7. (U) Begin land based testing of ICR at NSWC (NAVSSES) Philadelphia, PA Detachment.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603582N BUDGET ACTIVITY: 4
PROGRAM ELEMENT: TITLE: Combat System Integration
PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0164	Combat System Integration	10,322	9,626	6,842	CONT.	CONT.

B. (U) DESCRIPTION: This project provides shore based testing of new/upgraded integrated combat direction, weapon and sensor system computer programs prior to their installation in operational fleet units. The integrated suites of operational computer programs are tested to assure interoperability and undergo operational assessment testing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed testing of: Anti-Submarine Warfare Control System upgrade in DD 963 class; New Threat Upgrade in CGN 36 class; Automatic Identification (AUTO-ID) System, Command and Control Processor (C2P) and Advanced Combat Direction System (ACDS) Block 0 in CV/CVN classes.

2. (U) FY 1993 PROGRAM: Conduct testing of: Antisubmarine Warfare Module (ASWM) 4.3, AN/SYS-2 Integrated Automatic Detection and Tracking (IADT)/AUTO-ID in CV/CVN classes; C2P in CGN 38 class; Fire Control System MK 92 MOD 6 (FCS MK 92/6) in FFG 7 class. Conduct operational assessment of combat system improvements in DD 963 class.

3. (U) FY 1994 PLANS: Complete integration testing of: FCS MK 92/6 in FFG 7 class; AN/SYS-2 (IADT)/AUTO-ID in CV/CVN classes. Conduct integration testing of AN/SQQ-89 Surface Antisubmarine Warfare Combat System, MK 23 Target Acquisition System and Tomahawk Weapon Control System upgrades in DD 963 class; TOMAHAWK Vertical Launch System-Vertical Launch Antisubmarine Rocket System interoperability; operational assessment of combat system baseline improvements in CGN 36/38 classes.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN INTCOMBATSYSTESTFAC, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCEN FLTCOMBATDIRSSACT, Dam Neck, VA and NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: UNISYS, St. Paul, MN; RGE Engineering Service Co., Springfield, VA.; Integrated System Analysts, Inc., Arlington, VA.; COMPTEK Federal Systems Inc., Arlington, VA; PRC, McClean, VA.

E. (U) RELATED ACTIVITIES: Computer programs developed under these activities are tested in their integrated configuration: PE 0205620N, Surface ASW Combat Systems; PE 0603512N, Carrier Systems Development; PE 0604301N, MK 92 FCS Upgrade; PE 0604755N, Ship Self Defense; PE 0604372N, New Threat Upgrade; PE 0604518N, CIC Conversion.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0363	Insensitive Munitions Advanced Development	22,300	26,875	10,578	CONT.	CONT.
S1821	Conventional Fuze/Warhead Pkg	20,353	33,643	32,054	CONT.	CONT.
	TOTAL	42,653	60,518	42,632	CONT.	CONT.

B. (U) DESCRIPTION: (U) EXPLOSIVES ADVANCED DEVELOPMENT (IM) (Project S0363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This program will provide, validate and transition technology to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

(U) CONVENTIONAL FUZE/WARHEAD PACKAGE (Project S1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current specific requirements and initiatives to address them include: the ability to defeat anti-ship missiles attacking at extremely low altitudes by improving SPARROW Missile to defeat existing and near-term low-altitude targets; improve SPARROW Missile through the Missile Homing Improvement Program (MHIP) to counter deceptive countermeasures; demonstrate advance missile fuzing systems to defeat extremely low-altitude and low observable targets with the Advanced Threat Fuze (ATF). This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S0363 PROJECT TITLE: Insensitive Munitions Advanced Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0363	Insensitive Munitions Advanced Development	22,300	26,875	10,578	CONT.	CONT.

B. (U) DESCRIPTION: Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. This program will provide, validate and transition technology to all new weapon developments and priority weapon systems and enable production of munitions insensitive to these stimuli with no reduction in combat performance. The Insensitive Munitions (IM) Advanced Development Program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuzes and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the prcbability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued validation and shortfall analysis of weapon POA&Ms, and selected explosives candidates for general purpose bomb product improvements.

b. (U) Continued development of high performance metal accelerating explosives for fragmentation, shaped charges and submunitions.

c. (U) Completed formulations and processing studies of high bubble energy underwater (U/W) explosives. Down-selected to one high bubble energy U/W explosive for torpedo application.

d. (U) Selected explosives for dual-explosive warhead options, formulated and screened warhead designs based on a performance comparison against conventional single-explosive warheads and conducted large-scale tests.

e. (U) Completed IM tests of homogeneous minimum-smoke propellant.

f. (U) Continued to evaluate new and improved barrier and damage materials for packaging and to design and fabricate generic containers.

2. (U) FY 1993 PROGRAM:

a. (U) Continue validation and analysis of POA&Ms; large scale advanced propellants vulnerability tests and full scale testing of ordnance items.

b. (U) Begin development of insensitive high-energy cruise missile booster propellant and rocket motor.

c. (U) Conduct large scale performance and vulnerability testing of a high performance metal accelerating explosive.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: SO363 PROJECT TITLE: Insensitive Munitions Advanced Development

d. (U) Initiate insensitive ignition systems investigation.

e. (U) Complete formulation development of various IM propellants; and IM boost propellant for Standard Missile MK 104, and IM reduced-smoke propellant for Sidewinder/SRM.

f. (U) Complete interim qualification of a dense booster propellant.

3. (U) FY 1994 PLANS:

a. (U) Complete large scale testing of the selected melt castable general purpose explosive applicable to Tomahawk, general purpose bombs, SLAM or AIWS.

b. (U) Conduct large scale performance and vulnerability test on general purpose explosive candidates developed by private industry.

c. (U) Complete scale-up and large scale testing of a high solids metal accelerating explosive which may be used in BLU-97/B, Stinger, Sea-Hellfire, Standard Missile or MK 50 Torpedo.

d. (U) Conduct full scale testing of technology concepts of weapon ordnance items to support transition such as for MK 50, SMAW or TOW.

e. (U) Complete prototype IM Sidewinder/SRM reduced-smoke motor demonstration.

f. (U) Complete scale up of low vulnerability booster explosives and qualify in generic booster hardware.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCENDIV, Indian Head, MD; NAVSURFWARCEN, Crane, IN; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENCARDEROCKDIV, Bethesda, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-acquisition program decision document of 25 June 1990.

G. (U) RELATED ACTIVITIES: PE 0601153, Defense Research Sciences, 0602314N, Undersea Surveillance and Weapons Technology; PE 0602315N, MCM, Mining and Special Warfare Technology; PE 0603216N, Aviation Survivability; and PE 0604603N, Air-to-Air Surface Munitions. Cooperative technology transfer efforts with all weapons project offices are in progress. Close liaison is maintained with PE 0603514N (Shipboard Damage Control Program).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO AC/310 SG I

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

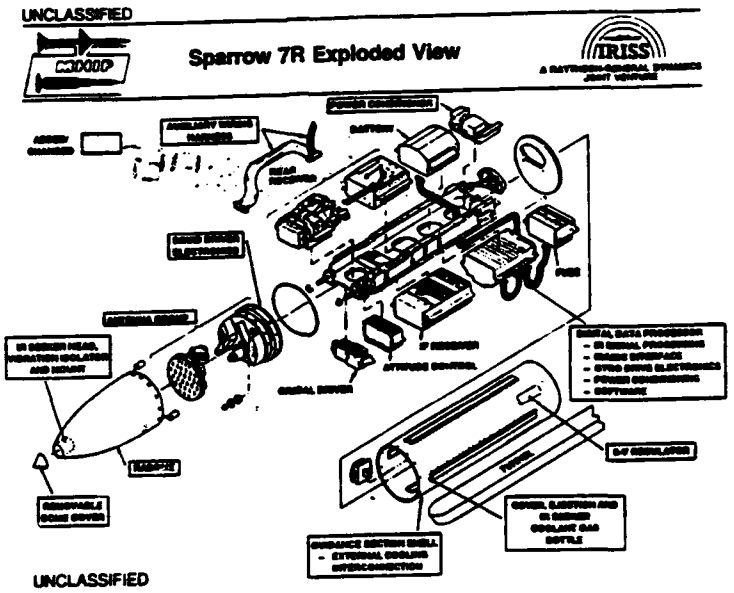
PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S0363 PROJECT TITLE: Insensitive Munitions Advanced Development

J. (U) MILESTONE SCHEDULE:

	Transition to Engineering Development	Date
1.	New fuzing/detonator concepts	FY 1993 (4th Qtr)
2.	Continuous processing/ injection loading techniques	FY 1993 (4th Qtr)
3.	Sympathetic detonation resistant explosive for large missile warheads and GP bombs	FY 1994 (3rd Qtr)
4.	Insensitive low signature propellant	FY 1994 (4th Qtr)
5.	Insensitive metal accelerating explosive	FY 1994 (1st Qtr)
6.	Melt-cast general purpose explosive	FY 1995 (4th Qtr)
7.	Insensitive high energy booster propellants and motors	FY 1996 (4th Qtr)
8.	Insensitive high bubble underwater explosive	FY 1996 (4th Qtr)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S1821 PROJECT TITLE: Conventional Fuze/Warhead Pkg



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		SPARROW MSIIA		CONT.
ENGINEERING MILESTONES	SPARROW CDR 3/92			
T&E MILESTONES				
CONTRACT MILESTONE			SPARROW LRIP 1/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	13,189	19,177	19,232	CONT.	CONT.
SUPPORT CONTRACT	0	0	0		
IN-HOUSE SUPPORT	7,164	14,466	12,822	CONT.	CONT.
GFE/ OTHER	0	0	0		
TOTAL	20,353	33,643	32,054	CONT.	CONT.

B. (U) DESCRIPTION: The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This project improves SPARROW missile capability to defeat existing and near term deceptive counter measures with the Missile Homing Improvement Program (MHIP). This project also addresses the combined threat of low observable, low altitude high speed encounters with the Advanced Threat Missile Fuze (ATF). This project also provides a single, cost effective, more capable fuze to replace three obsolescent in-service fuzes with the multi-function projectile fuze. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual development to engineering development with minimum technical and financial risk.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S1821 PROJECT TITLE: Conventional Fuze/Warhead Pkg

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Conducted laboratory tests and initiated fly-over tests.

b. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Evaluated 15 units and initiated fabrication of next 60 units.

c. (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP) SUBPROJECT: Continued FSD, completed Critical Design Review (CDR).

d. (U) SHIP SELF DEFENSE: Supported analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; supported development of system interface adaptations as necessary to provide effective ship self defense integration.

2. (U) FY 1993 PROGRAM:

a. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Complete analysis of fly-over test results and conduct captive carry tests.

b. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Produce and complete evaluation of 60 fuzes. Multi-Function Fuze will complete advance development in FY-93 and will transition to Full Scale Engineering Development in the 5"/54 and 76mm programs.

c. (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP) SUBPROJECT: Continue FSED; Commence flight test at PMTC; Complete operational assessment by COTF.

d. (U) GUIDANCE INTEGRATED FUZE: Initiate project to fully integrate the functions of missile guidance and fuzing section to enhance performance while reducing cost, space and weight.

e. (U) ADVANCED AIMED WARHEAD: Initiate project to develop capability to focus majority of warhead mass on the target rather than isotropically around the missile.

f. (U) ADVANCED AIMED FUZE: Initiate project to develop the fuzing function necessary to initiate the Advanced Aimed Warhead.

g. (U) SHIP SELF DEFENSE: Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising ship self defense systems, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

3. (U) FY 1994 PLANS:

a. (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP): Continue FSD; Complete MSIIIA; Release for LRIP; Conduct At-Sea TECHEVAL; Conduct At-Sea OPEVAL; Initiate SPARROW MHIP Pre-planned Product Improvement (P3I) Program.

b. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Complete analysis of all tests.

c. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Complete delivery of 200 fuzes and start evaluation.

d. (U) GUIDANCE INTEGRATED FUZE: Conduct track analysis on optimum integration of functions.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: S1821 PROJECT TITLE: Conventional Fuze/Warhead Pkg

e. (U) ADVANCED AIMED WARHEAD: Develop capability to focus majority of warhead mass on the target rather than isotropically around the missile.

f. (U) ADVANCED AIMED FUZE: Develop the fuzing function necessary to initiate the Advanced Aimed Warhead.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENWPNDIV, Pt. Mugu, CA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Raytheon, Lowell, MA; Motorola, Scottsdale, AZ; Hughes Missile Systems Company (HMSC), Pomona, CA; IRISS (Joint Venture of Raytheon and HMSC).

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Program delays due to IR common seeker technical issues impacting flight test program.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

PMP	7/89
TEMP in OPNAV For Review	
MHIP AP SEA 89-02/88-28 (Rev 1) Approved	7/91

G. (U) RELATED ACTIVITIES:

PE 0603755N, Ship Self Defense
PE 0604366N, STANDARD Missile Improvements, Block IIIB MHIP fully describes the common milestones for this joint program that adds a common seeker to both STANDARD Missile and SPARROW Missile.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

WEAPONS PROCUREMENT, NAVY:

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN Line 18 SPARROW MODS	7,704	0	28,274	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

SPARROW:
PMTC flight Test
At-sea TECHEVAL
At-sea OPEVAL

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

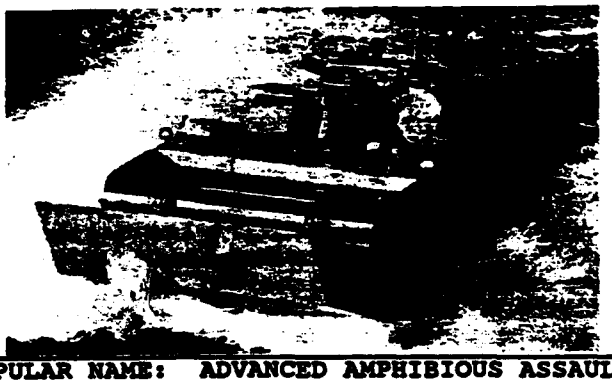
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
B0020	AAA	29,270	35,714	20,554	CONT.	CONT.
B1293	SCRE	11,805	17,057	0	0	110,998
	TOTAL	41,075	52,771	20,554	CONT.	CONT.

B. (U) DESCRIPTION: The Advanced Amphibious Assault (AAA) Program will design, develop, produce, and field a successor to the Marine Corps current amphibian, the AAV7A1. The AAA will provide the Marine Corps with Over-The-Horizon forcible-entry amphibious capability as well as the requisite survivability, firepower, and mobility to support operations ashore for FY 2005 and beyond. The Stratified Charge Rotary Engine (SCRE) is a lightweight/low volume, high horsepower engine for combat vehicles and other Department of Defense applications. The SCRE is one of several alternatives being evaluated for AAA application along with conventional diesels and gas turbine engines.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles
PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)



POPULAR NAME: ADVANCED AMPHIBIOUS ASSAULT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS-I 1st Quarter	CONT.
ENGINEERING MILESTONES	Concept Mockups	Hydro Test Rig Evaluation	Automotive Test Rig Evaluation	CONT.
T&E MILESTONES		Hydro Test Rig Evaluation	Automotive Test Rig Evaluation	CONT.
CONTRACT MILESTONES		Award 3rd Quarter		CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	12.759	25.872	11.967	CONT.	CONT.
SUPPORT CONTRACT	1.451	600	3.000	CONT.	CONT.
IN-HOUSE SUPPORT	12.363	8.132	5.427	CONT.	CONT.
GFE/ OTHER	2.697	1.110	160	CONT.	CONT.
TOTAL	29.270	35.714	20.554	CONT.	CONT.

B. (U) DESCRIPTION: Qualitative and quantitative improvements in equipment and forces of non-Soviet threats to United States national interests create severe deficiencies in the Marine Corps' current assault amphibian, the AAV7A1. Developing a replacement system that significantly improves water and land speed, offensive firepower, armor protection, cross country mobility and overall crew and system survivability is the objective of the AAA program. The AAA program will eliminate multiple mission area deficiencies in the ship-to-shore movement phase of the amphibious assault and during subsequent combat operations ashore.

(U) The Concept Exploration/Definition phase of this program is planned for completion during FY 1994. Recently completed operational effectiveness analysis and wargames have clearly identified the Advanced Assault Amphibious Vehicle (AAAV) alternative as the best solution to established mission deficiencies. The AAAV's inherent multimission capabilities have made it the best choice for being the principle means of surface mobility for forward deployed Marine Air Ground Task Force (MAGTF's). Current plans are for program documentation to be completed and approved, and a Milestone I Defense Acquisition Board (DAB) Review conducted during 1st Qtr FY 1994. Ongoing technical risk reducing contracts will be completed by the end of FY 1994 in anticipation of initiating prototype development in FY 1995.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles
PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Management of AAA Conceptual Design and technical risk reducing contracts, government verification testing of Concept Exploration/ Definition (CE/D) phase deliverables, review of Contract Data Deliverables and attendance at bi-monthly program reviews.

b. (U) Management of risk reduction contracts aimed at identification and mitigation of risk drivers in each contractor's conceptual design.

c. (U) Management of design specific experiments aimed at demonstrating viability of each design and reducing technical risk.

d. (U) Completed initial contractor AAA conceptual design studies.

e. (U) Completed technical evaluation of contractor initial conceptual design study reports.

f. (U) Completed independent weight verification studies and initial engine candidate studies.

g. (U) Updated contractor conceptual designs.

h. (U) Completed initial technical risk reducing experiments on contractor's conceptual designs.

2. (U) FY 1993 PROGRAM: Evaluate Technical Risk Reduction projects; prepare for DAB review.

3. (U) FY 1994 PLANS: Complete testing of full scale automotive test rigs; DAB MS-I review.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MCCDC, Quantico, VA; NTSC, Orlando, FL; NAVSURFWARCEN, Bethesda, MD; APG, Aberdeen, MD; Amphibious Vehicle Test Branch-Directorate, Camp Pendleton, CA; DRPM (AAA), Washington, DC. CONTRACTORS: Concept Exploration and Definition (CE/D) Phase: FMC, San Jose, CA; General Dynamics Land Division, Detroit, MI.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Execution of technical risk reduction activities prior to the DAB Milestone I review has extended the Concept Exploration phase approximately 12 months.

3. (U) Cost Changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles
PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)

F. (U) PROGRAM DOCUMENTATION:

1. (U) Mission Area Analysis	December	1987
2. (U) Mission Need Statement	April	1988
3. (U) Initial Life Cycle Cost Estimate	May	1988
4. (U) Program Decision Meeting	July	1988
5. (U) Acquisition Decision Memorandum	August	1988
6. (U) System Threat Assessment Report	March	1993
7. (U) Cost and Operational Effectiveness Analysis Update.	Feb 91 - Dec 92	

G. (U) RELATED ACTIVITIES: Project B1293, Stratified Charge Rotary Engine under this Program Element examines AAA candidate engines.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION (T&E):

1. (U) FY 1989-1991 T&E Results: The following developmental tests were conducted:

a. (U) Initial armor panel tests were conducted on both CE/D contractors' proposed armor design to validate their capability to defeat the specified threat.

b. (U) Hydrodynamic Model Tests were conducted on both CE/D contractors' 1/6 or 1/8 scale models of their proposed AAAV designs. These tests were conducted to validate drag, ride quality, and power estimates provided by the contractors.

c. (U) Two Early Operational Assessments (EOA) were conducted on the CE/D contractors' full-scale AAAV mock-ups to evaluate safety, training, maintenance, operational requirements, and other human factors issues.

2. (U) FY 1992 T&E: No tests will be conducted by the government during FY 1992. The government will monitor and evaluate all contractor tests conducted in conjunction with their technical risk reducing experiments.

3. (U) FY 1993 T&E: Government monitored and evaluated tests of each contractors' .75/.80 scale hydrodynamic test rigs.

4. (U) FY 1994 T&E: Government to conduct tests of each contractors' full scale automotive test rigs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures Systems

A. (U) RESOURCES: (Dollars in Thousands)

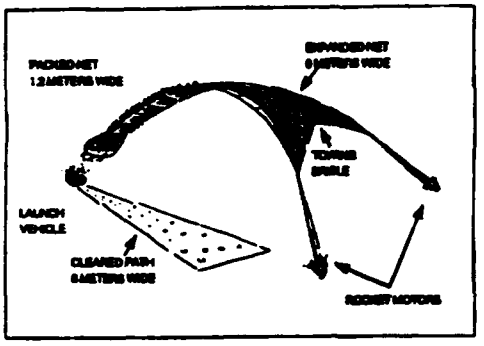
PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2104	Wide Area Mine Clearing System	0	0	0	CONT.	CONT.
C2106	Advanced Countermeasures System (ACS)[1]	0	0	2,743	11,747	14,490
	TOTAL	0	0	2,743	CONT.	CONT.

1 FY 1992 and FY 1993 funding is contained in Program Element (PE) 0603640M, Project C2078. FY 1994 funding is split between two PEs; $2,743 thousand in this PE and $3,700 thousand in PE 0603640M.

B. (U) DESCRIPTION: This PE focuses on the development and demonstration of mine clearing/countering devices.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures System (ACS)



POPULAR NAME: ACS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM			MS I	MS II 4Qtr/97
MILESTONES				MS III 4Qtr/01
ENGINEERING				
MILESTONES				LEVEL C SPECS 4Qtr/98
T&E				DT II 4Qtr/99
MILESTONES				OT II 2Qtr/98
CONTRACT				AWARD EMD
MILESTONES				CONTRACT 4Qtr/98

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT			925	8,000	8,924
SUPPORT CONTRACT			925	1,957	2,881
IN-HOUSE CONTRACT			893	1,790	2,685
GFE/ OTHER					
TOTAL			2,743	11,747	14,490

B. (U) DESCRIPTION: The ACS program focuses on the development of neutralizing advanced and hardened threat land mines as well as unexploded ordnance. Primary goals are: neutralization in-stride with assault operations; very high neutralization percentages against all types of mines; and neutralization with minimal hazard to personnel and equipment. This is a joint Army/Marine Corps program with the Army as the lead service, to satisfy the Stand-off Minefield Breach (SMB) requirement. The focus of this project is on unique amphibious/expeditionary Marine Corps requirements for the joint program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Funding contained in PE 0603640M, Project C2078.

a. (U) Fabricated and tested full scale Distributed Explosive Mine Neutralization System. Tests included systems flight tests and comprehensive laboratory/field warhead evaluation of early Advanced Technology Transition Demonstration (ATTD) hardware.

b. (U) Completed draft of Milestone 0 (MS 0) documentation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures System (ACS)

c. (U) Began risk reduction development/testing.

d. (U) Initiated ATTD performance specification.

e. (U) Began planning for joint Army/Navy/Marine Corps program.

2. (U) FY 1993 PROGRAM: Funding contained in PE 0603640M, Project C2078.

a. (U) Conduct risk reduction development/testing.

b. (U) Award Engineering Studies and Analysis contract for Concept Exploration and Development (CE&D) phase.

c. (U) Optimize/test key components and sub-systems.

d. (U) Initiate joint planning with Navy for surf-zone applications. Initiate joint planning with Army for land applications.

e. (U) Complete MS 0 documentation.

f. (U) Continue joint planning with Army for land applications for MS I transition.

g. (U) Initiate transition documentation for MS I.

h. (U) Award three CE&D phase conceptual design contracts.

3. (U) FY 1994 PLANS: $2,743 thousand contained in this PE and $3,700 thousand contained in PE 0603640M, Project C2078.

a. (U) Select candidate designs for Demonstration/Validation system, explosive warheads, and platform integration.

b. (U) Prepare/review MS I program documentation.

c. (U) Complete System Requirement Review.

d. (U) Complete Milestone I/II technical/program reviews.

e. (U) Continue joint planning with Army for the Demonstration/ Validation phase.

f. (U) Develop contract acquisition plan, solicitations, source selection plans, and engineering trade studies.

4. (U) PROGRAM TO COMPLETION: Complete MS II and transition ACS to PE 0604612M, Project C2182.

D. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCENDIV, Indian Head, MD; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; Ballistics Research Laboratory, Aberdeen, MD. CONTRACTORS: To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures System (ACS)

F. (U) PROGRAM DOCUMENTATION:

1. (U) Marine Corps Mission Need Statement September 1993

2. (U) Army Mission Need Statement September 1993

G. RELATED ACTIVITIES: PEs 0603606A/0603619A/0604080A, Improved Dispersed Explosive. Joint program Memorandum of Understanding between Army and Marine Corps is pending final signatures. PE 0603640M, Marine Corps Advanced Technology Transition Demonstration and PE 0604612M, Marine Corps Mine Countermeasures (Engineering). This program adheres to Tri-Service Reliance agreements.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Conduct Developmental Test II in 4Qtr/99. Conduct Operational Test II in 2Qtr/01.

FY 1994 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603634N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electromagnetic Effects Protection Development
PROJECT NUMBER: S0342 PROJECT TITLE: Electromagnetic Effects Protection Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0342	Electromagnetic Effects Protection Development	3,962	7,618	5,328	CONT.	CONT.

B. (U) DESCRIPTION: This project strengthens deterrence and enhances Naval force electronic and communication survivability through the development and testing of electromagnetic effects protection technology. Primary emphasis is on development of protection against electromagnetic pulse (EMP) effects and testing of "whole ship" to EMP threat level. Additionally, this project will provide for assessments concerning the reconstitution of nuclear missions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Prepared for at-sea Electromagnetic Pulse (EMP) trial (USS ANZIO).
b. (U) Performed system level EMP test and analysis.
c. (U) Analyzed test data to support specifications and standards.
d. (U) Developed Pulse Current Injection (PCI) and continuous wave free field test equipment.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct first at-sea EMP simulation trial of (USS ANZIO).
b. (U) Analyze test data from USS ANZIO EMP trial.
c. (U) Modify specifications and standards.
d. (U) Conduct follow-on total ship temporary hardening EMP trial.
e. (U) Conduct continuous wave free field test of USS ANZIO.
f. (U) Conduct nuclear CV/CVN strike reconstitution study.

3. (U) FY 1994 PLANS:

a. (U) Complete development of alternative test equipment.
b. (U) Analyze USS ANZIO test results.
c. (U) Modify specifications and standards.
d. (U) Complete data analysis of previous ship trials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Port Hueneme, CA. CONTRACTORS: Rockwell/GE-GESD/EG&G, Arlington, VA; Ingalls Shipbuilding, Pascagoula, MS, LATA, Alexandria, VA; ARS Alexandria, VA.

E. (U) RELATED ACTIVITIES: PE 0603514N, Ship Combat Survivability, Project S0384, Ship Survivability (Advanced).

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1598	Nuclear/Biological/Chemical (NBC) Equipment	514	1,765	6,054	CONT.	CONT.
C1964	Joint Anti-Armor Weapons System (JAAWS)/Javelin	415	447	464	1,272	14,119
C2112	Lightweight 155mm Howitzer	0	12,437	0	0	12,437
C2113	Short Range Anti-Armor Weapon (SRAW)	6,852	7,609	21,106	CONT.	CONT.
	TOTAL	7,781	22,258	27,624	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE) supports advanced development of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air Ground Expeditionary Force amphibious operations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1598 PROJECT TITLE: Nuclear/Biological/Chemical (NBC) Equipment

C. (U) DESCRIPTION: This program develops NBC equipment jointly with other services. Marine Corps efforts concentrate on amphibious characteristics involving detection, individual/collective protection and decontamination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Replaced Lightweight Decontamination System engines. Completed prototype design of Second Skin for M40 Mask. Continued development of Improved Laser Eye Protection. Began development of: Chemical Agent Warning System in the Amphibious Assault Vehicle (AAV); and M21 Remote Sensing Chemical Agent Alarm (RSCAAL) on-the-move product improvement. NBC Reconnaissance System (NBCRS) funding is contained in PE 0603640M, Project C2082. Completed NBCRS field demonstration, Developmental Test 0/Operational Test 0, and finalized documentation for planned transition.

2. (U) FY 1993 PROGRAM: Continue development of: M40 Mask Second Skin; Improved Laser Eye Protection; Chemical Agent Warning System in the AAV; and M21 RSCAAL product improvement. Review design and documentation requirements to support Milestone I for the NBCRS. Begin efforts to review design, build prototypes, and field test a new Lightweight NBC Glove. Begin field testing of a Lightweight Disposable Mask. Conduct live agent testing of an Individual NBC Detector and of an NBC Identification Monitor. Begin development of NBC Hazard Warning System. The Lightweight Chemical Protective Suit and the NBC Aerial Detector programs transition from PE 0603640M, C2082 at the end of FY 1993.

3. (U) FY 1994 PLANS: Complete background algorithm package for the M21 RSCAAL program. Procure suite of NBC equipment to integrate into the NBCRS. Begin efforts to further develop a software integration unit to link NBC equipment into the computer system of the NBCRS. Conduct live agent testing of new Chemical and Lightweight NBC Gloves, Suits and Detectors. Complete the NBC Information Warning System.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; CRDEC, Aberdeen, MD. CONTRACTORS: Brunswick Corporation, Deland, FL; Battelle Laboratory, Columbus, OH; Environmental Technologies Group, Baltimore, MD.

F. (U) RELATED ACTIVITIES: Program Transitions from PE 0603640M C2082 at the end of FY 1993

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 110	175	912	1,305	0	2,392
(U) PMC Line 105	2,100	2,055	0	0	4,155

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin



POPULAR NAME: JAVELIN

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS II June		MS IIIA April	MS III - April 1996 IOC - 3rd Qtr FY 1997
ENGINEERING MILESTONES				
T&E MILESTONES	PPQT	FDT&E Feb - Apr PT&DBT	IOT&E Sep - Dec	
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	22		0	2,118
SUPPORT CONTRACT	41	130	170	159	1,412
IN-HOUSE SUPPORT	374	295	294	1,113	10,589
GFE/ OTHER					
TOTAL	415	447	464	1,272	14,119

B. (U) DESCRIPTION: This project provides for the Marine Corps participation in the Joint Anti-Armor program entitled Javelin (Advanced Anti-tank Weapon System-Medium (AAWS-M)). This unique weapon system will provide the Marine Corps and Army with a state-of-the-art capability to destroy sophisticated and future armored threats. No such medium anti-armor system is currently available to the infantryman.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued to monitor and participated in the joint development, developmental testing, and operational testing of the Javelin (AAWS-M).

b. (U) Marine Corps participated in joint Defense Advanced Research Projects Agency/Army/Marine Corps Anti-Armor program transfers to PE 0603640M, Marine Corps Advanced Technology Transition Demonstration (ATTD), Project C2117, Joint Armor/Anti Armor Technology in FY 1992.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

2. (U) FY 1993 PROGRAM:

a. (U) Continue to monitor and participate in the joint development and operational testing of the Javelin (AAWS-M).

b. (U) Develop Marine Corps supportability concepts.

c. (U) Continue to prepare for Navy Weapons System Explosive Safety Review Board for shipboard qualification.

d. (U) Participate in Force Development Testing and Experimentation (FDTE).

3. (U) FY 1994 PLANS: Continue to monitor and participate in the joint development, Milestone IIIA and Low Rate Initial Production decision (LRIP).

4. (U) PROGRAM TO COMPLETION:

a. (U) Continue to monitor and participate in the joint development Milestone III decision and Full Rate Production (FRP).

b. (U) No further development or operational testing is required.

c. (U) This program is planned to complete in FY 1997.

D. (U) WORK PERFORMED BY: IN-HOUSE: Army Missile Command, Redstone Arsenal, AL; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Texas Instruments/Martin Marietta Joint Venture, Lewisville, TX.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Joint Service Operations Requirements - 4 April 1986

2. (U) Test and Evaluation Master Plan - February 1990

3. (U) System Threat Assessment - August 1990

4. (U) Integrated Program Assessment - Draft May 1992

5. (U) Program Baseline - August 1992

6. (U) Milestone II - June 1992

G. (U) RELATED ACTIVITIES: Army Armor/Anti Armor programs for heavy and light systems.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE FUNDS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

J. (U) TEST AND EVALUATION:

1. (U) Force Development Test and Experimentation (FDT&E), February - April 1993

2. (U) Portability Test April - May 1993

3. (U) Dirty Battlefield Test, May - June 1993

4. (U) Initial Operational Test and Evaluation (IOTE), September - December 1993

5. (U) Pre-Production Qualification Test (PPQT), September 92 - August 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)



POPULAR NAME: Predator

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		MS II September		MS III 2nd Qtr 2001	
ENGINEERING MILESTONES				CDR	
T&E MILESTONES				DT/OT	
CONTRACT MILESTONES					

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,003	4,356	18,256	CONT.	CONT.
SUPPORT CONTRACT	154	240	250	CONT.	CONT.
IN-HOUSE SUPPORT	3,695	3,013	2,600	CONT.	CONT.
GFE/ OTHER				CONT.	CONT.
TOTAL	6,852	7,609	21,106	CONT.	CONT.

B. (U) DESCRIPTION: Predator/SRAW will provide the Marine Corps with a lethal, disposable, fire and forget, top-attack, soft launch for firing from enclosed spaces, proliferable, accurate, night vision capable, lightweight, main battle tank killer.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Contractor's Test Missiles 2 through 6 were successfully flown in first quarter 1992.

b. (U) As of 18 September 1992, Predator's missile test program had 40 flights.

2. (U) FY 1993 PROGRAM:

a. (U) Complete 2 full-up missile flights scheduled for February/ March 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)

b. (U) Achieve Milestone II.

c. (U) Initiate Engineering and Manufacturing Development (EMD).

3. (U) FY 1994 PLANS:

a. (U) Continue EMD phase of program.

b. (U) Review by Weapons System Explosive Safety Review Board.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURWARCENDIV, Dahlgren, VA. CONTRACTORS: Loral Aeroneutronic Division, Newport Beach, CA; and Radian, Dumfries, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: The system is exceeding all expectations. Critical specifications are being bettered by a factor of 2 to 2-1/2 times.

2. (U) Schedule changes: Three year Engineering and Manufacturing Development (EMD) phase being changed to a six year EMD.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) The following documents were approved prior to the February 1990 Milestone I decision:

a. (U) Required Operational Capability

b. (U) Acquisition Decision Memorandum

c. (U) Acquisition Plan

d. (U) Life Cycle Cost Estimate

2. (U) The following are many of the documents which will be approved prior to the September 1993 Milestone II decision:

a. (U) Operational Requirements Document

b. (U) Systems Threat Assessment Report

c. (U) Intelligence Report

d. (U) Integrated Program Summary

e. (U) Life Cycle Cost Estimate

f. (U) Acquisition Program Baseline Agreement

g. (U) Test and Evaluation Master Plan

h. (U) Development Test and Evaluation Report

i. (U) Cost and Operational Effectiveness Analysis

j. (U) Acquisition Decision Memorandum

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)

3. (U) In addition to those listed above, the Live Fire Test and Evaluation Report will be completed prior to Milestone III decision.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TESTING AND EVALUATION: DTI/DTII in the year 2000.
OTI/OTII in the year 2001.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2078	Mine Neutralization	4,158	3,438	5,703	CONT.	CONT.
C2079	Stand Off Mine Detection (SOMD) System	0	3,491	3,216	3,927	10,634
C2080	Weaponry	1,489	6,502	6,251	12,098	26,340
C2081	Battlefield Electronic Support	1,877	2,044	6,374	CONT.	CONT.
C2082	Chemical/Biological Defense	2,244	1,898	860	CONT.	CONT.
C2115	Joint Tactical Directed Energy Weapon (TDEW) Technology	474	2,362	1,724	CONT.	CONT.
C2117	Joint Armor/Anti-Armor Technology (JAAT)	2,695	2,469	978	CONT.	CONT.
C2118	Advanced Engine/Propulsion Technology	3,052	3,144	3,229	CONT.	CONT.
C2153	Joint Very Shallow Water Mine Countermeasures (JVSWMCM)	0	0	680	CONT.	CONT.
C2155	Marine Corps Expeditionary Vehicle	0	0	6,799	CONT.	CONT.
TOTAL		15,989	25,348	35,815	CONT.	CONT.

B. (U) DESCRIPTION: Critical Marine Corps requirements being addressed in this program element are Standoff Mine Detection for surf zone and ashore; Mine Neutralization; Chemical/Biological Defense capability for Marine personnel and material; Advanced Infantry and Vehicle Mounted Weapon Systems; application of computer technology and advanced command and control architectures to Battlefield Electronic Systems and Command and Control Systems; protection from emerging laser weapons; and very high power/low-weight engines, drive-trains, and suspensions for future vehicles. This is an ongoing program to develop and demonstrate advanced technologies and system concepts in a quasi-operational environment. Multiple transitions into the Demonstration/Validation phase are planned, as well as fieldable prototyping to reduce risk in Engineering and Manufacturing Development. Joint service efforts are in line with Science and Technology Reliance agreements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2078 PROJECT TITLE: Mine Neutralization

C. (U) DESCRIPTION: Develops and demonstrates explosive, mechanical, and electro-magnetic technologies and concepts for neutralizing advanced and hardened threat land mines; wide-area, standoff type mines; and unexploded ordnance during amphibious assault operations and subsequent operation ashore and in littorals. Primary goals are: neutralization in-stride with assault operations; very high neutralization percentages against all types of mines; and neutralization with minimal hazard to personnel and equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Advanced Countermine System (ACS) (formerly titled Distributed Explosive Mine Neutralization System (DEMNS)): Completed demonstration of full scale prototype. Began Demonstration/Validation (DEM/VAL) transition preparation. Completed ATTD performance specification. Initiated planning for joint Army/Navy/Marine Corps program.

2. (U) FY 1993 PROGRAM:

a. (U) ACS: Conduct risk reduction development/testing. Award contracts for Concept Exploration and Development phase. Optimize/test key components and sub-systems. Initiate joint planning with Navy for surf-zone applications, and with Army for land applications. Complete Milestone 0 documentation. Initiate transition documentation.

b. (U) Off Route Smart Mine Clearance (ORSMC): Prepare ATTD documentation. Plan ATTD project (joint with Army).

c. (U) Autonomous Mine Countermeasures System (AMCMS): Prepare ATTD documentation. Plan ATTD project.

3. (U) FY 1994 PLANS:

a. (U) ACS: Conduct system demonstrations. Conduct Operational Test-0 and extensive Early Operational Assessment. Prepare Level A specification. Begin transition to DEM/VAL phase in PE 0603612M.

b. (U) ORSMC: Begin ATTD (joint with Army). Refine concept and optimize candidate neutralization technologies. Fabricate and test components and sub-systems. Refine signature duplication software.

c. (U) AMCMS: Begin ATTD project. Select candidate technologies and concepts. Fabricate and test components and sub-systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN, Dahlgren, VA, Indian Head, MD, and White Oak, MD; Army Belvoir Research, Development, and Engineering Center, Ft. Belvoir, VA; Sandia National Laboratory, Albuquerque, NM; Ballistics Research Laboratory, Aberdeen, MD. CONTRACTORS: HiTech Corporation, East Camden, AR; Alliant Technology Systems, Edina, MN.

F. (U) RELATED ACTIVITIES: PE 0602315N, MCM, Mining and Special Warfare Technology; PE 0602131M, Marine Corps Landing Force Technology; PE 0603612M, Marine Corps Mine Countermeasures; PE 0603635M, Marine Corps Ground Combat/Support System; PE 0603555N, Undersea Superiority Technology Demonstration; PE 0603606A, Landmine Warfare and Barrier Advanced Technology; PE 0603619A, Landmine Warfare and Barrier Advanced Development; PE 0604808A, Landmine Warfare and Barrier Engineering Development. Negotiations are underway to join Army programs and the ACS/ORSMC/AMCMS projects into joint programs at the appropriate milestone.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2079 PROJECT TITLE: Standoff Mine Detection (SOMD) System

C. (U) DESCRIPTION: Develops standoff mine and minefield detection technologies for Marine Corps amphibious operations and Army/Marine Corps land operations, including detection of buried land mines. Requirements are real-time high speed day/night operations, and detection at standoff ranges up to 3000 meters. Demonstrates sensor technologies such as passive optical, active laser, infrared, and ground penetrating radar, as well as advanced image processing algorithms. Technology concepts will be demonstrated in operational tests and field environments. Program will be joint between Marine Corps, Army, and Advanced Research Projects Agency (ARPA), building on accomplishments of the Army Standoff Minefield Detection System (STAMIDS) and transitioning Navy/Marine Corps 6.2 multi-spectral imaging technologies. SOMD will demonstrate far-field sensing techniques operating from an air platform.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Develop techniques for long-range detection of buried mines based on multi-sensor fusion and advanced image processing algorithms. Implement a joint program Memorandum of Understanding (MOU) between ARPA, Army, and Marine Corps. Define system concepts, conduct experimental investigations of competing sensor and processing technologies, and initiate technology development.

3. (U) FY 1994 PLANS:

a. (U) Continue joint technology development efforts with ARPA and Army in sensors, processing, test and evaluation. Downselect sensor and processing technologies and begin prototype system design and integration.

b. (U) Initiate integration of sensor in airborne test bed.

4. (U) PROGRAM TO COMPLETION: Complete SOMD technology development and transition to PE 0603612M and/or Army mine detection programs. This project is planned to complete at the end of FY 1996.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN, Panama City, FL; Department of Energy, Las Vegas, NV; Army Belvoir Research, Development and Engineering Center, Ft. Belvoir, VA. CONTRACTORS: Lawrence Livermore National Laboratory, Livermore, CA; KAMAN Aerospace, Tuscon, AZ and Bloomfield, CT; University of Washington, Seattle, WA. Others to be determined.

F. (U) RELATED ACTIVITIES: PE 0603606A, Landmine Warfare and Barrier Advanced Technology; PE 0602131M, Marine Corps Landing Force Technology; PE 0602315N, MCM, Mining and Special Warfare Technology; PE 0603555N, Undersea Superiority Technology Demonstration; PE 0603612M, Marine Corps Mine Countermeasures.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2080 PROJECT TITLE: Weaponry

C. (U) DESCRIPTION: Develops technology for Marine Corps weaponry to meet Marine Air Ground Task Force future combat needs. Focus is on leveraging other service efforts to meet Marine Corps unique requirements. Joint efforts are pursued with the other services through Tri-Service Science and Technology Reliance agreements. This project is coordinated with the Joint Services Small Arms Program, Joint Services Medium Caliber Automatic Weapon Technology Working Group, and Joint Electronic Armament Committee.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Cannon Caliber Electromagnetic Gun (CCEMG) -- Initiated three phased contract to include the associated hypervelocity projectile. Initiated system analysis and component trade-off analysis.
b. (U) Advanced Systems for Air Defense (ASAD) -- Initiated ATTD, using 6.2 technology for alertment and cuing of weapon sensors.
c. (U) Team Target Engagement Simulator (TTES) -- Initiated ATTD for modelling and simulation of infantry combat.

2. (U) FY 1993 PROGRAM:

a. (U) CCEMG -- Complete system analysis and component trade-off analysis. Design system, develop breadboard and conduct repeat single shot firing of CCEMG.
b. (U) ASAD -- Validate detection, cuing ability, and acoustic sensor components. Refine system design.
c. (U) TTES -- Develop interaction and branching technology. Initiate contract to develop synthetic reality technology for urban combat training.

3. (U) FY 1994 PLANS:

a. (U) CCEMG -- Salvo fire skid mounted CCEMG and refine system design.
b. (U) ASAD -- Refine design, integrate advanced processors for weapons sensors and award development contract.
c. (U) TTES -- Refine and complete human interface into synthetic urban force-on-force engagements.
d. (U) Advanced Lightweight Ground Weapons (ALWGW): Conduct technology development to demonstrate enhanced lethality for ground weapons. Issue Broad Agency Announcement for concepts.

4. (U) PROGRAM TO COMPLETION: Complete CCEMG, ASAD, TTES and ALWGW. Project is planned to complete at the end of FY 1997.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCEN, Dahlgren,VA; NAVAIRWARCENDIV, China Lake, CA; Army Research, Development and Engineering Center, Picatinny, NJ; Chemical Research, Development and Engineering Center, Aberdeen, MD; Naval Training Systems Center, Orlando, FL. CONTRACTORS: FMC, Minneapolis, MN.

F. (U) RELATED ACTIVITIES: PE 0603004A, Weapons and Munitions Advanced Technology; PE 0603607A, Joint Service Small Arms Programs.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2081 PROJECT TITLE: Battlefield Electronic Support

C. (U) DESCRIPTION: Demonstrates advanced technologies to improve Marine Corps Command and Control, Communications, and Intelligence (C3I) systems. Efforts are coordinated with the Marine Tactical Command and Control System (MTACCS) system architecture. Technologies are demonstrated in a series of C3I Field Demonstration Systems (FDS), which provide a vehicle for transitioning emerging C3I technologies into scheduled upgrades of MTACCS.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Amphibious Assault Networking Technology (AANT) -- Continued design of system to improve robustness of ship-to-shore communications, provide increased data throughput, and leverage Navy Copernicus architecture development.

b. (U) Command and Control in the Year 2000 (C2-2000) -- Initiated system development combining functions of 13 MTACCS component systems in a single Marine Corps Air-Ground C2 system, leveraging the Naval Tactical Control System - Afloat (NTCS-A), with interfaces to corresponding Army and Air Force architectures.

c. (U) Forward Observer/Forward Air Controller (FO/FAC) -- Initiated development of a man-portable system to accurately determine self and target location, with integrated communications link to call in fire.

2. (U) FY 1993 PROGRAM:

a. (U) AANT -- Complete assembly of AANT module at Marine Corps Tactical System Support Activity (MCTSSA) for FY 1994 demonstrations.

b. (U) C2-2000 -- Identify target MTACCS systems for inclusion. Convert Combat Information Processor, Advanced Tactical Air Command Central and Intelligence Analysis System to run on NTCS-A Unified Build and merge them into NTCS-A Landing Force Module.

c. (U) FO/FAC -- Complete system designs. Begin prototype assembly.

3. (U) FY 1994 PLANS:

a. (U) AANT -- Demonstrate target capabilities during Naval Communications Support System demonstrations.

b. (U) C2-2000 -- Convert MTACCS components Tactical Combat Operations, Advanced Field Artillery Tactical Data System, Improved Direct Air Support Center, Marine Combat Service Support Control System to run on NTCS-A Unified Build and merge them into NTCS-A Landing Force Module.

c. (U) FO/FAC -- Complete prototype integration. Demonstrate initial system capabilities.

d. (U) FDS -- Initiate task to provide quick demonstration of technology solution to command, control, communications, computers and intelligence (C4I) problems identified during Fleet Marine Force exercises.

e. (U) Joint Identification Friend or Foe -- Initiate concept design for Marine Corps portion of joint project for combat identification.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCTSSA, Camp Pendleton, CA; NCCOSC, San Diego, CA; Harry Diamond Laboratory, Adelphi, MD; NESEA, St. Inigoes, MD; NAVSURFWARCEN, Dahlgren, VA. CONTRACTORS: TRANSDEC, San Diego, CA; RF Micro Systems, El Cajon, CA.

F. (U) RELATED ACTIVITIES: PE 0603794N, C3 Advanced Technology; PE 0204163N, Fleet Communications; PE 0603731M, Marine Corps Command/Control/ Communications Systems (Advanced); PE 0206623M, Marine Corps Ground Combat/Supporting Arms Systems; PE 0603772A, Battlefield Force Integration.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2082 PROJECT TITLE: Chemical/Biological Defense

C. (U) DESCRIPTION: This project provides for Marine Corps unique requirements in Chemical/Biological Defense. Efforts are extensively coordinated with the Army and focus on leveraging Army technology. Includes the following tasks:

1. (U) Nuclear/Biological/Chemical Reconnaissance System (NBCRS) -- Provides capability to detect Nuclear/Biological/Chemical (NBC) agents in near real-time from a mobile ground platform.

2. (U) Lightweight Suit Technology (LIST) -- Addresses critical need for increased protection against NBC threats, while addressing heat stress and logistics issues.

3. (U) Lightweight Chemical Agent Stand-off Detector (LCASD) -- develops a small, lightweight (20 lbs.) real-time detector suitable for use in an unmanned or remotely piloted aerial vehicle.

4. (U) Survivability Technology for Amphibious Vehicles -- Develops new concepts for improved vehicle and crew NBC survivability in Marine Corps unique fighting vehicles. Demonstrates collective protection, enhanced sustainability, increased mobility, and increased survivability in expeditionary NBC environment. In FY 1994, this project transitions from NBC to a vehicle survival focus involving camouflage, low observable, blast/penetration resistance and stand-off detection, identification and warning of NBC threats.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) NBCRS -- Completed High Mobility Multi-purpose Wheeled Vehicle (HMMWV) NBCRS field demonstration, and finalized documentation for transition to DEM/VAL phase in PE 0603635M.

b. (U) LIST -- Completed two 15 day wear tests of lightweight suits/rainwear. Initiated live agent test evaluations.

c. (U) LCASD -- Completed aerial standoff detector prototype tests from HMMWV platform, detecting chemical agents while on-the-move.

2. (U) FY 1993 PROGRAM:

a. (U) LIST -- Complete testing of lightweight suits/rainwear and aerial standoff detector and prepare transition documentation. Finalize hardware performance specifications. Transition to joint service program.

b. (U) LCASD -- Complete program documentation, transition to PE 0603635M.

3. (U) FY 1994 PLANS:

a. (U) Survivability Technology for Amphibious Vehicles -- Incorporate small, catalytic oxidation filtration system for use as collective protection system into amphibious vehicle. Integrate interior NBC warning system into amphibious vehicle. Address low observable technologies and mine/blast survivability issues.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: US Army Natick Research & Development Center, Natick, MA; NAVSURFWARCEN, Dahlgren, VA; NRL, Washington, DC; Chemical Research, Development and Electronics Command, Aberdeen, MD. CONTRACTORS: Los Alamos National Laboratory, Los Alamos, NM; Battelle, Columbus, OH; Solar Turbines, San Diego, CA; Hughes Aircraft, Santa Barbara, CA.

F. (U) RELATED ACTIVITIES: PE 0603759A, Chemical Biological Defense and Smoke Advanced Technology; PE 0604806A, Chemical/Biological Defense Equipment - Engineering Development; PE 0603611M, Marine Corps Assault Vehicles; and PE 0603635M, Marine Corps Ground Combat/Support System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2115 PROJECT TITLE: Joint Tactical Directed Energy Weapon (TDEW) Technology

C. (U) DESCRIPTION: This project provides Marine Corps participation in joint demonstrations of defensive and offensive directed energy (DE) technologies. TDEW has been classified into these categories: radio frequency energy, lasers, and particle beam technology. The focus is multi-frequency countermeasure technologies and protection of Marines and their optics/electro-optic systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Participated in joint service frequency agile advanced technology protection program. Completed Counter Target Acquisition System testing. Transitioned broadband protection program for optics/electro-optics to MARCORSYSCOM Program Manager, Ground Weapons.

2. (U) FY 1993 PROGRAM: Continue participation in joint service frequency-agile protection program. Demonstrate prototype system hardware. Begin joint (Army) service, international (United Kingdom(UK)) OUTRIDER, Combat Protection System program, utilizing Embrace STINGRAY technology. Demonstrate brassboard HMMWV by year's end. Begin joint effort (ARPA, Army, Navy, UK) for STINGRAY/OUTRIDER. Continue joint effort with Air Force on non-permanent laser denial adjunct device.

3. (U) FY 1994 PLANS: Test prototype agile laser protection devices delivered in FY 1993. Continue operational test plan for OUTRIDER. Begin technical testing of OUTRIDER. Continue joint DE modeling effects of active countermeasure systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVAIRWARCENACDIV, Warminster, PA; Center for Night Vision and Electro-Optics, Ft. Belvoir, VA; NRDEC, Natick, MA; DARPA, Arlington, VA; Army Communications and Electronics Command, Ft. Monmouth, NJ. CONTRACTORS: Lawrence Livermore National Laboratory, Livermore, CA; Los Alamos National Laboratory, Los Alamos, NM.

F. (U) RELATED ACTIVITIES: PE 0604207A, STINGRAY; PE 0604710A, Night Vision Systems - Engineering Development; PE 0602301E, Computing Systems and Communication Technology; PE 0602131M, Marine Corps Landing Force Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2117 PROJECT TITLE: Joint Armor/Anti-Armor Technology (JAAT)

C. (U) DESCRIPTION: The JAAT program explores high risk, innovative technologies or unconventional approaches to armor/anti-armor development. Efforts are extensively coordinated with the Army, and leverage Army technology to meet Marine Corps operational requirements, including Armor for Marine Corps unique vehicles, and improved Anti-Armor technology for Marine Corps weapons.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Demonstrated heavy metals and conventional liner materials applied to tandem and secondary chemical energy (CE) warheads. Advanced liner materials and liner geometries were applied to tandem precursor CE warheads. Developed tandem CE warhead integration hardware and initiation systems. Conducted investigations into the penetration phenomenology of kinetic energy (KE) penetrators. Sub-scale penetration was conducted with segmented, hybrid and cylindrical rods against Rolled Homogeneous Armor, ceramic and reactive armors at hypervelocities. Continued development of Light Applique System Technique Armor, investigated alternative armors and three cover materials. Initiated selective armor upgrade for the High Mobility Multi-purpose Wheeled Vehicle. Continued Phase II of the Armor Protection Program. Awarded Phase III Enhanced Survivability effort contracts.

2. (U) FY 1993 PROGRAM: Pursue advanced CE warhead concepts - multi-purpose warhead technology, coupled CE and KE lethal mechanisms. Develop advanced KE penetrators - alternate penetrator materials and hypervelocity projectile design. Develop high-performance, lightweight, marine environment compatible armor for Marine Corps unique combat vehicles. Joint MOU expires at the end of FY 1993. Transition promising armor and CE warhead technologies to Marine Corps program, and continue development efforts.

3. (U) FY 1994 PLANS: Develop advanced technologies for warheads and shoulder fired anti-armor weapons. Continue to develop structural and applique high-performance, lightweight, marine-environment, compatible armors for Marine Corps unique requirements. Identify promising advanced vehicle survivability systems to reduce all vehicle signatures, visual, aural, Infrared, and radar being pursued in Exploratory Development and prepare for transition to this program. Coordinate efforts with Army and ARPA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCEN, Bethesda, MD; Combat Systems Test Activity, Aberdeen, MD. CONTRACTORS: Los Alamos National Laboratory, Los Alamos, NM; Lawrence Livermore National Laboratory, Livermore, CA; Alliant Technology Systems, Brooklyn Park, MN; DuPont, Newark, DE; Foster-Miller, Waltham, MA; GDLS, Warren, MI; KAMAN, Colorado Springs, CO; FMC, San Jose, CA; Aerojet Electro-systems, Azusa, CA; Nuclear Metals Incorporated, Concord, MA; Physics International Company, San Leandro, CA.

F. (U) RELATED ACTIVITIES: PE 0603226E, Experimental Evaluation of Major Innovative Technologies; PE 0602618A, Ballistics Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2118 PROJECT TITLE: Advanced Engine/Propulsion Technology

C. (U) DESCRIPTION: The Advanced Engine/Propulsion Technology program develops and demonstrates alternative engine and propulsion system and component advanced technology to meet Marine Corps unique water and land mobility requirements. The engine technology will achieve weight, speed, range, and marine-environment compatibility requirements for the future Assault Amphibian Vehicle.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Propulsion Systems Demonstrator (PSD) water testing, initiated land testing.

b. (U) Achieved required power of 223 HP during test of German Motoren Und Turbinen-Union (MTU) Ka-502 single cylinder engine. Demonstrated contract specifications of 2220 HP at both 3000 and 3300 revolutions per minute (RPM). Successfully completed 200 hour durability test at 2220 HP. Initiated design for the MTU Ka-503 2600 HP engine.

c. (U) Demonstrated 100 brake HP at 1780 RPM and peak cylinder firing pressure of 4,000 pounds per square inch on Turbo-Rotor-Compound (TRC) mono-cylinder test rig. Completed Three Cylinder TRC Air Management Study. Completed conceptual designs of installation of Three Cylinder TRC engine into various vehicles.

2. (U) FY 1993 PROGRAM:

a. (U) Complete combustion photography experiment.

b. (U) Finish detail design of MTU 2600 HP engine, procure long lead items and conduct developmental testing.

c. (U) Award three cylinder TRC engine contract. Complete conceptual design study.

3. (U) FY 1994 PLANS:

a. (U) Begin installation of German MTU 2220 HP engine into PSD.

b. (U) Begin fabrication of three cylinder TRC engine.

c. (U) Install composite heat exchangers in PSD, demonstrate increased cooling efficiency and weight reduction.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCEN CARDEROCK DIV, Bethesda, MD. CONTRACTORS: MTU Corporation, Friedrichshafen, Germany; Detroit Diesel, Detroit, MI; Engine Corporation of America, Anaheim, CA; AAI Corporation, Cockeysville, MD.

F. (U) RELATED ACTIVITIES: PE 0603005A, Combat Vehicle and Automotive Advanced Technology; PE 0602702E, Tactical Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2153 PROJECT TITLE: Joint Very Shallow Water Mine Countermeasures (JVSWMCM)

C. (U) DESCRIPTION: This program focuses on the development and demonstration of technologies and concepts for neutralizing advanced and hardened mines as well as wide-area, standoff type mines and unexploded ordnance, in the surf zone/beach area of the Amphibious Operations Area. Primary goal is to support the approved near-term VSWMCM concept of Operations for the beach/craft landing zone areas for the following functions: neutralization while moving with assault operation; very high neutralization percentages against all types of mines; and neutralization with minimal hazard to personnel and equipment. This project will be the Marine Corps' share of the joint Marine Corps and Navy program, and will specifically address amphibious craft landing zone needs not covered by Army or Navy projects.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Participate in joint Navy/Marine Corps JVSWMCM program.

b. (U) Refine exploratory development concept and optimize candidate neutralization technologies. Identify unique Marine Corps technology needs for the near-term VSWMCM concept of Operations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCEN, Indian Head, MD and Silver Spring, MD; ERDEC, Ft. Belvoir, VA; Army Ballistics Research Laboratory, Aberdeen, MD; Wright Laboratories, Tyndall AFB, FL. CONTRACTORS: Sandia National Laboratory, Albuquerque, NM and others to be determined.

F. (U) RELATED ACTIVITIES: Program Element 0603555N, Undersea Superiority Technology Demonstration. This program is in compliance with Tri-Service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Transition Demonstration (ATTD)
PROJECT NUMBER: C2155 PROJECT TITLE: Marine Corps Expeditionary Vehicle

C. (U) DESCRIPTION: This joint ARPA, Army, and Marine Corps program is devoted to the development and demonstration of the technologies necessary to define a light expeditionary vehicle that is amphibiously deployable and air-dropable. Addresses unique water and land mobility requirements in support of Marine Corps mission to conduct maneuver warfare from the sea. Emphasis will be placed on demonstrating technologies that reduce vehicle weight while improving vehicle survivability, mobility and maintainability. The program refines and demonstrates innovative composite materials for weight reduction, improved ballistic protection, and advanced signature reduction technologies transitioning from Exploratory Development. This project is fully coordinated with and complementary with Director of Defense Research and Engineering (DDR&E) Thrust Area 5 on Advanced Land Combat.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

   a. (U) Conduct component and vehicle system development efforts.

   b. (U) Initiate vehicle concept designs/trade-off studies.

   c. (U) Initiate plan for survivability systems integration.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCEN, Bethesda, MD; Army Tank and Automotive Command, Warren, MI; DARPA, Arlington, VA. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: PE 0602131M, Marine Corps Landing Force Technology; PE 0603005A, Combat Vehicle and Automotive Advanced Technology; PE 0602702E, Tactical Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0377	Explosive Ordnance Disposal Procedures	5,113	5,859	6,450	CONT.	CONT.
Q1317	Explosive Ordnance Disposal Diving Systems	3,058	3,249	2,909	CONT.	CONT.
	TOTAL	8,171	9,108	9,359	CONT.	CONT.

B. (U) DESCRIPTION: This is a Joint Service Program. Provides for the development of Explosives Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive 5160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Increasing types of foreign and domestic weapons necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render safe and dispose of sea mines and other underwater ordnance.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development
PROJECT NUMBER: Q0377 PROJECT TITLE: Explosive Ordnance Disposal Procedures

C. (U) DESCRIPTION: Provide Explosive Ordnance Disposal personnel of all military services with the specialized equipment and tools required to support their mission of detection, location, identification, rendering safe, recovery, field and laboratory evaluation, and final disposal of nuclear, conventional, chemical, and biological munitions, including improvised explosive devices.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. Received approval for production for MK 29 Mod 0 All Metals Locator.

b. Completed technical evaluation testing on EX 50 Mod 0 Remote Controlled Reconnaissance Monitor (RECORM) and Diver Acoustic Navigation System (DANS) projects.

c. Initiated Mobile Ordnance Disruption System (MODS) project.

2. (U) FY 1993 PROGRAM:

a. Obtain Approval for Production for DANS.

b. Complete operational testing on RECORM.

c. Initiate Expendable Dearmer projects.

3. (U) FY 1994 PLANS:

a. Obtain Milestone II decision for MODS, Expendable Dearmer and Remote Ordnance Neutralization System (RONS).

b. Obtain approval for production for RECORM.

c. Initiate Remote Firing Device project.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval EODTC, Indian Head, MD. CONTRACTORS: Datasonic, Inc., Cataumet, MA; Battelle-PNL, Richland, WA; Battelle-Columbus, OH; SPARTA INC, Huntsville, AL; OAO, Greenbelt, MD.

F. (U) RELATED ACTIVITIES: PE 0602315N, MCM Mining and Special Warfare Technology, provides for the development of new technologies which show promise and the transition to advanced development. PE 0604654N, Joint Service Explosive Ordnance Disposal Development, provides for the integration of specialized tools and equipment into specified procedures required for individual weapons and ordnance items.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE 184	294	697	740	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development
PROJECT NUMBER: Q1317 PROJECT TITLE: Explosive Ordnance Disposal Diving System

C. (U) DESCRIPTION: Development of diving equipment and explosive charges to support Explosive Ordnance Disposal (EOD) underwater operation. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render safe, and dispose sea mines and other underwater ordnance.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Commenced Technical Evaluation (TECHEVAL) for the EX19 Conventional Dive System.
   b. (U) Completed certification and began production of the Emergency Breathing System.
   c. (U) Commenced studies of the maximum percentage of oxygen in the breathing medium that can be provided to a diver.
   d. (U) Continued TECHEVAL of the MK 98 Neutralization Charge.

2. (U) FY 1993 PROGRAM:
   a. (U) Complete development and gain approval for Navy use status for the Underwater Fiberoptic Communications System.
   b. (U) Commence evaluation of improvements in diver worn equipment and procedures which increase diver capability during 300 foot dives.
   c. (U) Improve diver operated non-magnetic underwater object location capabilities.
   d. (U) Improve EOD non-magnetic underwater object lift capability.
   e. (U) Commence studies of the strength, mobility, and endurance required of NAVY EOD Technicians to perform their assigned missions in order to establish and validate entry level and maintenance physical fitness requirements.
   f. (U) Evaluate non-development item (NDI) capabilities for diving against chemical warfare agents.
   g. (U) Continue TECHEVAL of the MK 98 Neutralization Charge.

3. (U) FY 1994 PLANS:
   a. (U) Develop equipment which improves diver capability and endurance.
   b. (U) Develop a non-magnetic underwater laser augmented imaging system.
   c. (U) Develop a non-magnetic underwater lift system.
   d. (U) Evaluate non-magnetic acoustic firing devices.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCEN ORDSTA, Louisville, KY; Naval EODTC, Indian Head, MD; NEDU, Panama City, FL.; NAVSURFWARCEN MINEWARENGACT, Yorktown, VA. CONTRACTORS: Applied Physics Laboratory, University of Washington, Seattle, WA; AEROSPACE Design Inc, Carson, CA; FL; HI-TECH INC, East Camden, AK; BREN-TRONIC INC, Long Island, NY; Victoria Machine Works, Victoria, TX; Carleton INC, Tampa, FL; BREN-TRONIC INC, Long Island, NY.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE 34	258	444	1,472	CONT.	CONT.

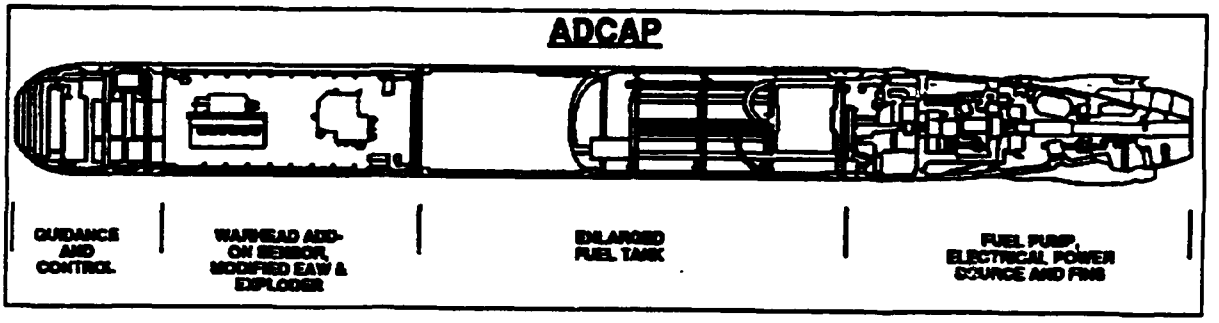
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N
PROGRAM ELEMENT TITLE: MK 48 ADCAP
PROJECT NUMBER: V0366

BUDGET ACTIVITY: 4
PROJECT TITLE: MK 48 ADCAP



POPULAR NAME: MK 48 ADCAP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS IV 01/93		MS III 2Q/96
ENGINEERING MILESTONES			TPU PDR 10/93 TPU CDR 7/94	CONT.
T&E MILESTONES			G&C OT-IIIB 10/93 TPU DT-III 8/94	4Q/96; G&C BLOCK IV OT 3Q/95; TPU/ G&C OT III
CONTRACT MILESTONES		TPU PROTOTYPE CONTRACT AWARD 7/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4,253	12,046	8,334	CONT.	CONT.
SUPPORT CONTRACT	48	122	126	CONT.	CONT.
IN-HOUSE SUPPORT	6,288	10,229	11,395	CONT.	CONT.
GFE/ OTHER	4,070	8,371	7,393	CONT.	CONT.
TOTAL	14,659	30,768	27,248	CONT.	CONT.

B. (U) DESCRIPTION: The MK 48 ADCAP torpedo R&D program focuses on three specific areas: the Guidance and Control (G&C) software block upgrades, the Torpedo Propulsion Upgrade (TPU) and Lethality Improvements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N
PROGRAM ELEMENT TITLE: MK48 ADCAP
PROJECT NUMBER: V0366

BUDGET ACTIVITY: 4
PROJECT TITLE: MK 48 ADCAP

Development, implementation and testing of these changes will be accomplished under the ADCAP G&C software block upgrade program.

(U)

TPU will significantly reduce the probability of U.S. submarine loss during a regional conflict.

(U) The ADCAP lethality program ends after FY93 program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted TPU component testing.

b. (U) Started contractor engineering studies for TPU.

c. (U) Introduced G&C Software Block Upgrade I Improvement into fleet torpedoes.

d. (U) Continued G&C Software Block Upgrade II Improvement Program.

e. (U) Continued Near-Term Lethality Improvement Program.

2. (U) FY 1993 PROGRAM:

a. (U) Award contract for TPU Prototype Design/Fabrication.

b. (U) Conduct TPU detailed design.

c. (U) Initiate fabrication of TPU components.

d. (U) Complete Near-Term Lethality Prototype Development Program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK48 ADCAP
PROJECT NUMBER: V0366 PROJECT TITLE: MK 48 ADCAP

e. (U) Conduct special shallow water test exercises.

f. (U) Commence upgrade of weapon simulators to emulate shallow water environments.

g. (U) Conduct Command, Operation, Test, and Evaluation Forces (COMOPTEVFOR) validation of weapon simulator.

3. (U) FY 1994 PLANS:

a. (U) Complete TPU component testing.

b. (U) Complete G&C Software Block Upgrade II Improvement and Program, including Operational Testing (OT-IIIB).

c. (U) Fabricate TPU Proof of Manufacture (POM) units.

d. (U) Initiate TPU Developmental Testing (DT-III). Approximately fifteen in-water runs are planned.

e. (U) Begin G&C Software Block Upgrade III/IV Improvement Program. Block III/IV addresses the software interfaces with the TPU Program.

f. (U) Continue special shallow water test exercises.

g. (U) Complete shallow water upgrade of weapon simulators.

h. (U) Upgrade weapon simulator to reflect latest G&C hardware configuration.

i. (U) Commence evaluation of improved shallow water tactics and algorithms.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport RI; NAVUNSEAWARCENDIV, Keyport, WA; NCCOSC RDT&E Division, San Diego, CA; CONTRACTORS: ARL/Penn State University, State College, PA; APL/University of Washington, Seattle, WA; and Hughes Aircraft Company, Middletown, RI,. TPU contractor to be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Shallow water testing and simulator improvements and TPU component testing and fabrication of TPU POM units add to FY 94 schedule.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) NDCP Rev. 2, 9/88.

2. (U) TEMP 371 Rev. 3, 3/90.

3. (U) TPU Operational Requirement Document (ORD) 7/92.

4. (U) Operational Requirement 070-02-86, 1/86.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK48 ADCAP
PROJECT NUMBER: V0366 PROJECT TITLE: MK 48 ADCAP

5. (U) Draft Tentative Operational Requirement for subject: "Improved Submarine Torpedo Warhead" for Warhead Lethality Improvement Program.

6. (U) Acquisition Decision Memorandum (ADM) for MS IV approved 1/93.

G. (U) RELATED ACTIVITIES:

(PE 0603562N) Submarine Tactical Warfare Systems.
(PE 0604562N) Submarine Tactical Warfare System.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN *	0	0	0		
TPU Kits Procurement Quantities**	0	0	0		

* TPU retrofit kits only, not all-up round torpedoes.
** TPU retrofit kits projected through the year 1999.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: G&C OT-III B 10/93. Initial Development Test and Evaluation (DT&E) of torpedo propulsion upgrade (TPU) is scheduled for 8/94-4/95. Approximately fifteen in-water runs are planned during FY94. Several dedicated shallow water exercises are planned during TPU/G&C DT/OT III 10/94-9/95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603706N BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Medical Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0095	Fleet Health Technology	11,762	12,066	12,648	CONT.	CONT.
M0096	Fleet Health Standards	4,106	4,007	4,308	CONT.	CONT.
M2022	Bone Marrow Registration	19,700	29,814	0	0	69,118
TOTAL		35,568	45,887	16,956	CONT.	CONT.

B. (U) DESCRIPTION: The Navy Medical Department's mission is the care and treatment of Navy and Marine Corps personnel in operational theaters with the ultimate goals of increased return-to-duty rates, enhanced performance, and reduced morbidity and mortality. Also, medically based standards must be developed to permit the optimal selection of personnel for specific Navy jobs and to ensure the physical readiness and safety of these personnel in the operational environment. Specifically, this program element will support the development of better methods for treating battlefield casualties as well as to develop preventive measures against infectious diseases encountered in military operations abroad. A further objective is to improve the quality of combat personnel by developing validated techniques for medical selection and training, as well as standards and procedures for protecting personnel during exposure to Navy and Marine Corps operational environments. The results of this program will be the identification of the best qualified Navy personnel, improved job and/or task performance, and the reduction of costs attributable to injury and death. This PE also has supported the Navy's effort to register and match donors and complete bone marrow transplants.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603706N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Medical Development
PROJECT NUMBER: M0095 PROJECT TITLE: Fleet Health Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0095	Fleet Health Technology	11,762	12,066	12,648	CONT.	CONT.

B. (U) DESCRIPTION: Encompasses critical endeavors designed to enhance fleet health care, augment field treatment capabilities, and improve medical logistics necessary for support of Naval and Marine Corps forces and combat casualties. Ongoing projects are focused on key biomedical and casualty relevant areas including: (1) blood products, blood substitutes, and hematopoietic stem cells; (2) combat wounds and multiple organ system failure; (3) fleet health and extreme environments; and (4) field diagnostics and medical/dental support capabilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Demonstrated the safety and efficacy of storing deglycerolized red blood cells under various scenarios.
b. (U) Obtained FDA approval for dimethyl sulfoxide as a cryoprotectant for platelets and a plastic bag system to isolate mononuclear cells from peripheral blood.
c. (U) Demonstrated that freeze-dried human red blood cells can be stored at 4°F for at least 49 days without any major alteration in the biochemical and biophysical properties of the cells, and can be reconstituted with polymer-free reconstitution salt solutions.
d. (U) Performed the world's first in vivo gene therapy studies with purified stem cells. Studies clearly showed that genes can be inserted into CD34+ stem cells, and that those cells are involved in long-term reconstitution of damaged marrow.
e. (U) Patented technique to study the biodistribution of liposomes.
f. (U) Developed a query system to facilitate injury/casualty rate projection.
g. (U) Completed software modules for computer assisted diagnosis of abdominal and chest repair in preparation for field testing.
h. (U) Completed study evaluating the utility of dilute concentrations of antibiotic peritoneal lavage solutions.

2. (U) FY 1993 PROGRAM:

a. (U) Develop an extended shelf-life for frozen, washed red blood cells.
b. (U) Study shipboard diet and the effects of deployment on serum cholesterol levels.
c. (U) Assess the physiological limitations of Navy and Marine Corps personnel having the sickle red blood cell trait and its impact on individual readiness.
d. (U) Improve techniques for the characterization and storage of tissue stem cells including the isolation and availability of particular stem cell populations.
e. (U) Develop synthetic lung surfactants and treatments for the prevention and care of shock lung, sepsis, and shock.

3. (U) FY 1994 PLANS:

a. (U) Develop red blood cells enzymatically converted from a specific ABO/rh blood type to universal donor red blood cells.
b. (U) Develop computer-assisted diagnosis for independent duty hospital corpsmen including integration with the automated medical record management systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603706N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Medical Development
PROJECT NUMBER: M0095 PROJECT TITLE: Fleet Health Technology

c. (U) Develop simple, field applicable, diagnostic assays for early detection of sepsis, shock, and other complications of combat trauma.
d. (U) Improve wound decontamination techniques.
e. (U) Develop methodologies to deal rapidly with heat and cold environment acclimatization.
f. (U) Develop readiness planning computer based models for combat medical operational scenarios.
g. (U) Enhance dental disease prevention and the treatment of dental diseases that impact on force readiness and deployment requirements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHINSTITUTE, Bethesda, MD; NAVAEROMEDRSCHLAB, Pensacola, FL; NAVHLTHRSCHCEN, San Diego, CA; NAVSUBMEDRSCHLAB, Groton, CT. CONTRACTORS: To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: MAPDD No. 295093 promulgated 12/03/92.

G. (U) RELATED ACTIVITIES: PE 0601102D, Clinical Medical Sciences; PE 0602233D, Mission Support; and PE 0604773D, Medical Equipment.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603706N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Medical Development
PROJECT NUMBER: M0096 PROJECT TITLE: Fleet Health Standards

C. (U) DESCRIPTION: Develops valid medical standards for selection, training, and retention of Naval personnel; reduces attrition and injury, and enhances personnel performance in Navy operational environments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Validated artificial eye performance for varying laser glare intensities for Naval Air Systems Command (NAVAIR).
b. (U) Provided Night Vision Goggle (NVG) training materials/ procedures for aviation squadron utilization to NAVAIR.
c. (U) Delivered procedures and tests to NAVAIR that assess flight simulator after-effects, and validated methods for reducing motion sickness.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver improved laser glare model to NAVAIR which predicts visual performance degradation, and devices/techniques to enhance aviator NVG use.
b. (U) Provide updated procedures/methods to NAVAIR to enhance aviator spatial awareness and reduce spatial disorientation (SD).
c. (U) Provide Navy safety standard for preventing shipboard radio frequency (RF) injuries.
d. (U) Develop prototype non-conductive socks and gloves for protection from radio frequency (RF) caused shocks and burns for Naval Sea Systems Command (NAVSEA).

3. (U) FY 1994 PLANS:

a. (U) Provide eye fatigue/distortion data related to NVG use to NAVAIR.
b. (U) Provide to NAVAIR functional performance specifications for improved SD training scenarios/systems.
c. (U) Provide to NAVAIR improved specifications for flight simulators.
d. (U) Assess acute toxicity of HFC-134a, a Freon-12 replacement.
e. (U) Assess toxicities of helicopter audio cabling jacket material for Naval Avionics Center (NAVAVIONCEN).
f. (U) Characterize hydraulic fluid MIL-H-19457C toxicity and reported absence of OTTO Fuel II teratogenicity for NAVSEA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NAVAEROMEDRSCHLAB, Pensacola, FL; NAVHLTHRSCHCEN, San Diego, CA; NAVMEDRSCHINSTITUTE TOX DET WPAFB, Dayton, OH; NAVSUBMEDRSCHLAB, New London, CT; and NAVAIRWARCEN, Warminster, PA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: This program is coordinated through the Armed Services Biomedical Research Evaluation and Management Committee.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
L0542	AIR HFE	976	1,075	926	CONT.	CONT.
L1770	M&P SYS	2,044	3,195	3,665	CONT.	CONT.
L1771	SHIP HFE	1,657	1,993	1,914	CONT.	CONT.
L1772	ED&TRN	3,684	6,045	6,356	CONT.	CONT.
L1773	S&T DEV	4,666	5,280	5,791	CONT.	CONT.
	TOTAL	13,027	17,588	18,652	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element develops and demonstrates advanced concepts in the areas of Manpower, Personnel, Training, and Human Factors. There are four broad areas of research:

1. (U) Air and Ship HFE: Projects L0542 and L1771 improve fleet readiness through human factors technology. This technology provides a better fit between the operator, equipment, and mission so that hardware systems will be operated with fewer human-induced errors and with greater safety and maintainability. Objectives are: (1) to improve crew and work station design and evaluation methods; (2) to establish target-acquisition and weapon-system standards for displays people can understand; (3) to develop airborne tactical decision aids for fleet Air Defense, Anti-Submarine Warfare (ASW) and strike missions; (4) to provide initial human factors support for new systems; and (5) to improve the integration between platforms and their crews.

2. (U) Manpower and Personnel: This project provides Navy personnel system managers with the tools to accurately choose and retain the right people and place them in jobs that best use their skills, training, and experience. By demonstrating the applicability of simulation modeling, mathematical optimization, statistical forecasting, and human performance measurement technologies, personnel and fleet readiness can be improved and personnel costs reduced.

3. (U) Education and Training Development: This project focuses advanced technology on the acquisition and maintenance of complex skills through both individual and team training. It improves training efficiency and effectiveness by applying operations research and instructional, cognitive, and computer sciences to training logistics, development, delivery, evaluation, and execution.

4. (U) Simulation and Training Devices: This project improves mission effectiveness and safety by applying knowledge about human learning to engineering design of training systems. The project funds proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

PROJECT NUMBER: L0542 PROJECT TITLE: Air Human Factors Engineering

C. (U) DESCRIPTION: This project develops and demonstrates advanced human factors engineering (HFE) technology to improve the integration of the human in Navy airborne weapons systems. Goals are to: (1) enhance human performance effectiveness, (2) reduce design-induced critical human performance errors, and (3) accelerate insertion of advanced HFE technology into existing and new weapons systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Developed and demonstrated Knowledgeable Observation Analysis-Linked Advisor System (KOALAS) intelligent control system for multisensor integration (MSI) in tactical aircraft. Demonstrated 40% increase in lethal range for F-14D air-to-air weapons system using high-fidelity simulations. Initiated transition of KOALAS technology to F-14 for MSI and to F/A-18 for electronic warfare (EW) systems integration. Provided technical data package to A/FX next-generation tactical aircraft program for demonstration/validation phase, and to AH-1W for the Midlife Upgrade program. Demonstrated multiplatform, multisensor integration for fully distributed airborne early warning and control. Facilitated other non-Navy transitions, including: Army Battlefield Distributed Simulation for Development (BDS-D); Department of Transportation Intelligent Vehicle Highway Simulation (IVHS) and others.

2. (U) FY 1993 PROGRAM: Demonstrate components for MSI network in F-14D, F/A-18C/D, S-3, P-3C, E-2C, and Unmanned Aerial Vehicle (UAV) simulations. Initiate developments/demonstrations of adaptive human systems functions, and integration with advanced human-machine interface technology (e.g. integration with voice input/output, helmet-mounted displays). Develop and demonstrate advanced HFE tools that support the identification, implementation, and testing of intelligent control systems. Define, develop, and demonstrate objective HFE performance criteria for testing intelligent control systems.

3. (U) FY 1994 PLANS: Demonstrate advanced HFE tools for testing intelligent control systems with focus on adaptive system components and surveillance missions. Demonstrate ability of KOALAS network to support multi-platform fusion for surveillance and cooperative tactical engagement among diverse platforms. Demonstrate enhanced situational awareness and tactical response in fleet air defense, strike, and other naval missions in limited objective warfare scenarios. Demonstrations will be accomplished in high-fidelity simulation environments at industry and government facilities.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA, and Patuxent River, MD; NRL, Washington, DC. CONTRACTORS: McDonnell Douglas, St Louis, MO; Magnavox, Ft Wayne, IN; Los Alamos National Laboratory, Los Alamos, NM; JJM Systems, Warminster, PA. Others.

F. (U) RELATED ACTIVITIES: PE 0603217N, Air Systems Advanced Technology Development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: L1770 PROJECT TITLE: Manpower and Personnel Systems

C. (U) DESCRIPTION: Ensures that the Navy can place the right person in the right job at the right time by applying new technologies in the areas of simulation modeling, mathematical optimization, statistical forecasting, and human performance measurement. Objectives include improved fleet readiness and reduced personnel costs by developing: (1) more accurate selection and classification methods; (2) more robust personnel strength planning techniques; and (3) person-job matches that better utilize skills and experience.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed enlisted community management planning and analysis system prototype. Demonstrated statistical methods that significantly improved forecasts of enlisted personnel losses under "downsizing" programs. Field tested a decision support system for allocating recruiters, advertising, and support resources among recruiting locations. Validated mathematical model that simulates the effects of joint duty officer requirements on manning of warfare communities.

2. (U) FY 1993 PROGRAM: Design personnel assignment policy analysis model. Complete prototype version of an Unrestricted Line (URL) career management model for officer strength planning. Evaluate computerized psychomotor, working memory, and spatial visualization tests for improving skill classification. Develop surrogate measures for personal readiness; develop models to address reenlistment goaling, sea/shore manning objectives, and women in the Navy goals. Complete prototype officer distribution management system.

3. (U) FY 1994 PLANS: Design Delayed Entry Program (DEP) decision support system to control the timing and mix of new accessions. Develop enlisted strength policy "analyzer" to produce compatible short- and long-term recruiting, strength, and retention plans and policies; develop transaction-oriented skill community projection models. Complete development of peacetime and mobilization medical manpower models at the skill level.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: B-K Dynamics, Rockville, MD; Automation Management Consultants, Inc., Rockville, MD; San Diego State University, San Diego, CA.

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology; PE 0604703N, Manpower, Personnel, Training, Simulation, and Human Factors; PE 0603732M, Marine Corps Advanced Manpower/ Training Systems; PE 0603007A, Human Factors, Personnel and Training Advanced Technology; and PE 0603227F, Personnel, Training, and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: L1771 PROJECT TITLE: Ship Human Factors Engineering

C. (U) DESCRIPTION: Project improves ship amphibious task force and battle group operations by incorporating human engineering into system support and training programs. This enables fewer operators with less training to perform in the areas of global surveillance, joint operations, mission planning, data fusion and Space and Electronic Warfare environments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed Military Strategic and Tactical Relay System (MILSTAR) Operator's Requirement Aid (MORA) program Test and Evaluation (T&E) on USS Coronado. Transitioned new EW display formats to Naval Surface Warfare Center, Dahlgren and Naval Electronic Systems Engineering Center, Portsmouth for Fleet use. Created the integrated Advanced Technology ASW Display (ATAD) system using 3-D stereoscopic imagery, audio controllers, and automatic speech recognition; demonstrated the conceptual 3-D ASW environment display.

2. (U) FY 1993 PROGRAM: Analyze requirements for decision support systems in the areas of joint planning, with particular emphasis on non-combatant roles such as evacuation of US citizens and humanitarian and disaster relief. Develop prototype decision aids. Complete Electronic Warfare (EW) display work for contact correlation and sensor integration. Develop and run experiments on passive ASW tasks to evaluate efficacy of ATAD displays over traditional waterfall displays. Complete work in symbology standardization and workstation design.

3. (U) FY 1994 PLANS: Develop software and human computer interface (HCI) for mission planning modules. Develop standardized HCI's, joint operations symbology, map representation and situational awareness displays for tri-service use. Develop analysis formats for EW tactical visualization, especially addressing defensive strategies in littoral warfare. Develop and run experiments on ASW tasks using active sonar and quantify improvement attributable to ATAD design. Transistion ATAD technology to OPNAV and SYSCOM program offices.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC, San Diego, CA. CONTRACTORS: Pacific Sciences and Engineering Group, San Diego, CA; Anacapa Sciences, Santa Barbara, CA.

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology; PE 0604703N, Manpower, Personnel, Training, Simulation and Human Factors.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: L1772 PROJECT TITLE: Education and Training Development

C. (U) This project focuses advanced technology on the acquisition and maintenance of complex skills through both individual and team training. It improves training efficiency and effectiveness by applying operations research and instructional, cognitive, and computer sciences to training logistics, development, delivery, evaluation, and execution.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Developed prototype computer-based gaming technologies for Skill Enhancement Program. Developed prototype automated decision-making tools for EW AN/SLQ-32 operators. Designed prototype ASW tactics trainer.

2. (U) FY 1993 PROGRAM: Design training seat inventory planning and control system. Design officer training effectiveness assessment procedure. Develop prototype for ASW tactical skills trainer. Develop Integrated Damage Control Training Technology (IDCTT) prototype interactive courseware. Develop Navy Leadership (NAVLEAD) behavioral modeling classroom applications and evaluation techniques. Develop Navy Corrections Retraining Assessment Model. Demonstrate EW operator advanced technology training process. Demonstrate and evaluate computer-based gaming technologies. Develop software and hardware for multi-media curriculum authoring and delivery system.

3. (U) FY 1994 PLANS: Develop training seat reservation control system. Develop technologically advanced training process to aid tactical visualization and control in EW. Develop prototype for testbed multi-media authoring and delivery system. Develop officer training effectiveness assessment procedure. Develop locally administered NAVLEAD behavioral modeling technologies. Demonstrate prototype ASW tactics trainer. Demonstrate IDCTT prototype. Evaluate distributed videoteletraining (VTT) technologies. Test and validate Navy Corrections Retraining Assessment Model.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: Instructional Science and Development, San Diego, CA.; Systems Engineering Associates, San Diego, CA.; Carlow International, Falls Church, VA.; Institute for Simulation and Training, Orlando, FL.; San Diego State University, San Diego, CA.

F. (U) RELATED ACTIVITIES: PE 0605798D, Joint Services Manpower and Personnel Technology; PE 0602233N, Mission Support Technology; PE 0604703N, Manpower, Personnel, Training, Simulation, and Human Factors; PE 0603007A , Human Factors, Personnel, and Training Advanced Technology; and PE 0603227F, Personnel, Training, and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development
PROJECT NUMBER: L1773 PROJECT TITLE: Simulation and Training Devices

C. (U) DESCRIPTION: Improves mission effectiveness and safety by developing and demonstrating application of advanced simulation technology and knowledge of human learning to engineering design of training systems. Conducts proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability in all Navy warfare areas.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Tested selected fidelity levels of an aviation strike mission simulator and simulated threat environment for forward deployed applications. Demonstrated networking of Forward Deployable Aviation Simulator Technology (FAST) for future electronic battlefield connectivity. Demonstrated compact Organic Combat Systems Training Technology (OCSTT) for training combat direction teams on-board ship. Demonstrated low cost crew stations to supplement aircrew coordination training (ACT) modules being tested in field sites.

2. (U) FY 1993 PROGRAM: Demonstrate/evaluate the effectiveness of Non-Development Items helmet displays for FAST strike mission application using selective fidelity cockpits. Test addition of radar and EW sensor operator stations to the OCSTT onboard ship simulation environment. Complete ACT demonstrations. Initiate network project applying Distributive Interactive Simulation (DIS) standards to Anti-Air Warfare (AAW) simulated platforms.

3. (U) FY 1994 PLANS: Integrate FAST modules for final test and evaluation with fleet pilots. Demonstrate OCSTT all warfare threat environment interactively with ships Combat Directions Center; test OCSTT network using the DIS standards to simulate battle exercise. Demonstrate connectivity of AAW platforms to perform a coordinated engagement exercise. Begin development of advanced technology submarine sonar employment training.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NTSC, Orlando, FL; NAVAIRWARCENACDIV, Warminister, PA; NAWC, Patuxent River, MD; Air Force Armstrong Lab/AZ, Williams AFB, AZ. CONTRACTORS: Sparta, Inc., Santa Monica, CA; Paragon, Inc., Orlando, FL; Kaiser Electro-Optics, Inc., San Jose, CA; JJM Systems Inc., Ivyland, PA; UCF, Orlando, FL; Enzian Technology Inc., Orlando, FL; ISA Associates, Sterling, VA.

F. (U) RELATED ACTIVITIES: PE 0603216A, Synthetic Flight Simulator Devices Development; PE 0603227F, Personnel, Training and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603709N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Marine Biological System
PROJECT NUMBER: Q0214 PROJECT TITLE: Marine Mammal Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0214	Marine Mammal Systems	4,765	4,506	3,470	- CONT.	CONT.

B. (U) DESCRIPTION: This program funds training of marine mammals to determine military worth and optimum utility. No effective man-made technology exists to duplicate the known capabilities of marine mammals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed a Strategic Plan which identifies USN long range plans for marine mammals, including Fleet requirements for existing/new systems and future R&D programs.

b. (U) Developed a Reintroduction Plan to identify marine mammals that may be suitable for reintroduction into the wild; methods by which reintroduction could be accomplished; and methods of post-reintroduction monitoring.

2. (U) FY 1993 PROGRAM:

a. (U) Completed a reintroduction plan.

b. (U) Develop a generalized underwater object detection, location and marking system for water depths from This is in response to a Department of Energy requirement of detection and location of

3. (U) FY 1994 PLANS: Provide care and feeding to the animals in the R&D inventory.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV DET, Kailua, HI and NCCOSC RDTE DIV ,San Diego, CA. CONTRACTORS: B-K Dynamics; Maritime Services, Kailua, HI.

E. (U) RELATED ACTIVITIES: PE 0602315N, MCM, Mining and Special Warfare Technology.

F. (U) OTHER APPROPRIATION FUNDS:

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE #184	5,192	3,000	1,100	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603711N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation Program
PROJECT NUMBER: R0138 PROJECT TITLE: Tactical Development Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO - COMPLETE	TOTAL PROGRAM
R0138	Tactical Development Support	6,107	5,388	4,464	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element funds the Navy's systems for collection, reconstruction and analysis of Fleet operational data elements during exercise and real-world operational events in support of tactical development and evaluation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) 12 Tactical Information Management System (TIMS) data collection systems supported 100+ Fleet commands data reconstruction/analysis of 160+ Fleet exercises, operations and tactics projects.
b. (U) Performed 140+ installations and removals of data collection equipments aboard fleet units.
c. (U) Provided data collection equipments during Desert Shield/Storm for data capture and event reconstruction.

2. (U) FY 1993 PROGRAM:
a. (U) Continue TIMS/data collection support for 100+ Fleet commands for analysis of 140+ Fleet projects.
b. (U) Perform 120+ installations/removals of data collection systems in support of 45 Fleet exercises.
c. (U) Continue TIMS Upgrade hardware/software development in accordance with Chief of Naval Operations (CNO) approved plans.

3. (U) FY 1994 PLANS:
a. (U) Continue Fleet exercise, operations and tactics project support using TIMS equipment, and installation/removal of data collection systems.
b. (U) Continue CNO approved TIMS Upgrade plan.
c. (U) Continue TIMS software development in response to Fleet requirements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD. CONTRACTORS: United Information Systems, Inc, Beltsville, MD; Summit Research Corp., Rockville, MD; Advanced Systems Technicians, Inc, Silver Spring, MD.

E. (U) RELATED ACTIVITIES: Program Element 0605155N, Fleet Tactical Development and Evaluation.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstration

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
T1816	Logistics Technology Development (LOGDEV)	9,001	11,590	9,273	CONT.	CONT.
T1884	Rapid Acquisition of Manufactured Parts (RAMP)	4,937	12,772	0	0	83,912
T1910	Logistics Engineering Advanced Demonstrations (LEAD)	3,900	4,187	4,447	CONT.	CONT.
TOTAL		17,838	28,549	13,720	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element funds the Navy's advanced technology development core efforts in the logistics area. The focus is on Navy-unique aspects of logistics technology. The projects apply advanced technology to logistics needs and problems in order to: design weapon systems and their support to eliminate requirements for large logistics tails; reduce the high cost of maintaining weapon systems and improve readiness; assist program managers with technology to design, deliver, and support weapon systems within shortened development cycles; reduce weapon system repair downtime and develop innovative logistics support systems for contingency operations; and develop technological solutions to environmental concerns associated with ship and weapon system maintenance. There are three projects:

1. (U) LOGDEV -- Reduces development, production, and support costs for military electronic systems, while increasing the reliability and readiness of these systems.

2. (U) RAMP -- Demonstrates substantially reduced manufacturing costs and procurement lead times for spare and replacement parts at Navy depot level maintenance facilities, via computer integrated manufacturing technology. Project completes in FY 1993, with technology transitioning to the Shipboard Flexible Computer Integrated Manufacturing (FCIM) task, for the short term demonstration only (see paragraph 3.c. below)

3. (U) LEAD -- Consists of short term demonstrations of emerging technologies in logistics and environmental compliance. Facilitates transition of concepts from Exploratory Development to other R&D categories or directly to the fleet. Includes the following tasks:

a. (U) Integrated Diagnostic Support System (IDSS) -- Developed and demonstrated an integrated set of diagnostic tools to improve weapon system testability and shipboard troubleshooting of system failures. Task completed.

b. (U) Air Vehicle Diagnostic System (AVDS) -- Develops technology for an on-line, on-board helicopter mechanical diagnostics system with potential for major reduction in helicopter accident rates. This PE conducts seeded fault testing to develop knowledge base for future ATD.

c. (U) Shipboard FCIM: Demonstrates FCIM technology developed for depot maintenance under the RAMP Program in an intermediate maintenance environment, i.e., a Shore Intermediate Maintenance Activity (SIMA) and on board a Navy Tender.

d. (U) High Pressure Water Automated Closed-Loop Paint Stripping System (HACS): Demonstrates an environmentally sound alternative to grit blasting for ship hull paint removal. Addresses toxic waste and airborne hazards associated with grit blasting. Increases paint removal rates, reducing cost substantially.

e. (U) Non-Polluting/Biodegradable Antifouling Hull Coatings: Demonstrates "easy release" and biodegradable coatings developed in 0601153N and 0602234N in a realistic waterborne environment. Provides an environmentally acceptable alternative to current anti-fouling paints. Scales up lab technologies for patch, stripe, and full ship testing at sea. Reduces cost by extending time between dry-dockings and underwater hull cleanings.

f. (U) Integrated Electronic Technical Manual (IETM): Demonstrates conversion of component technical data from paper to an interactive information-based software format loaded in a laptop or smaller computer, suitable for use by repair personnel. Provides improved configuration control, improved component troubleshooting, and automatic update of component maintenance history.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstration
PROJECT NUMBER: T1816 PROJECT TITLE: Logistics Technology Development (LOGDEV)

C. (U) DESCRIPTION: Improves weapon system readiness and supportability through development of advanced logistics technology. Current focus is the Standard Hardware Acquisition and Reliability Program (SHARP), which reduces development, production, and support costs for military electronic systems, while increasing the reliability and readiness of these systems. SHARP develops multi-system, advanced electronic hardware prototypes and standards applicable to new systems and for upgrades to existing systems. SHARP specifies Standard Electronic Modules (SEM), Standard Power Supplies (SPS), Standard Battery Systems (SBS), and Standard Enclosures Systems (SES). These standards are used in multiple electronic systems, thus reducing design costs, manufacturing costs, and inventory requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed development of ten SEM standards. Completed development of two shipboard and one airborne SPS. Completed development of 396 pin high density connector.
b. (U) Demonstrated thermal modeling tools for liquid immersion cooling.
c. (U) Demonstrated SHARP fiber optic backplane.
d. (U) Demonstrated roughly $50 million in planned cost avoidance through reduced development, production, and logistic support costs of standardized components as compared to system-unique components.

2. (U) FY 1993 PROGRAM:
a. (U) Develop high reliability, maintainable, modular electronics packaging system providing increased cooling and low weight compared to current technology.
b. (U) Demonstrate high reliability, modular opto-hydraulic actuator.
c. (U) Demonstrate high reliability, no maintenance Inertial Navigation System (INS) battery.
d. (U) Transition SHARP developed enclosures, modules, power supplies, and photonics interconnect hardware in Navy/NASA Fiber Optic Control System Integration (FOCSI) fly-by-light demonstration.

3. (U) FY 1994 PLANS:
a. (U) Continue development of SEM, SPS, SBS, and SES, reducing development costs and logistic support costs associated with non-standard components, and improving system reliability.
b. (U) Demonstrate advanced electronics packaging/cooling techniques.
c. (U) Develop/demonstrate advanced battery technologies.
d. (U) Demonstrate improved repairability of electronic circuit cards through use of solderless interconnect techniques.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCENDIV, Crane, IN, Carderock, MD and Annapolis, MD. CONTRACTORS: VITRO, Bloomington, IN; Mentor Graphics, Beaverton, OR; SDA Inc, Indianapolis; IN; SAI Inc, McLean, VA; CTS Inc, New Hope, MN; VHE, South Bend, IN.

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology; PE 0602234N, Materials, Electronics, and Computer Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstration
PROJECT NUMBER: T1910 PROJECT TITLE: Logistics Engineering Advanced Demonstrations (LEAD)

C. (U) DESCRIPTION: Improves weapon system readiness and supportability through development of advanced logistics technology. Tasks in this project provide advanced diagnostic and test capabilities, and advanced industrial technology for ship maintenance and environmental compliance.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) IDSS -- Completed Acceptance Test Procedure for Feedback Analyzer, and Improved Technical Data System. Conducted mini-demo on multi-weapon systems to test tools. Conducted IDSS test bed demo on AN/BSY-2.

b. (U) Selected new tasks to be accomplished under LEAD. Developed execution plans for new tasks.

2. (U) FY 1993 PROGRAM:

a. (U) AVDS -- Perform seeded fault testing to develop gear box vibration data base in preparation for future ATD.

b. (U) SHIPBOARD FCIM -- Initiate system design. Develop and validate functional requirements. Transition hardware and software from RAMP program. Initiate new hardware and software development.

c. (U) HACS -- Initiate task demonstrating environmentally sound paint removal. Develop and define system requirements. Design end effector/ shroud subsystem.

d. (U) HULL COATINGS -- Initiate task demonstrating environmentally sound ship hull painting systems. Select easy release coatings to be demonstrated. Test for required physical film properties.

3. (U) FY 1994 PLANS:

a. (U) AVDS -- Complete gear box vibration data base and neural network analyses. Transition to ATD in PE 0603792N.

a. (U) SHIPBOARD FCIM -- Complete SIMA and Tender system design. Initiate SIMA installation and deployment, including user training.

b. (U) HACS -- Develop water reclamation/recirculation subsystem. Initiate system integration. Test control architecture and feedback sensors. Conduct acceptance demonstration at contractor site.

c. (U) HULL COATINGS -- Select natural antifoulant coating formulations to be demonstrated. Demonstrate process scale-up for large scale (500 to 1,000 gallon) production of easy release coatings. Initiate ship patch/stripe testing.

d. (U) IETM -- Initiate new task. Perform system requirements review. Begin system development, using commercially available hardware and software in an open system architecture.

4. PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN, Dahlgren, VA, and Bethesda, MD; NRL, Washington, DC. CONTRACTORS: Harris Corp., Syosset, NY; GAI Inc., Sparta, NJ; Westland Helicopters, Yeovil, England; others to be determined.

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology; PE 0602234N, Materials, Electronics, and Computer Technology; PE 0603792N, Advanced Technology Transition.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0394	Shallow Depth Diving Equipment (Note 1)	1,983	1,272	5,906	CONT.	CONT.
V0397	Deep Ocean Tech (Note 2)	8,890	5,832	0	0	167,246
M0099	Deep Submergence Biomedical Development	6,582	6,215	5,877	CONT.	CONT.
	TOTAL	17,455	13,319	11,783	CONT.	CONT.

(U) Note (1): As part of the PE restructuring requested by Congress in the FY 1992 DoD Appropriations Conference Report, Project S0394 has been transferred to this PE from PE 0603702N.

(U) Note (2): Efforts developed under Project V0397 will be completed in FY 93 and the technology developed will be transitioned to PE 0603502N, V2094.

B. (U) DESCRIPTION: Developments in this program will enable the U.S. Navy to overcome deficiencies which constrain underwater operations in the areas of search, location, rescue, recovery, salvage, construction, and protection of offshore assets. This program develops medical technology, diver life support equipment, and the vehicles, systems, and tools to permit manned and unmanned underwater operations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering Development
PROJECT NUMBER: S0394 PROJECT TITLE: Shallow Depth Diving Equipment

C. (U) DESCRIPTION: This project develops systems to support conventional diver operations from surface platforms to depths of 300 feet, and saturation diving to depths of 850 feet. Diver operations include ship husbandry, salvage/recovery, and submarine rescue operations to support national as well as Navy needs around the world. Modern certifiable diving systems which ensure diver safety and allow maximum work efficiency will replace currently antiquated systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) For the Conventional Dive System (CDS): Completion of production parts buy and assembly of Full Face Mask (FFM) MK 24 units. Completion of assembly of six pre-production Underwater Breathing Apparatus (UBA) MK 19 units. Performed unmanned testing of breathing resistance, scrubber duration, and oxygen control on UBA MK 19 pre-production units.

b. (U) For the Submarine Rescue Diving & Recompression System (SRDRS): Began definition of system requirements.

2. (U) FY 1993 PROGRAM:

a. (U) For the Conventional Dive System (CDS): Complete TECHEVAL of UBA MK 19 and FFM MK 24. Perform environmental testing of UBA MK 19, and FFM MK 24.

b. (U) For the Submarine Rescue Diving & Recompression System (SRDRS): Complete definition of system requirements. Milestone 0 decision.

3. (U) FY 1994 PLANS:

a. (U) For the Conventional Dive System (CDS): Detail design development of the dry helmet MK 23. Support procurement of UBA MK 19, and FFM MK 24. Complete OPEVAL for UBA MK 19, and FFM MK 24. Correct any deficiencies noted in OPEVAL, update documentation, and proceed to Milestone IIIa decision in December 1993.

b. (U) For the Submarine Rescue Diving & Recompression System (SRDRS): Complete system concept studies. Cost and Operational Effectiveness Analysis. Milestone I decision. Preliminary design of the system and its sub-systems. Prepare system performance specifications. Milestone II decision.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Coastal Systems Station, Dahlgren Division, Naval Surface Warfare Center, Panama City, FL; Navy Experimental Diving Unit (NEDU), Panama City, FL. CONTRACTORS: Advanced Engineering and Research Associates, Inc., Arlington, VA; ROH, Inc, Arlington, VA; Oceaneering International, Houston, TX & Upper Marlboro, MD; Competitive TBD.

F. (U) RELATED ACTIVITIES: PE 0603654N Joint Service EOD Development.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 34	0	0	1,977	CONT.	CONT.

These amounts are for the procurement of CDS.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: US-France Data Exchange Agreement (N-62-F-190) for exchange of diving information.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering Development
PROJECT NUMBER: M0099 PROJECT TITLE: Deep Submergence Biomedical Development

C. (U) DESCRIPTION: Develops biomedical technology to increase diver safety and effectiveness; supports deeper, longer, safer, more flexible dives. Requirements: NAPDD #007-02 Rev. 1, Deep Submergence Biomedical Development, of 30 Jan 92.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Delivered diver thermal garment selection criteria and updated diver training and work schedules to NAVSEA. Validated models that predict diver performance based Underwater Breathing Apparatus (UBA) specifications.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver risk based air, nitrogen (N_2)/oxygen (O_2), and mixed gas decompression tables. Publish improved model for saturation excursion and decompression. Report multi-depth risk analysis for oxygen toxicity. Report on use of perfluorocarbons to treat bends.

b. (U) Deliver interim guidance on dehydration reducing drugs.

c. (U) Provide engineering guidance insulating diving suits.

d. (U) Specify utility of variable hydrostatic loading of diving helmets.

3. (U) FY 1994 PLANS:

a. (U) Provide guidelines based on work rate for warm water dives. Report methods of diver acclimation to hot and cold water.

b. (U) Deliver report of drug efficacy in reducing oxygen toxicity.

c. (U) Deliver a predictive stress test for Sea Air Land (SEAL) candidates.

d. (U) Deliver predictive guidelines for diver performance.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHINSTITUTE, Bethesda, MD; NAVSUBMEDACHLAB, New London, CT. CONTRACTORS: State University of New York at Buffalo, Buffalo, NY; University of Pennsylvania, Philadelphia, PA; Duke University, Raleigh, NC.

F. (U) RELATED ACTIVITIES: Special Operations Command, Tampa, FL provides funding to support Naval Special Warfare specific scenarios.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Data Exchange Agreements with Australia and Japan.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0400	Ordnance Reclamation	539	624	1,266	CONT.	CONT.
S0401	Shipboard Waste Management	23,518	25,079	35,229	CONT.	CONT.
Y0817	Pollution Abatement Ashore	1,524	1,429	7,820	CONT.	CONT.
T2042	Plastic Substitution	305	146	146	CONT.	CONT.
	TOTAL	25,886	27,278	44,461		

B. (U) DESCRIPTION: This program develops processes, prototype hardware, systems and operational procedures that will allow the Navy to operate in the U.S., foreign and international waters, air, space, and land areas while complying with U.S. statutes and international agreements. The program also includes efforts to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's requirement to meet environmental standards outlined by EPA, Executive Order 12088 of October 1978, Public Law PL100-220 and DoD Directive 6050.4 of 16 March 1982, DoD Directive 4210.15 of 27 July 1989, DoD Directive 6050.15 of 14 June 1985 and DoD Directive 6050.9 of 13 February 1989. Project S0401 also includes RDT&E efforts that allow the Navy to be in compliance with the U.S. Clean Air Act of 1990 with regard to ozone depleting substances. Four major areas of effort are addressed: air conditioning and refrigeration, Halons, chlorofluorocarbons (CFCs) recovery/recycling and solvents.

(U) The technology developed will permit the Navy to comply with present and future regulations in an affordable and cost-effective manner without impairing the military readiness of operational units. The development of effective treatment systems will result in significant cost avoidances as Navy shipboard and landbased systems will be in compliance with environmental regulations and restrictions. The program solicits technology from industry and academia, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Duplication of effort within the Navy and Department of Defense is avoided through close liaison among the Navy system commands and with DoD and other federal agencies. International cooperation and information exchange is achieved with allied nations through direct liaison with NATO-sponsored international symposia.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0400 PROJECT TITLE: Ordnance Reclamation

C. (U) DESCRIPTION: Project enables field activities to comply with environmental laws/standards and provides economically and environmentally acceptable techniques for disposing of the vast amount of ordnance and its energetic contents. Reclamation is the preferred method for this, but for those items which are carcinogenic, safe methods of disposal will be developed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Designed/fabricated/tested an automated high pressure waterjet pilot plant developed for the removal of energetics from ordnance.

b. (U) Developed a test method for determining the sensitivity of explosives to waterjet impact and has been used to evaluate the removal of various Plastic Bonded Explosives (PBX) loaded items.

c. (U) Developed a plan of action and initiated lab scale recovery/conversion research to determine the most economical and environmentally acceptable approach to PBX and propellant recovery and reuse.

2. (U) FY 1993 PROGRAM:

a. (U) Complete final report on Air-Inductively Coupled Plasma (ICP) spectrometer and colored flare incineration trial burn.

b. (U) Initiate development of a Fourier Transform Infrared (FTIR) Spectroscopy unit for continuous monitoring of air toxic compounds.

c. (U) Continue propellant reclamation efforts and initiate testing to develop technology to download and recover ingredients from Navy tactical solid rocket motors.

3. (U) FY 1994 PLANS:

a. (U) Complete lab/bench scale studies to examine chemical transformation of non-recyclables (binders, nitrocellulose, nitroglycerine) contained in Navy explosives and propellants into innocuous compounds suitable for fuel incineration feed stocks, other uses or non-hazardous waste disposal.

b. (U) Continue development of reclamation/reuse technology for the propellant removed.

c. (U) Initiate studies to chemically convert Explosive D (ammonium picrate) to a usable compound or one safe for non-hazardous waste disposal.

d. (U) Completed comprehensive final report of Controlled Air Incinerator unit with results from all testing.

e. (U) Provide recommendation on design of production unit for disposal of pyrotechnic smokes, colored flares, dyes and scrap.

f. (U) Initiate chemical conversion technology for pyrotechnic materials, i.e., titanium tetrachloride and lead chromate.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCEN DET WHITE OAK, Silver Spring, MD; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0401 PROJECT TITLE: Shipboard Waste Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0401	Shipboard Waste Management	23,518	25,079	35,229	CONT.	CONT.

B. (U) DESCRIPTION: Project develops equipments and procedures for managing all shipboard waste problems. Emphasis is on developing shipboard systems for compliance with national, state, and international regulations and on achieving a pollution-free profile for future ships. This program will also develop conservation and ozone-safe replacement chemical technology for Navy solvents and refrigeration and fire fighting systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted a laboratory evaluation (LABEVAL) and Technical Evaluation (TECHEVAL) on Preproduction Prototype (PPP) Solid Waste Pulper (SWP); LABEVAL two Engineering Development Model (EDM) Plastic Waste Processor (PWP) designs, and the Medical Waste Processor (MWP).

b. (U) Conducted LABEVALs and shipboard evaluations and uncovered design and operational deficiencies in the Shipboard Vertical Trash Compactor (SVTC), the SWP and both PWPs.

c. (U) Prepared for installation of High Capacity Oil Water Separator (HCOWS) aboard USS EISENHOWER (CVN 69).

d. (U) Conducted TECHEVAL of small craft Oil-Water Separator (OWS).

e. (U) Investigated problems associated with Shipboard Compensated Ballast Fuel Systems (SCBFS) and low flow devices and appliances.

f. (U) Investigated technologies for secondary/tertiary OWS treatment.

g. (U) Initiated LABEVAL of membrane systems for greywater treatment and development of breadboard (BB) Supercritical Water Oxidation (SCWO) system.

h. (U) Evaluated evaporative greywater treatment system and proposal for secondary/tertiary OWS treatment systems.

i. (U) Investigated low flow devices and appliances.

j. (U) Developed specification for open-ocean OWS salvage system.

k. (U) Initiated LABEVAL of Laser Detection and Sampling System (LDSS) and development of Halon and CFC substitution and conservation technologies.

l. (U) Conducted TECHEVAL and first article test of Off-Shore Fire Fighting System (OSFFS).

m. (U) Continued Organotin (OT) monitoring at Navy selected Navy harbors.

n. (U) Evaluated CFC alternatives for Air Conditioning (AC) refrigeration and Halon replacement for ships and aircraft and refrigerant recycling systems and non-CFC solvents.

o. (U) Monitored design of twin screw non-CFC AC plant for surface ships.

p. (U) Designed and fabricated R-114 recovery unit.

2. (U) FY 1993 PROGRAM:

a. (U) Correct concept designs and operational deficiencies uncovered on the SUTC, SWP and the PWPs; LABEVAL two PWP PPPs and select one for continued development.

b. (U) Prepare specifications for small craft solid waste management equipment.

c. (U) Install, SHIPEVAL and TECHEVAL HCOWS aboard USS EISENHOWER (CVN69); achieve Initial Operational Capability (IOC) and specification for small craft OWS.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0401 PROJECT TITLE: Shipboard Waste Management

d. (U) Continue investigation of SCBFS, OWS, and technologies for secondary/tertiary OWS treatment systems.
e. (U) Design and LABEVAL membrane greywater treatment systems.
f. (U) Complete development of and initiate evaluation of BB SCWO unit; evaluate potential greywater treatment processes and low-flow appliances and devices.
g. (U) Continue LABEVAL of LDSS and development of non-CFCs for AC and refrigerant and Halon replacement for ships and aircraft and non-CFC solvents.
h. (U) Achieve IOC for the OSFFS.
i. (U) Conduct statutory OT monitoring at Navy selected Navy harbors.
j. (U) Continue SHIPEVAL of R-12 replacement refrigerant, and evaluating refrigerant recycling systems.
k. (U) Develop R-114 plant modifications.
l. (U) Conduct aircraft nacelle CFC replacement testing.
m. (U) Fabricate non-CFC twin screw AC plant for surface ships.

3. (U) FY 1994 PLANS:

a. (U) Continue redesign and laboratory evaluation of SVTC, SWP and PWPs.
b. (U) Initiate development of small craft solid waste management systems.
c. (U) Initiate TECHEVAL of HCOWS.
d. (U) Select secondary/tertiary OWS treatment systems; evaluate solutions for SCBFS.
e. (U) Develop EDM secondary/tertiary OWS treatment systems.
f. (U) Fabricate and initiate testing of a membrane greywater treatment system.
g. (U) Complete fabrication of EDM SCWO unit; contract(s) for advanced development of greywater treatment processes.
h. (U) Continue to evaluate low-flow appliances and devices.
i. (U) Initiate evaluation of marine sanitation devices.
j. (U) Continue statutory OT monitoring at Navy selected Navy harbors.
k. (U) Continue evaluation of CFC alternatives for air conditioning refrigerant and Halon replacement for ships and aircraft.
l. (U) Initiate R12 refrigerant backfit.
m. (U) Continue development of R-114 plant modifications.
n. (U) Procure CFC-114 refrigerant recovery/recycling units.
o. (U) Develop Halon-1301 recovery/recycling/reclamation systems.
p. (U) Continue evaluation of alternative solvents and non-CFC engine nacelle testing.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIR, Arlington, VA; NAVAIRWARCENACDIV, Warminster, PA; NRL, Washington, DC; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Advanced Engineering Research Associates, Inc., Arlington, VA; ARTECH, Chantilly, VA; Aspen Systems, Inc., Marlboro, MA; Battelle Pacific Northwest Labs, Richland, WA; Carrier Corp., Syracuse, NY; Geo-Centers, Inc., Boston, MA; George C. Sharp, Inc., Arlington, VA; GKY & Assoc., Springfield, VA; J.J. McMullen, Arlington, VA; Johns Hopkins University, Baltimore, MD; LaQuay Corp., Minneapolis, MN; M. Rosenblatt and Sons, Inc., Arlington, VA; MAR, Arlington, VA; NACI, Washington, DC; NKF, Fairfax, VA; Northern Research and Engineering Corporation, Woburn, MA; omega Recovery Service, Whittier, CA; PROTECTOR, Inc., Severna Park, MD; SAN-I-PAK, Tracy, CA; SOMAT, Pomeroy, CA; Spauschus Associates, Atlanta, GA; York International Corp., York, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0401 PROJECT TITLE: Shipboard Waste Management

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

G. (U) RELATED ACTIVITIES:
PE 0602233N, Mission Support Technology

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

F. (U) PROGRAM DOCUMENTATION

TEMP	067-6 of Dec 87 Small Craft OWS
TEMP	067-2 of Feb 81 Advanced Oily Waste Treatment
TEMP	067-1 of Mar 81 Advanced Oily Waste Treatment
TEMP	013-12 of Feb 87 Vertical Trash Compactor
TEMP	013-26 of Apr 88 Solid Waste Pulper
TEMP	013-27 of May 88 Offship Firefighting Systems
NAPDD	May 86 CHT Tank Degreasing
NAPDD	May 86 GRP Soil Drain Evaluation
NAPDD	Oct 88 Advanced Non-Oily Waste Treatment
NAPDD	Oct 88 Advanced Solid Waste Control
NAPDD	May 86 Organotin Waste Treatment
NAPDD	Oct 88 Shipboard Hazardous Waste
NAPDD	Oct 87 Ship Air Emissions/VCCs
OR	273-03-90 of Sep 90 High Efficiency Air Conditioning Plant
OR	274-03-91 of Sep 90 Supplemental Cooling Units
ORD	(Draft) N/A High Capacity oil/Water Separator (HCOWS)
ORD	(Draft) N/A Shipboard Plastics Waste Processor

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Category III (AFRP) milestones for the following programs are as follows:

Off Ship Fire Fighting System	1Q93
Small Craft OWS	3Q93
High Flow OWS	4Q94
Shipboard Vertical Trash Compactor	2Q95
Solid Waste Pulper	4Q94
Plastic Waste Processor	4Q95
NAPDDs	Various

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: Y0817 PROJECT TITLE: Pollution Abatement Ashore

C. (U) DESCRIPTION: Project develops technologies to enable the Navy to comply with environmental law, save money, and reduce liability at shore activities.
D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS
1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Field tested non-chromic acid anodizing.
b. (U) Secured approval drinking water pipe lining.
c. (U) Completed nonpoint source (NPS) assessment techniques.
d. (U) Completed development of low cost bioassay technology.
e. (U) Assessed volatile organic compound (VOC) control technology approach.
f. (U) Developed specifications for Cone Penetrometer vehicle.
g. (U) Evaluated pyrotechnic dye incineration.
h. (U) Started rocket motor exhaust scrubbing.
i. (U) Fabricated high pressure water hull blaster.
2. (U) FY 1993 PROGRAM:
a. (U) Demonstrate non-chromic acid anodizing.
b. (U) Test and evaluate VOC complaint aircraft leading edge rain erosion coating.
c. (U) Modify high velocity low volume spray application equipment for high solids content (low VPC) use.
d. (U) Deliver first article Cone Penetrometer for POLs.
e. (U) Obtain EPA approval for lead analyzer.
f. (U) Develop design criteria for VOC control technology.
g. (U) Craft OBA Canister disposal system.
h. (U) Transition MUSE NOX boiler emissions reduction technology to the field.
i. (U) Initiate MUSE NOX diesel emissions reduction investigations.
j. (U) Pilot test in-situ JP5 (Vapor) soil bioventing treatment.
k. (U) Design pilot transportable small arms range ship paints and coatings for VOC compliance and hazardous materials reduction.
l. (U) Design and test pilot scale rocket motor exhaust scrubber.
m. (U) Continue developmental testing of pyrotechic dye incinerator.
3. (U) FY 1994 PLANS:
a. (U) Design large-tank leak detection system.
b. (U) Demonstrate shipboard high pressure, water/garnet abrasive blasting.
c. (U) Develop low VOC polymer and waterborne coatings technology.
d. (U) Design Al-Mn molten salt plating technology for Cr replacement.
e. (U) Test advanced aircraft depainting concepts and efficient High Velocity Low Volume painting equipment.
f. (U) Transition non-chromic acid anodizing process.
g. (U) Validate Benthic Flux Sampling Device for sediment studies. Develop fiber optic petroleum spill alarm system.
h. (U) Transition lead analyzer technology to field.
i. (U) Construct pilot arms range treatment unit.
j. (U) Field test selected VOC control technologies.
k. (U) Transition oxygen breathing apparatus canister disposal system. Develop buried ordnance detector.
l. (U) Design large Li-battery disposal system.
m. (U) Perform propellent recycling tests.
n. (U) Evaluate Ultraviolet (UV) destruction of Nitrate Esters.
o. (U) Continue Reformulation of ship paints and coatings for VOC compliance and hazardous materials reduction.
p. (U) Construct pilot transportable small arms range treatment unit.
q. (U) Design and evaluate full scale rocket motor exhaust scrubber. Test pyrotechnic dye incineration technology compliance with RCRA and Clean Air Standards.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.
E. (U) WORK PERFORMED BY: IN-HOUSE: CDNSWC Annapolis, MD; NSWC Crane Division, IN NAWCACDIV Warminister, PA; NCCOSC NRAD San Diego, CA; NRL Washington, DC; NCEL Por Hueneme, CA; NOS Indian Head, MD; NADEPs and NSYs. CONTRACTORS: Not applicable.
F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology
G. (U) OTHER APPROPRIATION FUNDS: DERA $7M FY93, DERA $10M FY94.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: T2042 PROJECT TITLE: Plastic Substitution

C. (U) DESCRIPTION: The purpose of this project is to investigate methods to reduce or eliminate plastic material from items going aboard Navy ships to assist the fleet in complying with Annex V to the International Convention for the Prevention of Pollution from Ships (MARPOL). MARPOL was ratified by Congress and signed into law by the President on 29 December 1987.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Researched materials and processes to reduce the volume of plastic material going aboard Navy ships.

b. (U) Conducted laboratory and fleet testing of new concepts for reusable/refillable packaging and containers, PRIME-compatible expendable packaging materials, and nonplastic products including food service items.

c. (U) Researched problems of management of used sonobuoy launch containers and explore concepts to alleviate the problems.

d. (U) Explored concept of automatic substitutions of nonplastic items of supply.

2. (U) FY 1993 PROGRAM:

a. (U) Continue to and evaluate materials and processes to reduce the volume of plastic material going aboard Navy ships.

b. (U) Conduct analysis of previously tested reusable containers, compiling descriptive information, strengths and weaknesses, and possible application with economic analyses.

c. (U) Review of substances for bulk packaging and concentration.

d. (U) Report on scope of problem of waste management of used sonobouy launch containers and lack of opportunities for recycling.

e. (U) Description of stand-alone software system for automatic substitutions of nonplastic items of supply.

3. (U) FY 1994 PLAN:

a. (U) Continue laboratory and fleet testing of packaging materials and nonplastic products.

b. (U) Research production of items of supply, such as milk bladders, from proven biodegradable materials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN DET, Annapolis, MD; Army Research Development and Engineering Center, Natick, MA. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0829	ENERGY CONSERVATION (ADV)	2,791	3,147	2,753	CONT.	CONT.
R0838	MOBILITY FUELS (ADV)	1,887	1,976	1,576	CONT.	CONT.
	TOTAL	4,678	5,123	4,329	CONT.	CONT.

B. (U) DESCRIPTION: This program supports projects to evaluate, adapt, and develop energy related technologies for ship, aircraft, and land-based operations to: (a) increase fuel-related weapon systems capabilities such as range and time on station; (b) conserve energy and reduce energy costs; (c) reduce Navy shore facilities dependence on petroleum fuels and apply energy technologies that improve environmental compliance; (d) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems; (e) relax unnecessarily restrictive fuel specification features to reduce cost and increase availability worldwide; and (f) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels when military specification fuels are unavailable or in short supply. Through 1985, the Navy Energy R&D Program, of which this program element is a part, had produced energy cost avoidance estimated at $127M per year (compared to 1975 consumption rates). As currently funded, savings of $150M per year by 1995 and $317M per year by 2000 are projected compared to 1985 costs.

This program, and the companion PE 0604710N, Navy Energy Program (ENG), support the achievement of Executive Department, DOD, and Navy Energy Management Goals enunciated in Executive Order 12759 of Apr 91, Defense Energy Policy Memorandum 91-2 of May 91 and OPNAV Instruction 4100.5C of July 86, respectively.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM
PROJECT NUMBER: R0829 PROJECT TITLE: ENERGY CONSERVATION (ADV)

C. (U) DESCRIPTION: This project improves the energy efficiency of Navy ships, aircraft, and shore facilities and thereby contributes to reduced operating costs and improved fleet sustainability and performance. Major efforts include work to increase the efficiency of aircraft engines and auxiliary systems, develop improved hull coatings and auxiliary equipment for ships, and evaluate alternate energy sources and energy use management strategies at Navy shore facilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Aircraft: Demonstrated improved efficiency compressor and turbine technology for GE F404/F414 engines. Completed initial studies of Integrated Flight/Propulsion Control (IFPC) technology for F/A-18E/F. Ships: Completed ship impact/cost analyses of a Steam Augmented Gas Turbine (SAGT) propulsion engine. Redesigned shipboard air conditioning systems to permit use of ozone-safe refrigerants with minimum efficiency loss. Accepted products from 6.2 non-toxic antifouling (AF) paints program into advanced AF paint candidate screening program. Facilities: Continued DT&E of Inverse Flash Steam Purification (IFSTEP) system for pierside clean steam supply. Expanded Integrated Energy Resource Planning (IERP) into a tri-service effort. Developed control system requirements for photovoltaic (PV)/diesel hybrid systems.

2. (U) FY 1993 PROGRAM: Aircraft: Initiate IFPC tech demo program for F/A-18. Select and develop control system architecture for F/A-18E/F; determine retrofit potential of IFPC for F/A-18C/D. Ships: Complete feasibility studies of SAGT engine. Initiate laboratory testing of new compressor impellers for use with alternative refrigerants. Investigate environmental stresses caused by the in-water cleaning of ablative AF paints. Initiate bilge keel exposure, and disk drag tests of non-toxic AF paints/paint components. Facilities: Transition IFSTEP (clean steam) to 6.4 field testing. Develop energy technology/resource management investment strategies for Navy/DOD facilities. Identify for development industrial process energy saving technologies. Establish criteria for grid interactive PV systems.

3. (U) FY 1994 PLANS: Aircraft: Continue IFPC Technology Demonstration Program--develop/validate hardware and system integration. Integrate F/A-18 Flight Performance Advisory System (FPAS) developed in 6.4 into IFPC program. Ships: Complete laboratory testing of composite heat exchanger and SHIPEVAL of composite ducting sections. Complete redesign of CG-47, DDG-51, and DD-963 air conditioning compressor impellers for operation with non-freon refrigerants. Initiate bilge keel panel exposures of natural product AF formulations and "easy release" paints. Facilities: DT&E steam to hot water space heating conversions and use of reverse osmosis for production of potable water. T&E PV/hybrid power systems for site-specific applications. Continue IERP investment strategy studies. Develop energy efficient processes/components for industrial facilities.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN DET, Annapolis, MD; NAVAIRWARCENACDIV, Trenton, NJ; NCEL, Port Hueneme, CA; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: GE, Lynn, MA; McDonnell Aircraft, St. Louis, MO; Teledyne Inet, Torrance, CA; Northern Research Eng. Corp., Woburn, MA.

F. (U) RELATED ACTIVITIES: PE 0604710N, Navy Energy Program (ENG). Air conditioning programs are closely integrated with PE 0603721N, Environmental Protection, and PE 0603513N, Shipboard Systems Component Development.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM
PROJECT NUMBER: R0838 PROJECT TITLE: MOBILITY FUELS (ADV)

C. (U) DESCRIPTION: This project provides data through engine and fuel system tests which relate the effects of changes in Navy fuel procurement specification (spec) properties to the performance and reliability of Naval ship and aircraft engines and fuel systems. This information is required to: (a) determine the extent to which unnecessarily restrictive spec features can be relaxed to reduce cost and increase availability worldwide. Savings of $20M per year by the end of 1992 increasing progressively to over $120M by 2000 are projected to be achievable compared to current fuel costs; (b) provide guidance to fleet operators for the safe use of off-spec or commercial grade fuels when military spec fuels are unavailable or in short supply; and (c) make needed periodic changes to fuel specs to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. Recent problems with fuel quality have adversely affected ship and aircraft system performance and reliability and resulted in degradation of fuel in storage. The resulting readiness impacts, additional maintenance costs, and the cost of lost equipment, although difficult to quantify, are many times the cost of this project. Over the next decade, the potential for fuel quality related problems will increase because of changing industry practices required to comply with new environmental restrictions. This project represents the only investment designed to maintain the Navy's ability to operate as a "smart" customer for a commodity that costs approximately $3B per year to procure, transport, store and consume and is essential to fleet operations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed ship high-speed diesel engine (HSDE) durability evaluations, and recommended a broadened HSDE fuel spec that may encompass commercial-grade marine gas oils. Developed guidelines for usage of Metal Deactivator Additive (MDA) as a jet fuel thermal stability improver. Developed accelerated field test to predict storage life of JP-5.

2. (U) FY 1993 PROGRAM: Complete GE LM2500 main propulsion engine, combustor rig tests for ignition and stability, and initiate thermal stability performance evaluations for broadened-spec, MILSPEC marine diesel fuels (BSMMDFs). Develop a new Marine diesel fuel low temperature behavior test method based on cold filtration to replace cloud point and pour point tests. Complete development of quantitative thermal stability measurement techniques to allow the rapid assessment of the potential for off-spec fuel to limit aircraft engine life.

3. (U) FY 1994 PLANS: Continue burner rig tests to determine the relationship between engine durability and fuel properties for the Allison 501-K17/34 Gas Turbine Engine (GTE). Complete GE LM2500 combustor performance evaluation for BSMMDFs. Complete development of a cost effective strategy for eliminating the adverse effects on JP-5 thermal stability caused by copper contamination from the copper/nickel shipboard aviation fuel system piping. Complete development of an accelerated procedure to evaluate/quantify the effects of fuel properties, additives and filter/separator components on the water coalescence of JP-5 and Marine diesel fuel.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN DET, Annapolis, MD; NAVAIRWARCENACDIV, Trenton, NJ; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NRL, Washington, DC. CONTRACTORS: Allison Gas Turbine, Indianapolis, IN; Detroit Diesel Corp, Detroit, MI; General Electric Corp, Cincinnati, OH; Pratt and Whitney, West Palm Beach, FL; Rolls Royce, Atlanta, GA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: ABCA/IEP-3 agreement with UK, Canada, and Australia on the use of Naval marine fuels and allied products.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603725N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Facilities Improvement
PROJECT NUMBER: Y0995 PROJECT TITLE: Navy Facilities Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Y0995	NAVY FACILITIES SYSTEMS	462	1,533	1,383	CONT.	CONT.

B. (U) DESCRIPTION: This project provides for advanced developments to reduce the costs of Naval facilities infrastructure through full scale test validations of new concepts and advancing technologies: (a) a High Performance Magazine (HP Mag) to increase ammunition storage efficiency or decrease costs by a factor of 8; this will result in better land use to provide new options for base consolidations and reduce munitions storage operating costs. Additionally, compile test data for survivability of facilities; (b) Specialized equipment to reduce peacetime costs, capability shortfalls and risks to the Seabee Underwater Construction Teams. It focuses on needs where private construction R&D is lacking, and transfers university research to Navy application/acquisition.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Initiated constructibility assessments of HP Mag. materials.
   b. (U) Continued development of Arctic Ocean Remote Operating Work Vehicle (ROV) for Arctic Ocean construction operations.
   c. (U) Completed: Underwater Electric Ground Fault Detector and Clean-Exhaust Space Heater for diver safety against electrocution and asphyxiation.
   d. (U) Completed feasibility study for Joint Camouflage Concealment Deception (JCCD); program test designs and test plans initiated.
2. (U) FY 1993 PROGRAM:
   a. (U) Complete constructibility assessment of HP Mag. Design tests and other procedures to obtain facility survivability data.
   b. (U) Field test Arctic ROV for ten fold endurance and range improvement; demonstrate feasibility of Quick Cold-Start Electric Generator for emergency electricity and heat in Arctic.
   c. (U) Complete test designs and test plans for JCCD; start testing.
3. (U) FY 1994 PLANS:
   a. (U) Design HP Mag demonstration for full scale explosive testing. Continue with facility survivability test data compilation and analysis.
   b. (U) Complete Arctic ROV and continue Cold-Start Generator testing.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCEL, Port Hueneme, CA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCEN, White Oak DET Silver Spring, MD; U. S. Army Waterways Experiment Station (WES), Vicksburg, MS; CONTRACTORS: CEMCOM Research, Lanham, MD; Mission Research, Santa Barbara, CA; Benthos, North Edgerton, MA.

E. (U) RELATED ACTIVITIES:
PE 0602233N, Mission Support Technology
PE 0602234N, Materials, Electronics and Computer Technology
PE 0603792N, Advanced Technology Demonstrations

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands): Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1933	Undersea Warfare (USW) Advanced Technology Demonstration	14,739	13,932	12,183	CONT.	CONT.
X1959	Critical Sea Tests (CST)	21,610*	27,799*	24,714	48,454	122,577
X2100	Advanced Deployable Array	3,946	3,560	0	0	7,506
H2089	Advanced Collection Technology	10,613	10,497	10,332	CONT.	CONT.
V2159	ASW Target**	0	2,000	1,943	947	5,890
X2186	Low Frequency Tech	0	14,226	0	0	14,226
X2187	Shallow Water ASW System	0	2,824	0	0	2,824
TOTAL		50,908	74,838	49,172	CONT.	CONT.

* Includes funds orginally shown in PE 0605863N, Project X2029.
**Funds were transferred from PE 0603254N after restructure of the MK-30 Target program.

B. (U) DESCRIPTION:

(U) The objective of this program is to rapidly transition enabling Anti-Submarine Warfare (ASW) technologies to existing and future ASW systems, allowing U.S. forces to maintain their technological advantage for minimal investment. As a result of recent geo-political changes, this program's focus is shifting from "blue water" ASW to shallow water ASW to address the more likely regional conflict scenarios. Programmatic emphasis has been placed on ASW coordination in the tactical Battle Force and on active systems to more effectively pursue the full range of potential submarine threats.

(U) The Advanced Undersea Warfare Technology Program validates underwater acoustic concepts through Warfighting Payoff analyses and at-sea and Regional field experiments; it develops Advanced Collection Technologies to support cross-platform direct measurement of potential threat submarine in the Low Frequency Active (LFA), as well as and passive regimes. This program also supports Full Spectrum processing; advanced acoustic sources and active acoustic Critical Sea Tests for

The program provides developmental demonstration systems, Warfighting Payoff Analyses; initial concept testing in the laboratory and at-sea, and specifications for engineering development to field ASW passive and active systems capable of detecting the very quiet diesel-electric submarine threats of the 1990s through 2010. The program also demonstrates exploitation of specific regional and shallow water environments for USW operations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: Undersea Warfare Advanced Technology Demonstration (USW ATD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
X1933	USW ATD	14,739	13,932	12,183	CONT.	CONT.

B. (U) DESCRIPTION: The USW ATD Project includes full spectrum processing development to that have not been exploited with previous processing systems. Current systems are The Full Spectrum effort is designed to provide a more effective

The Regional Field Development portion of this project provides for the transition of the project and for

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Procured Regional Surveillance demonstration array components, initiated Regional processor accomplishments.
b. (U) Conducted Regional Exercises and interim field measurements.
c. (U) Analyzed and reported regional sensor performance.
d. (U) Continued full spectrum signal processing development for signals. Initiated transitions.
e. (U) Initiated acoustic warfare implementation planning for cross platform/system interoperability in a LFA sonar operational environment.
f. (U) Tested three (3) acoustic source element candidates (Sparker, Thermal, and Inverse Flextensional).
g. (U) Collected 39 threat data packages for Full Spectrum Database.

2. (U) FY 1993 PROGRAM:
a. (U) Deploy Regional surveillance demonstration array, including advanced processing from Exploratory Development(6.2) programs and FY 1992 results.
b. (U) Conduct regional exercises, analyze, and report previous year's exercise results.
c. (U) Evaluate options and define transition plan.
d. (U) Procure and test an array of acoustic sources, utilizing the preferred single-element technology from FY 1992 tests.
e. (U) Complete/deliver to Navy Planners, including interoperability and Command, Control, Communications and Intelligence (C3I)/threat integration. This includes analysis of Critical Sea Test data.
f. (U) Identify priority Full Spectrum processing opportunities against
g. (U) Complete baseline of all systems performance assessment for USW system against submarines.
h. (U) Conduct modeling and analyses to quantify and assess the expected of the initiatives withir this program element.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: Undersea Warfare Advanced Technology Demonstration (USW ATD)

3. (U) FY 1994 PLANS:

a. (U) Conduct regional exercises, analyze, and report previous year's results.

b. (U) Test array of acoustic sources, utilizing the preferred single-element technology from FY 1993 tests.

c. (U) Develop and evaluate Full Spectrum Processing prototype processor for

d. (U) Revise and expand matrix of

e. (U) Update/revise reflecting acoustic interoperability and C3I/threat integration developments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC, San Diego, CA; NAVAIRWARCEN Warminster, PA; NAVSURFWARCEN, White Oak, MD; NAVUNSEAWARCEN, New London, CT; NAVPERSR&DCEN, San Diego, CA. CONTRACTORS: Polar Associates Inc., Santa Barbara, CA; Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; TRW, McLean, VA; Science Application International Corporation (SAIC), McLean, VA; ORINCON, San Diego, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

(U) NAPDD #326-87 for Full Spectrum	7 Dec 1992
(U) ASN (RD&A) Memo "Distribution of ASW Technology Funds"	21 Dec 1990
(U) OR (S)	Apr 1990
(U) NAPDD #251-07 for Regional ASW Command Concept	7 Dec 1990
(U) Memorandum Of Agreement(MOA)	

G. (U) RELATED ACTIVITIES: PE 0602314N, Undersea Surveillance and Weapons Technology, PE 0602315N, MCM, Mining, and Special Warfare Technology, PE 0602323N, Submarine Technology, PE 0602435N, Ocean and Atmospheric Technology, PE 0603792N, Advanced Technology Demonstrations; PE 0603555N, Undersea Superiority Technology Demonstrations; PE 0204311N, Integrated Surveillance System; PE 0603254N, ASW Systems Development; PE 0604261N, Acoustic Search Sensors (ENG) and PE 0603553N, Surface ASW.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests (CST)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1959	CST	21,610 *	27,799 *	24,714	48,454	122,577

* Includes funding previously shown in PE 0605863N.

B. (U) DESCRIPTION: The Critical Sea Tests (CST) project provides a consolidated means of conducting at-sea (both shallow and deep water) active system experiments for Post Cold War regional conflict scenarios in support of all ASW platforms and development programs (ARPA, 6.1, 6.2, 6.3, 6.4, operation and training development). The CST (X1959) Phase II transferred from PE 0603792N in FY 1992 with objectives broadened to emphasize including shallow water. The testing assets of this project are the core of planned The scientific focus for this project has shifted from deep water ASW detection to critical shallow water issues (in regional conflict scenarios) and acoustic warfare interoperability issues which fleet operators need to address immediately. Reverberation, transmitted waveforms, processing algorithms, and operational considerations are evaluated in key at-sea areas of ASW interest, to provide design information and improvements for existing, planned, and potential LFA systems. Acoustic warfare interoperability testing and operations are part of this investigation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted tests off in combined Air Defense Initiative ASW and CST effort (E1/CST 6) in 1st Quarter FY 1992.

b. (U) Conducted combined air/submarine/surface surveillance ASW sea tests in

2. (U) FY 1993 PROGRAM:

a. (U) Conduct combined tactical and surveillance sea tests in the

b. (U) Conduct joint surface and submarine tactical sea tests in

c. (U) Analyze FY 1992 tests and provide reports on both scientific and operational results to all ASW platform users.

3. (U) FY 1994 PLANS:

a. (U) Conduct one major sea test in shallow water environments

b. (U) Address both surveillance and tactical active acoustic Science and Technology requirements in sea tests.

c. (U) Include interoperability (surveillance with tactical ASW) in sea tests.

d. (U) Address data fusion, C3I real-world issues in support of Acoustic Warfare planning.

4. (U) PROGRAM TO COMPLETION: Conduct final sea test in shallow water site. Complete data analysis. Demobilize sea test assets. Project completes at end of FY 1996.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NRL-SSC, Stennis Space Center, MS; NCCOSC, RDT&E DIV, San Diego, CA; NCEL, Point Hueneme, CA; NAVAIRWARCENACDIV, Warminster, PA; and NAVUNSEAWARCEN, New London, CT. CONTRACTOR: The John Hopkins University/Applied Physics Laboratory, Laurel, MD.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests (CST)

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
1. (U) NAPDD 138-098, Advanced Technology Transition At-Sea ASW Experiments, dated 2 October 1986 (PE 0603742N Project R1959-01).
2. (U) NAPDD 328-911E, ASW Advanced Technology Critical Sea Test Phase II, dated 9 March 1993 (PE 0603747N Project X1959).
3. (U) CST Phase II Program Plan (U), 10 May 1991.
4. (U) Execution Plan for PE 0603747N Project X1959; Advanced Anti-Submarine Technology, Critical Sea Test (CST) Phase II; dated 23 October 1992.

G. (U) RELATED ACTIVITIES: PE 0603785N, Combat Systems Oceanographic Performance Assessment, provides at-sea measurements and data collection. PE 0204311N, ISS, provides development, testing and deployment of a LFA sonar capability. The following programs are the transition target projects awaiting successful output from this project: PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602435N, Ocean and Atmospheric Technology; PE 0603792N, Advanced Technology Transition; and PE 0603555N, Undersea Superiority Technology Demonstrations; PE 0204311N, ISS; PE 0604261N, Acoustic Search Sensors (ENG), PE 0603553N, Surface ASW; PE 0604221N, P-3 Modernization Program; PE 0604503N, Submarine System Equipment Development; PE 0604784N, Distributed Surveillance Systems; and PE 0603254N, ASW Systems Development. All tactical ASW acoustic sensor programs are provided with the information/findings from CST for incorporation into their design/development and operation/training improvements.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:
1. (U) Canadian-U.S. Supplemental Arrangement to North American Air Defense Modernization, Memorandum of Understanding 29 September 1992.
2. (U) US/CANADIAN Information Exchange Project (IEP) C-30, "Low Frequency Active Acoustics Research and Development Information."
3. (U) US/UNITED KINGDOM IEP-B85, "Exchange of Low Frequency Active Acoustics (LFAA) Research, Development and Technology Information and Technical Information Related to LFAA System Development."
4. (U) US/UNITED KINGDOM IEP-B-74, "Shallow Water Undersea Surveillance."

J. (U) MILESTONE SCHEDULE:

Plan and Execute Phase II Sea Tests	1/2 Qtrs FY 1992
Complete Data Analysis	3 Qtrs FY 1993
Plan and Execute Sea Tests	3/4 Qtrs FY 1993
Complete Data Analysis from FY 1993 Sea Tests	1 Qtr FY 1994
Conduct one Major Sea Test	FY 1994
Complete Data Analysis from FY 1994 Sea Test	FY 1995
Conduct one Major Sea Test	FY 1995
Complete Data Analysis from FY 1995 Sea Test	FY 1996
Conduct Final Sea Test	FY 1996
Demobilize Test Assets	FY 1996
Complete Data Analysis	FY 1996

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: H2089 PROJECT TITLE: Advanced Collection Technology

A. (U)RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H2089	Advanced Collection Technology	10,613	10,497	10,332	CONT.	CONT.

B. (U) DESCRIPTION: This project takes 6.2 technology and concepts into advanced development and limited prototype builds. These will be used operationally for the collection of acoustic and non-acoustic data on small naval targets,
For example, it provides the technology to obtain
)data

Other technologies, such as radar and optical detection and target identification capabilities (i.e., periscope detection, Inverse Synthetic Aperture Radar and Synthetic Aperture Radar (SAR), etc.), will be integrated with advanced signal processing and displays.
(U) Programs such as LFA require'
There is currently
An on-going effort in this program is the technology development for a family of target strength measuring calibrated active sonobuoys which will operate at various frequencies from'
acoustic propagation characteristics in shallow water are being analyzed as a result of Operation NATIVE at-sea tests for validating the effectiveness of quiet

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:
1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Continued the technology development for the Naval Underwater Acoustic Multiple Ping (NUAMP) Sonobuoy and developed signal processing software for integration into the Advanced Processor Experimental (APEX) signal processor.
b. (U) Analyzed acoustic data collected during exercises NATIVE I to provide information for the

2. (U) FY 1993 PROGRAM:
a. (U) Perform technology demonstrations in air drop testing, over-the-side testing and operational testing of the NUAMP sonobuoy and integration of related signal processing software into the APEX Commercial-off-the-Shelf Futurebus+ configured signal processor previously developed under this project.
b. (U) Continue to analyze data collected during NATIVE I and collect additional ambient noise data
Initiate tests to verify the model's performance.
3. (U) FY 1994 PLANS:
a. (U) Complete technology assessment in operational testing of the NUAMP sonobuoy and
and APEX signal processor.
b. (U) Initiate technology integration and prototyping of a quieted Magnetic Anomaly Detection system to provide an extended capability

c. (U) Initiate technology prototyping of modified radar to provide a SAR capability and improve image processing algorithms for integration in APEX signal processor to
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: H2089 PROJECT TITLE: Advanced Collection Technology

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCEN, Warminster, PA/Patuxent River, MD; NAVSURFWARCEN, White Oak, MD; NRL, Washington, D.C. CONTRACTORS: Texas Instruments Incorporated, Dallas, Texas; Spartan Electronics, Jackson, MI; IBM, Manassas, VA; General Scientific Corporation, Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology changes: Not applicable.
2. (U) Schedule changes: Not applicable.
3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Descriptive Document (NAPDD) #239-98 15/08/90

G. (U) RELATED ACTIVITIES: PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602435N, Ocean and Atmospheric Technology; PE 0603553N, Surface ASW; PE 0205620N, Surface ASW Combat System Integration; PE 0603691N, MK 48 Advanced Capabilities; PE 0603254N, ASW Systems Development; PE 0604261N, Acoustic Search Sensors (ENG); PE 0604221N, P-3 Modernization Program; PE 0604212N, ASW and other Helicopter Developments; PE 0603792N, Advanced Technology Transition; and PE 0603555N, Undersea Superiority Technology Demonstrations.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: V2159 PROJECT TITLE: ASW Target

C. (U) DESCRIPTION: This project develops an acoustic VLF transducer system for use in mobile ASW targets. Mobile ASW target acoustic systems cover a wide frequency range for compatibility with Navy ASW weapons and sensors. The Fleet Commanders recently requested a target providing an extended bandwidth VLF capability. Current and planned Mobile ASW targets are limited in the VLF range. This effort develops and demonstrates a VLF range acoustic system responsive to future Fleet ASW training and test and evaluation target requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM:
   a. (U) Prepare VLF transducer specification and procurement package.
   b. (U) Award contract(s) to design, build and test VLF transducer prototype(s).
   c. (U) Complete system design.

3. (U) FY 1994 PLANS:
   a. (U) Contractor(s) design, fabricate and assemble prototype(s).

4. (U) PROGRAM TO COMPLETION:
   a. (U) Perform in-water testing of prototype demonstration systems.
   b. (U) This effort is planned to complete in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI and NAVUNSEAWARCENDIV Keyport, WA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: PE 0603254N Project V0968, ASW Systems Development, Advanced ASW Target. VLF transducer may be incorporated in the ASW Systems Development, Advanced ASW Target.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U2039	COOP ENGAGEMENT	0	0	94,504	46,441	140,945
U2133	QRCC	19,806	17,180	12,660	CONT.	CONT.
U2136	LINK IRON	160,000	140,659	126,732	CONT.	CONT.
U2138	INFRARED	4,951	5,607	0	0	10,558
U2139	OUTLAW BANDIT	19,806	20,359	0	0	40,165
U2184	FACT	15,844	10,264	3,308	CONT.	CONT.
U2190	NULKA DECOY	0	1,906	0	0	1,906
U2191	INFRARED RAM	0	9,486	0	0	9,486
U2192	EVOLVED SEA SPARROW	0	1,998	0	0	1,998
U2193	SENSOR INTEG	0	2,870	0	0	2,870
	TOTAL	220,407	210,329	237,204	CONT.	CONT.

B. (U) DESCRIPTION: This program incorporates efforts dedicated to the enhancement of ship self defense against Anti-Air Warfare (AAW) threats. Its primary focus is on the development of technologies, systems and procedures necessary to defeat the evolving Anti-Ship Cruise Missile (ASCM) threat. A description of Project U2136, Link Iron, is not included due to a higher level of classification.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U2039	COOP ENGAGEMENT	0	0	94,504	46,441	140,945

B. (U) DESCRIPTION: Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real time, composite track picture having fire control quality. CEC distributes sensor data from each ship and aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapon systems. CEC will significantly improve our Battle Force defense in depth, including both local area and self defense capabilities against current and future AAW threats. CEC is designed to enhance the AAW warfighting ability of ships and aircraft and to enable coupling of the Force into a single, distributed AAW weapon system and towards more effective use of tactical data and the cooperative use of all the Force sensors and weapons. These capabilities will provide the ship defense flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile third world countries.

(U) CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System Modifications. The DDS encodes and distributes ownship sensor and engagement data, and is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor which is able to process force levels of data in a timely manner that allows its output to be considered real-time fire control data. This data is passed to the ships combat system as fire control quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Demonstrate cued and remote data missile firing engagement with AEGIS and new threat upgrade class ships.

b. (U) Demonstrate cued self defense missile firing engagements.

c. (U) Complete Composite Identification and Cooperative Engagement Decision data collection.

d. (U) Develop/test Fleet CEC tactics and operations.

e. (U) Conduct Demonstration Tests/Operational Tests (DT/OT).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement

4. (U) PROGRAM TO COMPLETION: Build additional CEC units for OPEVAL/TECHEVAL. Complete analysis of DT/OT lessons learned. Demonstrate Airborne Early Warning Aircraft Air CU. Obtain initial operating capability decision.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCEN FLTCOMBTATDIRSSACT, Dam Neck, VA; Electromagnetic Compatibility Assessment Center, Annapolis, MD. CONTRACTORS: JHU/APL, Laurel, MD; E-Systems, Inc., (ECI Division), St Petersburg, FL; PRC, Inc., Arlington, VA; GESD, Moorestown, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: ORD in chop. MNS completed 2/93.

G. (U) RELATED ACTIVITIES: Not applicable.

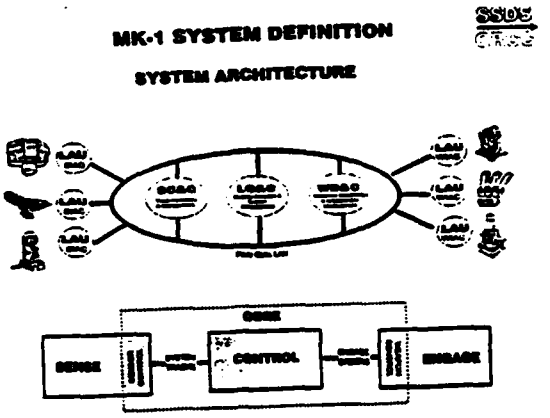
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2133 PROJECT TITLE: Quick Reaction Combat Capability (QRCC) - Advanced



POPULAR NAME: QRCC

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MK 1 EMD 04/94	CONT.
ENGINEERING MILESTONES			MK 1 MS II 01/94	CONT.
T&E MILESTONES		SSDS MK 1 DEMO 06/93		CONT.
CONTRACT MILESTONES				CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	8,481	5,100	3,710	CONT.	CONT.
SUPPORT CONTRACT	206	540	1,025	CONT.	CONT.
IN-HOUSE SUPPORT	11,119	11,540	6,425	CONT.	CONT.
GFE/ OTHER	0	0	1,500	CONT.	CONT.
TOTAL	19,806	17,180	12,660	CONT.	CONT.

B. (U) DESCRIPTION: The QRCC program provides the multi-sensor integration and hardkill/softkill coordination to improve current system performance with respect to short range anti-air ship self defense. It is intended to leverage recent critical experiments and Rapid Anti-Ship Missile Integrated Defense System (RAIDS) Ship Self Defense System (SSDS) Mark (MK) 0 program efforts, to upgrade existing short range Anti-Air Warfare (AAW) defenses by providing a quick reaction capability through flexible imbedded doctrine, that coordinates the detect-through-engage sequence for in-service equipment. In particular, QRCC applies multi-sensor integration to existing sensors; upgrades and integrates RAIDS for support of local command and control; integrates and coordinates weapon systems; and provides a first level of hardkill/softkill integration. QRCC architecture centers on the distributed processing concept and will be incrementally implemented and demonstrated via a MK 1 SSDS focusing on integration of the Rolling Airframe Missile (RAM), Close-In Weapon System (CIWS) and Electronic Countermeasure System (SLQ-32), followed by a MK 2 system which integrates NATO SEASPARROW, CIWS, RAM,SLQ-32 and the Target Acquisition System (TAS) across a broad ship class spectrum. It integrates existing system elements

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2133 PROJECT TITLE: Quick Reaction Combat Capability (QRCC) - Advanced

via a fiber optic local area network and uses color workstations for system operation, maintaining form, fit and function of the OJ-194 console. QRCC will pace the threat along a development path which captures emerging technologies to enhance short range AAW capability, transitioning to Engineering and Manufacturing Development (E&MD) programs (RDT&E category 6.4) where appropriate.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Defined demonstration system for Landing Ship Dock (LSD) class ship.

b. (U) Defined operational system for LSD class ship.

c. (U) Initiated software specification and completed development for demonstration system.

d. (U) Procured developmental and Advance Development Model (ADM) hardware.

e. (U) Prepared plans, including documentation to support a June 1993 demonstration aboard an LSD class ship.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct demonstration aboard LSD class ship.

b. (U) Transition RAIDS (SSDS MK 0) to FFG-7 and achieve procurement authorization.

c. (U) Develop programmatic documentation to support MS II.

3. (U) FY 1994 PLANS:

a. (U) Achieve Milestone II E&MD decision for MK 1 system.

b. (U) Transition to E&MD for SSDS MK1 version for LSD class ship, to include conduct of Preliminary Design Review and Critical Design Review.

c. (U) Initiate design/development for SSDS MK 2 system for TAS/NATO SEA SPARROW configured ships.

d. (U) Begin adaptations of MK 1 system for installation aboard FFG-7 and LHA class ships.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Hughes Missile Systems Company, Tucson, AZ; Hughes, Fullerton, CA; JHU/APL, Laurel, MD.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2133 PROJECT TITLE: Quick Reaction Combat Capability (QRCC) - Advanced

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
MAPDD: 313-86 approved 9/92

G. (U) RELATED ACTIVITIES: PE 0604755N, Ship Self Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line P172	0	0	13,020	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) Initial system demonstrations of advanced multi-sensor integration concepts are to be accomplished as preludes for transition to E&MD under RDT&E,N category 6.4 funding.

2. (U) MK 1 system demonstration to be conducted 06/93.

3. (U) MK 2 system demonstration to be conducted 05/95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2184 PROJECT TITLE: Force AAW Coordination Tech

C. (U) DESCRIPTION: Force Anti-Air Warfare Coordination Technology (FACT) Program is an advanced development program designed to demonstrate Force AAW concepts and capabilities. FACT improvements are designed to enhance the AAW warfighting ability of ships and aircraft and to enable coupling of the Force into a single, cooperative AAW weapon system. These capabilities will provide the flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile third world countries.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Demonstrated advanced Auto-ID Cruiser, Silent Gridlock capability, improved Identification Friend-or-Foe tracking concepts and initial advanced Force Threat Evaluation and Weapon Acquisition (FTEWA) capabilities.
b. (U) Assessed feasibility of Remote Data Engage (RDE) between units.
c. (U) Conceived recommended Link interoperability improvements among Force participants, Joint Services, and Allied network participants.

2. (U) FY 1993 PROGRAM:

a. (U) Support integration of RDE capability in shipboard Systems and Link interoperability between Joint and Allied forces.
b. (U) Demonstrate advanced multi-sensor tracking and Force Identification, Geodetic SGS/AC in Fleet AAW exercise, and FTEWA.
c. (U) Complete feasibility of Remote Missile Launch.
d. (U) Provide further recommendations for improving Link-11 interoperability among Force participants, Joint Services, and Allied network participants. Provide recommendations for improving Link-16 integration into Force, including interoperability with existing Link-11.

3. (U) FY 1994 PLANS:

a. (U) Support integration of FTEWA into major AAW combatants and Link interoperability between Joint and Allied forces.
b. (U) Provide further recommendations for improving Link-11 interoperability among Force participants, Joint Services, and Allied network participants. Provide recommendations for improving Link-16 integration into Force, including interoperability with existing Link-11.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN; NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCEN FLTCOMBATDIRSSACT, Dam Neck, VA; NCCOSC RDTE DIV, San Diego, CA; ECAC, Annapolis, MD; Fleet Analysis Center, Corona, CA. CONTRACTORS: JHU/APL, Laurel, MD; ECI, St. Petersburg, FL; PRC, Inc., Arlington, VA; SYSCON Corporation, Arlington, VA; VITRO, Rockville, MD; LOGICON, San Diego, CA; GESD, Moorestown, NJ.

F. (U) RELATED ACTIVITIES:

PE 0604366N, Standard Missile Improvements
PE 0205604N, Tactical Data Links
PE 0604307N, AEGIS Combat System Engineering
PE 0604518N, Combat Information Center Conversion

G. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands): Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603763N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Warfare Systems Architecture and Engineering
PROJECT NUMBER: X1991 PROJECT TITLE: WSA&E

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1991	WSA&E	7,255	7,914	7,033	- CONT.	CONT.

B. (U) DESCRIPTION: The Warfare Systems Architecture and Engineering (WSA&E) program provides the engineering, technological, and analytical underpinnings for Navy's warfighting assessment (including the Investment Balance Review) and acquisition processes (PPBS and COEAs). It provides the fundamental models, tools, baseline data, Measures of Effectiveness (MOE), and framework to evaluate the present and future warfare effectiveness of Navy forces. Outputs provided by WSA&E yield consistency in rational decision-making processes for the Navy and for joint service programs including force architecture options, operational effectiveness options among alternative weapon systems, prioritization of warfighting requirements, assessment of risks from downsizing, altering force structure, or programmatic delays, and evaluation of new proposals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Developed Power Projection Top Level Warfare Requirements (TLWR).
   b. (U) Developed six draft detailed Navy regional scenarios.
   c. (U) Performed multiwarfare analysis of Power Projection in support of POM process.
   d. (U) Developed architecture databases.
   e. (U) Developed draft model and simulation accreditation process.

2. (U) FY 1993 PROGRAM:
   a. (U) Begin MOE update to reflect Joint/Navy initiatives.
   b. (U) Develop additional scenarios based on DPG.
   c. (U) Update architecture database.
   d. (U) Continue to develop and accredit multiwarfare models and tools and improve analytic methodology.
   e. (U) Perform multiwarfare analysis to support POM 96.

3. (U) FY 1994 PLANS:
   a. (U) Implement Joint Navy Model Requirements/Architecture Neckdown Strategy.
   b. (U) Develop, update and maintain Navy standard scenarios based on Defense Planning Guidance.
   c. (U) Update architecture database and interconnectivity network.
   d. (U) Continue to develop and accredit Joint Mission Area/Support Area tools and improve analytic methodology.
   e. (U) Perform Joint Mission Area/Support Area analysis to support Investment Balance Review process.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CADEROCK DIV, Bethesda, MD; NCCOSC/RDTE DIV, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENACDIV, Warminister, PA; NAVAIRWARCENWPNDIV, China Lake, CA: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVUNSEAWARCENDIV, Newport, RI; NRL, Washington, DC; CONTRACTORS: JHU/APL, Laurel, MD; BAH, Bethesda, MD; SAIC, LaJolla, CA; TRW, McLean, VA.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATION AGREEMENT: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603782N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Shallow Water MCM Demonstration
PROJECT NUMBER: R2127 PROJECT TITLE: Shallow Water Mine Countermeasures (MCM) Demos

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2127	Shallow Water Mine Countermeasure (MCM) Demos	4,914	9,848	5,148	CONT.	CONT.

B. (U) DESCRIPTION: The focus of this program is a technical demonstration to adapt the Magic Lantern Advanced Development Model (ML(A)) system to better meet Marine Corps requirements. Results from this Phase I technical demonstration project will be used to support USN/USMC decisions relative to follow on development and acquisition of a deployable system in the mid to late 1990s.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Upgraded the government analytical performance model, including tank and pier testing of optics/imaging components, to allow for evaluation of contractor designs and test data.
b. (U) Established specifications for ML(A).
c. (U) Studied advanced signal processor algorithms with potential application to ML(A).

2. (U) FY 1993 PROGRAM:
a. (U) Initiate Shallow Water Mine Countermeasure near term Development Model contract. Initiate fabrication of ML(A).
b. (U) Continue image processing and model development studies to support the ML(A) system and evaluate results against ability to achieve both near term requirements and far term goals.
c. (U) Complete performance testing of optics/imaging components.

3. (U) FY 1994 PLANS:
a. (U) Initiate ML(A) contractor testing.
b. (U) Initiate documentation required to support an acquisition decision.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN, Panama City, FL. CONTRACTORS: Kaman Aerospace, Tucson, AZ and Bloomfield, CT; Others to be determined.

E. (U) RELATED ACTIVITIES: PE 0602315N, MCM, Mining, and Special Warfare Technology; PE 0602435N, Oceanographic and Atmospheric Technology; PE 0603555N, Undersea Superiority Technology Demos; PE 0603612M, Marine Corps Mine Countermeasures; PE 0604373N, Airborne Mine Countermeasures.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	Advanced Environmental Acoustic Support (AEAS)	14,015	13,914	9,779	CONT.	CONT.
R2017	Advanced Underwater Acoustic Modeling Project (AUAMP)	3,134	3,028	2,110	CONT.	CONT.
V0823	Sensor Performance Prediction (SPP)	9,124 *	8,757 *	7,961	CONT.	CONT.
	TOTAL	26,273	25,699	19,850	CONT.	CONT.

* Note: V0823 was funded under PE 0603708N in FY 1992 and FY 1993.

B. (U) DESCRIPTION: The Combat Systems Oceanographic Performance Assessment (CSOPA) Program Element provides oceanographic/atmospheric Research and Development (R&D) for expanded knowledge and improved understanding of the environment and its impact on combat systems performance. Its purpose is to assess, predict and enhance the performance of current and proposed undersea surveillance, tactical and weapons systems. This effort is accomplished through at-sea experimentation, numerical model and data base development, development and evaluation of stand-alone and Command, Control, Communications, Computers, and Intelligence (C^4I)-system-embedded prediction/tactical decision aid products, fleet technical support, and instrumentation development. Emphasis is placed on shallow water and other harsh environments, and regional conflict scenarios. Mine warfare and mine countermeasure issues are addressed within the context of these scenarios. The Advanced Environmental Acoustic Support (AEAS) Project conducts undersea environmental and acoustic measurements and develops computer prediction products, measurement instrumentation, data bases, and analyses in support of undersea warfare systems. The Advanced Underwater Acoustic Modeling Project (AUAMP) is focused on the development of a multi-source, multi-receiver, fully multi-static undersea warfare system performance prediction capability in support of low frequency active undersea warfare sonar systems currently being developed for use in this decade. The Sensor Performance Prediction (SPP) Project, formerly the Acoustic Performance Prediction Project, develops computer based on-board capabilities to provide system performance predictions and operating mode selection guidance and tactical decision aids for tactical platforms based on in-situ measurements, synoptic data and environmental data bases. These products are essential to the effective employment of the combat systems, particularly in the regional conflict/littoral warfare scenarios. The CSOPA Program supports all scales of Naval operations, including global, theater, regional, and local. Additionally, CSOPA products are being tailored for, and assimilated into, fleet trainers in order to provide realistic support to warfare simulations. Direct support to existing fleet systems is provided in the Combatant Data Collection (CDC) thrust which focuses on measurements through operational weapon systems and direct, real-time feedback to optimize system performance in tactical situations.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Perf Assessment (CSOPA)
PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	Advanced Environmental Acoustic Support	14,015	13,914	9,779	CONT.	CONT.

B. (U) DESCRIPTION: The quieting of new generation threat submarines has dramatically reduced the detection ranges achieved by existing passive acoustic ASW systems. Additionally, the concern over Third World conflicts has renewed the need to address diesel submarine and mine warfare issues. To counter these threats, the Navy has undertaken the development of active sonar systems for ASW and improved mine detection/avoidance. There is an urgent and continuing need to enhance system performance through a better understanding of the ocean environment. The requirement for understanding the environment for active sonar systems is greater than that for passive sonar systems because of the added difficulty of reverberation, the requirement to operate effectively in shallow water (a very difficult environment because of repetitive interactions of the acoustic signal with the surface and bottom boundaries), and the added requirement to receive the signal and detect the target at other receiver points separate from the acoustic source (multistatics). This project provides environmental acoustic predictive capability and data essential to optimize the design, development and performance of undersea acoustic surveillance and tactical ASW systems. It conducts undersea environmental and acoustic measurements and develops computer prediction products, measurement instrumentation, data bases and analyses in support of ASW systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Provided preassessments of system performance in specific environmental areas to systems designers for incorporation into emerging Low Frequency Active (LFA) and bottom-laid passive ASW systems design concepts. Supported modeling and analysis efforts to extend Low Frequency Active Acoustics (LFAA) concepts in the Arctic environment. Conducted ice camp exercises in the Arctic to collect environmental acoustic data to support emerging systems.

b. (U) Conducted ice camp exercises in the Beaufort Sea to collect critical lower frequency propagation and ambient noise.

c. (U) Collected shallow water Very Low Frequency (VLF) acoustic data in the Grand Banks area to address issues unique to shallow water. Analyzed data from Native 1 sea test.

d. (U) Developed a first cut to extending the Navy standard Low Frequency Bottom Loss (LFBL) model/data base down in frequency to include VLF. Used Finite difference research code to identify significant mechanisms to include in long range VLF upgrades to LFBL.

e. (U) Participated in major field experiments in support of ASW system design and operations (i.e., Fixed Distributed System, Air Defense Initiative (ADI), VLF, LFA, AN/SQQ-89 upgrades, Critical Sea Test (CST)) by providing data collection, analysis and modeling expertise.

f. (U) Developed series of background documents which provide basic environmental information for high priority areas required by shallow water warfare planners (ASW, Mine Warfare (MIW), Anti-Mine Warfare (AMW), and Naval Surface Warfare (NSW)).

g. (U) Developed prototype product for Mine Countermeasures (MCM) support using data from sediment classifier and extended the standard prediction model for MCM sonar.

h. (U) Extended existing deep water shipping data base to shallow water for use as input to newly initiated shallow water ambient noise model.

i. (U) Initiated planning and pre-assessments for FY-93 sea test to acquire necessary shallow water data to support existing and emerging systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Perf Assessment (CSOPA)
PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support

j. (U) Completed development of volume reverberation vertical line array and transition to NAVOCEANO. Tested and evaluated developmental digital acoustic array, and AEAS Digital Acoustic Buoy System (ADABS).

k. (U) Conducted initial CDC concept demonstration of real-time in situ environmental data measurement by operational fleet platforms, for the purpose of system performance optimization.

l. (U) Delivered environmental module to the AIR/ASW system trainer, the Generic Acoustic Stimulator System (GASS).

m. (U) Developed model to predict time, angle spreads in thin sediments based upon Kirchoff slope scattering. Obtained a new thin sediment bottom loss data set (PAC ECHO 4) to be used for further development of a Frequency/Angle/Time (FAT) spread model.

n. (U) Delivered to CNOC as a Navy standard, a new updated LFBL model and associated database replacing the "stainless steel layer" provinces with fine scale layering.

o. (U) Developed a new automated inversion code to be used by NAVOCEANO to upgrade LFBL using new bottom loss data.

p. (U) Developed a system loss (SYS LOSS) model to account for losses due to the environment as well as system factors.

2. (U) FY 1993 PROGRAM:

a. (U) Continue to develop field measurement techniques which will support database requirements for undersea weapon systems. Participate in CST-7 field experiments in support of emerging undersea systems design and operations.

b. (U) Support advanced systems concepts by conducting ocean area assessments via computer modeling and designing of initial survey requirements.

c. (U) Process and analyze Arctic LFAA data from the FY-92 Arctic exercises and provide results to system designers. Support LFAA reverberation algorithm and model development for Arctic application. Evaluate the model using data from the FY-92 exercises.

d. (U) Analyze Low Frequency Passive propagation and ambient noise from the FY-92 Beaufort Sea exercise. Upgrade the Navy Standard propagation model Ice-Capable Acoustic Prediction (ICECAP) based upon these results. Document accomplishments and technical contributions of the AEAS Arctic Program.

e. (U) Support upgrades to the VLF passive range dependent propagation prediction model, ambient noise model and data base. Incorporate seismic reflectors into LFBL to provide bottom loss at VLF.

f. (U) Continue development of environmental models and databases to enhance shallow-water operational capabilities.

g. (U) Continue to publish environmental area assessment documents for high priority shallow water areas.

h. (U) Test and evaluate shallow water ambient noise model with existing data sets. Evaluate shallow water shipping data base.

i. (U) Expand CDC capability to other platforms, and demonstrate ability to database the measurements.

j. (U) Plan long-term acoustic measurements in shallow water to ascertain temporal variability.

k. (U) Develop models to predict bottom scattering, reverberation and time spreads for shallow water and deep water thin-sediment areas. Incorporate into the Navy Standard Model, Acoustic Signal Excess Prediction System (ASEPS) Transition Loss (ASTRAL). Extend LFBL to active frequencies.

l. (U) Extend and expand DARPA-developed high-fidelity synthetic ocean acoustic environment to cover higher frequency regimes for use in simulations.

m. (U) Begin comparison of inverse beam forming with conventional beam forming methods.

n. (U) Develop transputer architecture for underwater acoustic models to reduce computation times.

o. (U) Develop data acquisition system for use on Navy aircraft to acquire environmental information for input to tactical decision aids (TDAs).

p. (U) Enhance environmental decision support system for MCM C4I.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Perf Assessment (CSOPA)
PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support

q. (U) Develop bottom scattering model for sub-bottom lens and point scatterers for active systems.

r. (U) Conduct integrated analysis of CST-7 Phase II acoustic surface backscatter data and coincidental environmental data. Develop algorithms that relate observable environmental parameters to surface backscattering strength for Fleet sonar system performance prediction.

s. (U) Plan a measurement/analysis/modeling project that addresses surface forward-reflected sonar signals in shallow water scenarios.

3. (U) FY 1994 PLANS:

a. (U) Complete and distribute the final document summarizing the history of the AEAS Arctic Program.

b. (U) Participate in harsh environments exercises to collect acoustic data to address outstanding issues such as reverberation and scattering.

c. (U) Support the Fleet Commands with sensor performance pre-assessments, validated models and pre-deployment guidance.

d. (U) Design long-term acoustic measurements and data recording systems.

e. (U) Execute the surface forward-reflected signals measurement, analysis and modeling plan.

f. (U) Integrate predictive capabilities for MCM into MIW C4I applications software architecture.

g. (U) Modify spread models to include angle-frequency spreads as indicated by analysis of new at-sea bottom interaction data. Develop spread and scattering model for thick-sediment effects (angle, frequency spreads).

h. (U) Expand SYS LOSS model to include additional systems.

i. (U) Extend the shallow water LFBL effort to active frequencies.

j. (U) Continue to develop MIW tools based upon bottom interaction products.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL SSC, Stennis Space Center, MS; NRL, Washington, DC; NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: Applied Research Laboratories, University of Texas, Austin, TX; Planning Systems Inc., McLean, VA and Slidell, LA; Science Applications International Corp., McLean, VA; Systems Integrated, San Diego, CA; Areté Associates, La Jolla, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: The 1994 Plan reflects technology changes that are the result of changes in the World Order. The traditional primary threat, the deep water Soviet nuclear submarine fleet, has been replaced by the most likely scenario of a limited conflict. Future limited conflicts are expected to require the conduct of undersea warfare (ASW, mine detection and avoidance, torpedo detection and avoidance) and special warfare in shallow water and other adverse environments. In accordance with sponsor guidance, AEAS will reduce support to fixed surveillance systems, Arctic research, deep water sound propagation and data bases, and specific systems development support. Emphasis will be on generic environmental products applicable to undersea warfare, across warfare areas.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.
G. (U) RELATED ACTIVITIES: PE 0204311N, Integrated Surveillance System; PE 0604784N, Distributed Surveillance Systems; PE 0603792N, Advanced Technology Transition.
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Perf Assessment (CSOPA)
PROJECT NUMBER: R2017 PROJECT TITLE: Advanced Underwater Acoustic Modeling Project (AUAMP)

C. (U) DESCRIPTION: This project is focused on the development of a multi-source, multi-receiver, fully bi-static ASW system performance prediction capability in support of low frequency, active ASW systems currently being planned and developed for use in the 1990's.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Developed a multi-source, multi-receiver LFA modeling capability.
b. (U) Provided modeling and acoustic measurement support to CST Program, LFA Program, and the ADI-E1 sea tests.
c. (U) Evaluated the Baseline Model components (transmission loss, reverberation, etc.) and detection output results vs. actual sea test data and other scientific algorithms.
d. (U) Delivered the AUAMP Baseline 2.6 model to Oceanographic and Atmospheric Master Library/Software Review Board (OAML/SRB) as the Navy standard range dependent LFA performance prediction model.
e. (U) Delivered a volume scattering strength data base to OAML for approval and for inclusion into the Navy Standard Master Library.

2. (U) FY 1993 PROGRAM:
a. (U) Update/Improve/Evaluate multi-static Baseline model for Integrated Undersea Surveillance System (IUSS)/NAVAIR/NAVSEA use, especially in multi-static shallow water environments.
b. (U) Start development of techniques for using in-situ reverberation for real-time predictions and reverberation data basing.
c. (U) Deliver to ADI program manager and other Navy users, a modeling capability for designing deployable bottom-mounted systems for active and passive use in shallow water and slope environments.
d. (U) Participate in LFA at-sea evaluations.

3. (U) FY 1994 PLANS:
a. (U) Participate in Low Frequency Active-Surveillance Towed Array Sonar System (LFA-SURTASS) technical evaluation and deliver an LFA TDA for at-sea OPTEVFOR evaluation.
b. (U) Upgrade/deliver multi-static model for operational use that includes use of in-situ noise and reverberation data for sonar performance predication and "next ping" assessment.
c. (U) Upgrade and deliver multi-static models and data bases for operational use in shallow water and coastal areas.
d. (U) Participate in LFA at-sea evaluations, CST, Advanced Deployable Systems (ADS), and Low-Low Frequency Active (LLFA) sea tests, and evaluations with an emphasis on bottom interaction scenarios.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL SSC, Stennis Space Center, MS; NRL, Washington, DC; NCCOSC RDTE DIV, San Diego, CA; NAVUNSEAWARCENDIV, Newport, RI. CONTRACTORS: Science Applications International Corp., McLean, VA; Planning Systems Inc., McLean, VA and Slidell, LA; Marine Acoustics Inc., Arlington, VA and Mystic, CT.

F. (U) RELATED ACTIVITIES:
- PE 0603792N, Advanced Technology Transition
- PE 0603747N, Advanced ASW Technology

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Perf Assessment (CSOPA)
PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

C. (U) DESCRIPTION: The SPP Project develops on-board software capabilities that provide sensor performance predictions and Tactical Decision Aids (TDA) for all tactical platforms using in-situ measurements, synoptic data and new/updated environmental data bases. SPP enables the full performance potential of complex systems by increasing their detection/tracking performance. In FY92 the program began to address non-acoustic systems and selected non-ASW platforms. In FY93 the program began to focus on Shallow Water/Regional Conflict scenarios. The project title change in FY94 from Acoustic to Sensor Performance Prediction reflects this broader focus.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Developed/evaluated acoustic reverberation monitor.
   b. (U) Implemented ASW Tactical Decision Aid (ASWTDA) in the Navy Tactical Command System-Afloat (NTCS-A).
   c. (U) Completed development of improved sensor performance prediction module/Decision Aid for the Tactical Environmental Support System (TESS)(3A), the Navy Command and Control System Ashore and the CV ASW Module.
   d. (U) Completed a new Submarine Fleet Mission Program Library (SFMPL).
   e. (U) Defined mine warfare prediction/decision aid requirements.
2. (U) FY 1993 PROGRAM:
   a. (U) Begin development of mine warfare tactical decision aids.
   b. (U) Update SFMPL to provide expanded automatic data entry.
   c. (U) Complete update of ASWTDA to ingest synoptic environmental data provided by TESS. Evaluate at-sea.
   d. (U) Update ASWTDA to include active predictions. Evaluate at-sea.
   e. (U) Upgrade surface SPP Advanced Development Model (ADM). Evaluate during Fleet regional conflict/littoral exercises.
3. (U) FY 1994 PLANS:
   a. (U) Update P3 Maritime Patrol Aircraft Laptop Prediction System (LAPS) to include Mine Warfare TDA and on-line tutorials.
   b. (U) Update ASWTDA to include: Bi-static predictions, measured environmental data, non-acoustic detection/counter-detection capabilities.
   c. (U) Update the Surface Ship SPP ADM to address SQQ-89 Combat System Modernization and to include littoral warfare product requirements. Evaluate at-sea.
   d. (U) Update/evaluate Submarine SPP ADM to address sensor/weapon upgrades, incorporate non-acoustic system predictions and bi-static vulnerability.
   e. (U) Update/evaluate the Integrated Carrier ASW Prediction System II ADM to include bi-static predictions, weapons predictions and processor mode selection guidance and non-acoustic predictions.
   f. (U) Develop/evaluate an updated SPP capability for TESS 3.X.
   g. (U) Develop and implement mine warfare planning/clearance TDAs.
   h. (U) Define Special Warfare TDA requirements for the Submarine ADM and other in-situ prediction systems.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NAVOCEANO, Bay St. Louis, MS; NCCOSC RDTE DIV, San Diego, CA; NAVAIRWARCENACDIV, Warminster, PA; CONTRACTORS: A&T, North Stonington, CT; Sonalysts, Waterford, CT; D.H. Wagner, Sunnyvale, CA.

F. (U) RELATED ACTIVITIES: PE 0205620N, Surface ASW Combat System Integration; PE 0603207N, Air/Ocean Tactical Application; PE 0604503N, Submarine System Equipment Development; PE 0603504N Adv Submarine Combat Systems Development; PE 0603553N Surface ASW.
G. (U) OTHER APPROPRIATION FUNDS: Not applicable.
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Technology Transition
PROJECT NUMBER: R1889 PROJECT TITLE: Advanced Technology Demonstrations

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889	Advanced Technology Demonstrations	61,645	86,599	63,294	CONT.	CONT.

B. (U) DESCRIPTION: Provides transition of the Navy's most promising technological opportunities into 6.3B and 6.4 programs through risk-reducing 6.3A Advanced Technology Demonstrations (ATDs), with nominal duration of three years and nominal cost of $10M each. New ATDs are selected by the Assistant Secretary of the Navy (Research, Development, & Acquisition) roughly 12 months prior to start. ATDs provide a link between Navy requirements and emerging technologies, promote transition of the best maturing 6.2 concepts, and reduce system development risk. The Program provides a vehicle for transition of high-risk/high-payoff technologies, especially those with multi-system application. This program is a primary vehicle for implementing recommendations of the Packard Commission and Defense Science Board.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted final demonstration of Advanced Electronic Support Measures (ESM) for Ship Defense, Programmable Automated Welding System, Missile-Borne Integrated Neural Network, and Undersea Weapons Guidance and Control.

b. (U) Synthetic Red Blood Cells -- Began large-scale production.

c. (U) Combat Wound Management -- Conducted trials.

d. (U) Advanced Electronic Decoy -- Performed preliminary flight tests.

e. (U) Light Weight Planar Array -- Tested quarter-scale model.

f. (U) SPOTLIGHT -- Completed Display Processing (DP), Sensor Data Integration (SDI), and Resource Optimization (RO) software engineering.

g. (U) Quiet Surface Ship Propeller (Quiet Propeller) -- Initiated manufacture of full-scale blades.

h. (U) Air/Surface Anti-Submarine Warfare (ASW) Weapon, High Energy Propulsion -- Completed propulsion system design, procured all necessary hardware, completed subsystem testing, commenced land-based system testing.

i. (U) Multibeam Detection/Classification (Multibeam D/C) -- Established interfaces and developed single-channel (phase 1) system. Down selected from five to three contractors.

j. (U) Synthetic Aperture Radar Countermeasures (SAR Countermeasures) -- Developed subsystem architecture.

k. (U) Multi-band Anti-Ship Missile Defense Tactical Electronic Warfare System (MATES) -- Contract awarded to design, fabricate, and test the ATD system.

l. (U) Submarine Volumetric Towed Array -- Developed system specification, began procurement of Advanced Development Model.

m. (U) Multi-Mission Propulsion Technology (M/M Propulsion) -- Initiated system design, developed test requirements.

n. (U) High Performance Ammo Storage Magazine (HP Magazine) -- Established operational requirements. Initiated structural design.

o. (U) Aircraft Situational Awareness (ASA) -- Initiated ATD. Details available at higher level of classification.

p. (U) Performed planning and up-front work for FY 1993 start ATDs.

2. (U) FY 1993 PROGRAM:

a. (U) Synthetic Red Blood Cells and Combat Wound Management -- Transition to commercial/operational use.

b. (U) Advanced Electronic Decoy -- Perform system integration and final demonstration.

c. (U) Light Weight Planar Array -- Perform acoustic/vibration/flow noise tests.

d. (U) SPOTLIGHT -- Complete system integration and laboratory testing.

e. (U) Quiet Propeller -- Conduct sea trials of installed propellers.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Technology Transition
PROJECT NUMBER: R1889 PROJECT TITLE: Advanced Technology Demonstrations

f. (U) Air/Surface ASW Weapon, High Energy Propulsion -- Complete land-based system testing and conduct in-water performance demonstrations.
g. (U) Multibeam D/C -- Develop interface criteria and develop phase 2 (multi-channel) systems. Conduct shakedown sea tests.
h. (U) SAR Countermeasures -- Fabricate hardware and integrate subassemblies into a prototype system. Initiate limited field test.
i. (U) MATES -- Conduct field tests and design reviews. Order long lead items.
j. (U) Submarine Volumetric Towed Array -- Handling System Testbed delivered. Conduct sea test.
k. (U) M/M Propulsion -- Fabricate prototype motor and vehicle.
l. (U) HP Magazine -- Complete roof/soil blanket and stowage cell demos. Initiate material handling demo. Initiate construction of full-scale magazine.
m. (U) ASA -- Continue ATD.
n. (U) Low Probability of Intercept Communications -- Define networking approach. Begin subsystem development.
o. (U) Advanced ASW Receiver -- Perform engineering required to award the prime system integration contract. Develop government furnished hardware. Prime contractor will initiate system design.
p. (U) Ferroelectric Liquid Crystal (FLC) ASW Image Processor -- Develop system design and conduct correlator fabrication.
q. (U) Advanced Self-Defense Combat System -- Begin design and demonstration of architecture and local area network.
r. (U) Torpedo Terminal Placement -- Initiate development of new guidance laws which will facilitate accurate torpedo warhead placement in shallow and deep water.
s. (U) Space-Based Low Probability of Intercept (LPI) Sensors -- Develop sensor design.
t. (U) Helmet-Mounted Mission Rehearsal Simulation System (formerly called CV Weapon System Trainer) -- Develop photo imagery capability. Initiate efforts on threat subtask. Procure monochrome helmet for application to night strike mission. Complete ATD.
u. (U) Advanced Submarine Propulsor -- Design blade sections and sensors.
v. (U) Corona and Pulsed Power Agent Destruction -- Perform conceptual engineering design.
w. (U) Freeze-dried Red Blood Cells -- Begin design of system for freeze-drying, storage, and reconstitution of red cells and platelets.
x. (U) Voice/Data Integration -- Develop software for controllers.
y. (U) Initiate planning for FY 1994-start ATDs.

3. (U) FY 1994 PLANS:
a. (U) Quiet Propeller -- Analyze sea trial data.
b. (U) Multibeam D/C -- Conduct multi-channel system at-sea demonstration. Prepare system data package.
c. (U) SAR Countermeasures -- Complete testing.
d. (U) MATES -- Integrate and test hardware/software. Perform field test.
e. (U) Submarine Volumetric Towed Array -- Complete multiple-line hydro-mechanical trials.
f. (U) M/M Propulsion -- Finish vehicle assembly and initiate flight tests.
g. (U) HP Magazine -- Complete full-scale demonstration construction and conduct high explosive test.
h. (U) ASA -- Complete ATD.
i. (U) Low Probability of Intercept Communications -- Continue subsystem development. Write systems control software.
j. (U) Advanced ASW Receiver -- Demonstrate key hardware components and software algorithms. Conduct critical design review.
k. (U) Advanced Self-Defense Combat System -- Initiate system installation at Wallops Island and conduct work station demonstration.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced Technology Transition
PROJECT NUMBER: R1889 PROJECT TITLE: Advanced Technology Demonstrations

l. (U) Torpedo Terminal Placement -- Complete and evaluate system modeling, perform test vehicle integration, and initiate in-water testing of heavyweight configuration.

m. (U) Corona and Pulsed Power Agent Destruction -- Conduct system demonstration.

n. (U) Freeze-dried Red Blood Cells -- Increase circulation survival rate. Conduct animal testing. Develop scale-up techniques.

o. (U) Voice/Data Integration -- Develop/validate network control software.

p. (U) Advanced Gun Launched Airframe -- Develop airframe and propelling charge.

q. (U) Air Vehicle Diagnostic System (AVDS) -- Acquire host system for AVDS and collect SH-60 seeded fault data to train neural network.

r. (U) Advanced Lightweight Fuselage -- Complete conceptual design for composite fuselage.

s. (U) Advanced Hybrid Propulsor - Develop concept.

t. (U) Advanced Infra-Red (IR) Sensor -- Initiate system architecture/processor procurement definition.

u. (U) Select and begin planning for FY 1995-start ATDs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN, Dahlgren, VA/Bethesda MD/Panama City, FL; NAVAIRWARCEN, China Lake, CA/Warminster, PA; NCCOSC, San Diego, CA; NAVUNSEAWARCEN, New London, CT/Newport, RI/Keyport, WA; NRL, Washington, DC; NCEL, Port Hueneme, CA. CONTRACTORS: ARL/PSU, State College, PA; Battelle, Columbus, OH; Kentucky Medical R&D Corp, Louisville, KY; Bioelastics, Birmingham, AL; Hughes Aircraft, Los Angeles, CA; Locus/Questech, Sunnyvale, CA; Raytheon, Waltham, MA; Texas Instruments, Dallas, TX; INTEL, Santa Clara, CA; 3M, St. Paul, MN; Varian, Palo Alto, CA; ITT, Easton, PA; Thiokol, Elkton, MD; McDonnell-Douglas Aircraft, St.Louis, MO; Textron, Valencia, CA; APL/JHU, Laurel, MD; MITRE Corporation, Bedford, MA; MIT Lincoln Labs, Boston, MA; New Mexico School of Mines, Socorro, NM; Carnegie-Mellon University, Pittsburgh, PA; E-Systems, Inc., Dallas, TX; Metron, Inc., Reston, VA; Martin Marietta Corp., Denver, CO; Cambridge Research Associates, Cambridge, MA; Hughes Aircraft, Carlsbad, CA; and numerous others.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Non-acquisition Program Definition Documents (NAPDDs) for all Advanced Technology Demonstrations.

G. (U) RELATED ACTIVITIES: Navy and other DOD Technology Base programs and industry Independent Research and Development (IR&D) programs are sources of technology opportunities for ATDs. All sub-projects are either Navy unique in character or fully coordinated with other Services. For each ATD, a transition plan is in place to facilitate transition from the ATD-stage to the next level of development.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603794N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: C3 Advanced Technology

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2091	Space and Electronic Warfare (SEW) Advanced Technology	16,365	1,862	3,067	CONT.	CONT.
R2201	Global Communications	0	0	7,680	CONT.	CONT.
S2188	Range Naval Tactical Data System Display Emulation System (RNDES)	0	22,369	0	0	37,369
TOTAL		16,365	24,231	10,747	CONT.	CONT.

B. (U) DESCRIPTION: This PE funds the Navy's advanced technology development core efforts in the Command, Control and Communications (C3) area. The focus is on demonstrations of next generation communication systems for U. S. Navy ships, aircraft, and submarines. There are three projects:

1. (U) SEW Advanced Technology -- Demonstrates multinet, multimedia communications controller that provides smart interface between user systems and Radio Frequency (RF) transmission/receive systems.

2. (U) Global Communications -- This project ensures Naval connectivity, via theater extension networks, to the DOD Global Communications Grid.

3. (U) RNDES -- The Range Naval Tactical Data System Display Emulation System (RNDES) common work station is the name provided the ship adaptation of the consoles currently being manufactured under the NAVAIR Range NTDS upgrade program. These consoles emulate capabilities of the UYQ-21(V), OJ-194, and OJ-451 displays, including all manual entry action controls and display language interpretation. This program adapts, integrates, and installs a system comprised of the RNDES display suite and a modified advanced video processor.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603794N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: C3 Advanced Technology
PROJECT NUMBER: X2091 PROJECT TITLE: SEW Advanced Technology

C. (U) DESCRIPTION: Demonstrate multinet, multimedia communications controller that provides smart interface between user systems and Radio Frequency (RF) transmission/receive systems. Projects will be conducted in three C3 Systems areas: (1) Automated Integrated Communication Systems (AICS) that apply digital networking techniques to voice/data/video communications; (2) Development of C3 software toolsets using Ada language; and (3) Multi-Level Secure (MLS) processing systems that provide a common operational picture among tactical units.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) AICS: Completed design requirements and gateway between Communication Support Systems (CSS) and interior platform distribution system.
b. (U) Ada: Evaluated commercial software, acquired program environment for developing toolsets, overview of toolset capabilities. Developed mode and event design tables.
c. (U) MLS: Completed specs for relational database structures to support a flexible data environment. Demonstrated an increment of data parsing design.

2. (U) FY 1993 PROGRAM:
a. (U) AICS: Complete test-bed demonstration of partial Tactical Digital Information Exchange System (TADIXS) node to achieve end-to-end system implementation.
b. (U) Ada: Develop module decomposition and abstract interfaces for the tabular-specification toolset. Construct initial version of toolset with mode table capability and enhanced version with mode and event table capability.
c. (U) MLS: Develop detailed understanding of Copernicus functional and information flow requirements. Prepare Copernicus security policy and draft security architecture that implements policy that will be developed.

3. (U) FY 1994 PLANS:
a. (U) AICS: Complete design of full TADIXS node to integrate MLS processing capabilities into external communications.
b. (U) Ada: Enhance consistency checker with module decomposition capability and abstract interfaces; apply to mode and event tables.
c. (U) MLS: Develop system prototype to demonstrate hardware/software addressing cost/producibility. Develop full system documentation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NCCOSC, San Diego, CA. CONTRACTORS: Harris Corp., Melbourne, FL; Booz-Allen, Arlington, VA; and others to be determined.

F. (U) RELATED ACTIVITIES: PE 0303401N, Communications Security; PE 0602234N, Materials Electronics and Computer Technology; PE 0602232N, C3 Technology; PE 0604574N, Navy Tactical Computer Resources; PE 0604231N, Tactical Command Systems; and PE 0301567G, Computer Security Program.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATION AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603794N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: C3 Advanced Technology
PROJECT NUMBER: R2201 PROJECT TITLE: Global Communications

C. (U) DESCRIPTION: This new start project ensures Naval connectivity, via theater extension networks, to the DOD Global Communications Grid, a world wide communications network to support power projection in crisis situations. Interoperability and scalability of global communications will be paramount. DOD systems must follow the potential new international standards of Asynchronous Transfer Mode (ATM) and Synchronous Optical Network (SONET). These standards will permit multi-media exchanges scalable up to the multiple gigabit per second data rate. This project will demonstrate information transfer among the surface, subsurface, airborne, and embarked forces to accomplish their mission "from the sea" in joint operations. The information transfer will employ ATM/SONET technology to the lowest feasible unit level. This project has been planned and will be executed in close cooperation with the Army and Air Force and complements the Advanced Research Projects Agency (ARPA), National Security Agency, and Defense Information Systems Agency Global Grid efforts. The project implements the C3 technology demonstrations identified by the Director of Defense Research and Engineering Science and Technology Thrust on Global Surveillance and Communications.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Develop engineering level description of the Navy/USMC elements of the theater extension network relative to other service and DOD elements.

b. (U) Establish initial interconnection architecture among service laboratory participants using commercial off the shelf ATM technology.

c. (U) Test and simulate the applicability of ATM/SONET fiber optic technology over narrowband tactical RF media in a maritime environment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC, San Diego, CA; NRL, Washington, DC. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: PE 0602232N, C3 Technology; PE 0603238N, Global Surveillance, Precision Strike, Air Defense Technology Demonstrations.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATION AGREEMENT: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2038	Advanced Minor Caliber Gun	*2,468	*3,632	14,254	- 17,200	42,966
S2093	Gun Weapon Systems (WARSHIPS)	5,102	7,490	2,993	CONT.	CONT.
	TOTAL	7,570	11,122	17,247	CONT.	CONT.

*Previously funded under Program Element 0603656N Project S2038.

B. (U) DESCRIPTION: The Advanced Minor Caliber Gun System (AMCGS) (Operational Requirement #243-03-92) is a Non-Developmental Item (NDI) based acquisition which will provide to surface ships the capability to defend themselves in a Low Intensity Conflict against high speed surface targets and low slow speed air targets. Program funding has been restructured to support the results of the AMCGS cost and operational effectiveness study which was completed 31 August 1992. Program planning includes development, testing, and systems integration.

(U) The Gun Weapon Systems (WARSHIPS), formerly Advanced Gun Weapon System Technology Program (AGWSTP), is a non-acquisition program identifying and exploiting emerging technologies through demonstration and validation of concepts. Advanced technologies will be necessary to fulfill projected mission requirements. These increased requirements have resulted from deficiencies in a) Neutralizing highly maneuvering surface targets, b) Precision firing in friendly/enemy confined areas, c) Supporting amphibious assaults from over the horizon distances, d) Neutralizing low flying, highly maneuverable air targets, such as current and next generation anti-shipping cruise missiles. Technologies which have been developed and funded by other agencies are also being leveraged, not only as a means to determine near term benefits to surface combatants, but with the goal of ensuring that all existing and emerging technologies are maximally exploited for the benefit of the Navy also.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology
PROJECT NUMBER: S2038 PROJECT TITLE: Advanced Minor Caliber Gun

PICTURE NOT AVAILABLE

POPULAR NAME: AMCGS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		MS II(12/92)		MS III(3/96) IOC(12/96)	
ENGINEERING MILESTONES					
T&E MILESTONES				TECHEVAL/ OPEVAL(10/95)	
CONTRACT MILESTONES		AMC		LRIP FRP	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,968	2,296	10,774	14,279	29,472
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	500	1,336	3,480	2,921	13,494
GFE/ OTHER	0	0	0	0	0
TOTAL	*2,468	*3,632	14,254	17,200	42,966

*Previously funded under PE 0603656N Project S2038.

B. (U) DESCRIPTION: The Advanced Minor Caliber Gun System (AMCGS) (Operational Requirement #243-03-92) is a Non-Developmental Item (NDI) - based Acquisition which will provide to surface ships the capability to defend themselves in a Low Intensity Conflict against high speed surface targets and low, slow speed air targets. Program funding has been restructured to support the results of the AMCGS cost and operational effectiveness study which was completed 31 August 1992. Program planning includes development, testing, and systems integration.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS

a. (U) Acquired System Threat Assessment Report

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology
PROJECT NUMBER: S2038 PROJECT TITLE: Advanced Minor Caliber Gun

b. (U) Completed Weapons Specification (#33095)

c. (U) Completed Lethality Testing

d. (U) Completed Cost and Operational Effectiveness Analysis (COEA).

2. (U) FY 1993 PROGRAM:

a. (U) Issue Prime Item Contractor Eng/Mfg Development Award

b. (U) Develop NDI Sensor Specification

c. (U) Test/Select NDI sensor

d. (U) Begin System Integration

e. (U) Conduct Qualification Testing.

3. (U) FY 1994 PLANS:

a. (U) Continue Eng/Mfg Development

b. (U) Continue System Integration

c. (U) Start Sensor Integration

d. (U) Conduct Sensor Integration Qualification Testing.

4. (U) PROGRAM TO COMPLETION: During the FY96-01 time period the AMCGS will complete the following objectives: award Full Rate Production (FRP), prepare for Initial Operating Capability (IOC), accept delivery of AMCGS, complete production acceptance test and evaluation, and evaluate proposed product improvements.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV ORDSTA, Louisville, KY; NAVSURFWARCENDIV, Port Hueneme, CA. CONTRACTORS: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule changes: The program start date and all subsequent program tasks have been scheduled to begin FY 1993 to meet recommendations reported by the COEA. The combined DT/OT has been rescheduled for 10/95-12/95 to permit production approval in FY96. The new estimated IOC is 12/96.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TOR	01/86
OR	01/89
STAR	01/92
MNS	05/92

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Developmental Testing/Operational Testing 10/95 - 12/95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology
PROJECT NUMBER: S2093 PROJECT TITLE: Gun Weapon Systems (WARSHIPS)

C. (U) DESCRIPTION: The Gun Weapon Systems (WARSHIPS), formerly Advanced Gun Weapon System Technology Program (AGWSTP) identifying and exploiting emerging technologies through demonstration and validation of concepts. Advanced technology guns will be necessary to fulfill projected mission requirements. These increased requirements have resulted from deficiencies in a) Neutralizing highly maneuvering surface targets, b) Precision firing in friendly/enemy confined areas, c) Supporting amphibious assaults from over the horizon distances, d) Neutralizing low flying, highly maneuverable air targets, such as current and next generation anti-shipping cruise missiles. Technologies which have been developed and funded by other agencies are also being leveraged, not only as a means to determine near term benefits to surface combatants, but with the goal of ensuring that all existing and emerging technologies are maximally exploited for the benefit of the Navy also.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: The program began the application of precision guided munitions to gun launched ordnance. A total of eight contracts were awarded for Phase I design studies for the development of two advanced Technology Demonstration gun weapon systems. Contracts were awarded to General Electric, General Dynamics, FMC, Alliant Techsystems, Loral Acronutronic, GenCorp, Aerojet, and McDonnell-Douglas. The program has produced design requirements for test bed guns and selected test sites for the guns. The program initiated the Range Extension Near Term (RENT) specialized tracking filter and algorithm was developed for tracking certain types of maneuvering anti-shipping cruise missiles. The program began development of vulnerability models for maneuvering cruise missiles and other threats of this genre together with vulnerability analyses on the Boghammer fast boat threat.

2. (U) FY 1993 PROGRAM: Complete Phase I designs and select contractors for Phase II. Perform demonstration of RENT propulsion systems for range greater that 23 nmi. Test specialized tracking algorithms in simulations of AAW engagements. Begin construction of 5" and 8" based gun technology test beds. Complete analysis of 21st Century AAW threats, Anti-Surface Warfare (ASUW) mission and NGFS. Determine test bed requirements and definition. Develop a high order fire control system algorithm ADM.

3. (U) FY 1994 PLANS: Develop Advanced Development Models (ADM) for near term AAW smart munitions. Perform analysis of 21st century AAW threats, ASUW missions and NGFS. Determine test bed requirements and definition. Develop a high order fire control system algorithm ADM.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV ORDSTA, Louisville, KY; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Indian Head, MD; Sandia National Laboratories, Albuquerque, NM; Pacific Northwest Laboratories, Richland, WA; Lawrence Livermore Laboratories, Livermore CA; Ballistic Research Laboratories, Aberdeen, MD; ARDEC, Picatinny, NJ; Benet Laboratories, Watervliet, NY. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0485 1/	ALFS	19,477	38,617	25,741	33,155	139,037
H1109 2/	CH/MH-53	8,816	11,638	5,587	CONT.	CONT.
H1378 3/	AH-1W	11,068	9,599	5,615	33,224	139,708
H1707	LAMPS MK III	33,776	34,435	45,300	CONT.	CONT.
	TOTAL	73,137	94,289	82,243	CONT.	CONT.

1/ Previously funded under PE 0604219
2/ Previously funded under PE 0604260
3/ Previously funded under PE 0604213

B. (U) DESCRIPTION: H0485 ALFS - This program develops an Airborne Low Frequency Sonar (ALFS) and upgrades sonobuoy processing for SH-60 aircraft (CV Helo & LAMPS MK III Block II) and improves anti-submarine warfare (ASW) mission effectiveness against the quiet submarine threat and in shallow water environments. This dipping sonar has demonstrated capabilities 3 to 6 times (square miles of ocean searched per hr) the existing capability. This provides improved aircraft carrier battle group (CVBG) inner zone submarine protection, providing improved (CVBG) survivability and operating flexibility through improved detection, localization and classification of submarine threats from the outer zone through the CVBG inner zone. ALFS includes embedded training capability to maintain combat ready skills, and improved sonobuoy processing.

(U) H1109 CH/MH-53 - Project develops an improved main gearbox (MGB). MGB improvements include enhanced reliability and maintainability. Project provides for the development required to integrate a Global Positioning System (GPS) into the MH-53E. This integration will provide the capability to navigate in the national airspace and to conduct precise navigation while engaged in Airborne Mine Countermeasures operations.

(U) H1378 AH-1W - This project provides for development of the AH-1 Cockpit Upgrade effort emphasizing workload reduction to increase margin of safety in night, nap-of-the-earth adverse weather operations. The Wing Tip Station wiring is performed in conjunction with the development of the Advanced Rocket Control System (ARCS) providing the AH-1 with simultaneous air-to-air missile and air-to-ground capability and Advance Rocket System (ARS) delivery capability. AH-1 improvements include the integration of a stabilized fire control system with a state-of-the-art missile during FY 1993.

(U) H1707 LAMPS MK III - The Block II Upgrade improves the capability of the LAMPS MK III Weapons System to provide battle group protection and to add significant capability in coastal littorals and regional conflicts. The Block II Upgrade represents a significant avionics modification to the SH-60B by enhancing primary mission areas of ASW and Anti-Surface Warfare (ASUW). ALFS will be added to enhance the existing acoustic suite. An added multi-mode radar includes an inverse synthetic aperture radar mode (permits stand-off classification of hostile threats). An improved electronics surveillance measures system will enable passive detection and targeting of radar sources not currently detectable. Aircrew and aircraft survivability in hostile environments will be significantly improved through software integration of the self-defense equipments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H0485 PROJECT TITLE: ALFS

PICTURE NOT AVAILABLE

POPULAR NAME: ALFS

A. (U) SCHEDULE/BUDGET INFORMATION (Dollars in Thousands):

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS II NPDM 12/91			MS III 4096
ENGINEERING MILESTONES	PDR 10/91	ALL CDR's PDR 4-9/93 6/93		
T&E MILESTONES				OPEVAL 3Q/96 TECHEVAL 3Q/95
CONTRACT MILESTONE	ALFS AWARD 12/91	INTEGRATION 5/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	14,851	31,456	20,592	24,715	103,874
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	4,168	6,561	4,849	8,440	33,000
GFE/ OTHER	458	600	300	0	2,163
TOTAL	19,477	38,617	25,741	33,155	139,037

B. (U) DESCRIPTION: This program develops an Airborne Low Frequency Sonar (ALFS) and upgrades sonobuoy processing capability for the SH-60F in order to maintain and improve anti-submarine warfare (ASW) mission effectiveness against the quiet submarine threat and in shallow water environments. These improvements will also be included in the SH-60B Block II Upgrade. This project provides a dipping sonar that has demonstrated capabilities typically 3 to 6 times (square miles of ocean searched per hour) the existing capability. This improvement will significantly increase aircraft carrier battle group (CVBG) inner zone submarine protection, providing improved CVBG survivability and operating flexibility. For the SH-60B in the middle and outer zones, ALFS improves redetection and localization speed. In addition to long range active sonar search, ALFS provides detection and classification of submarine threats, an embedded training capability to maintain combat ready skills, and improved sonobuoy processing capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed ALFS source selection.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H0485 PROJECT TITLE: ALFS

b. (U) Conducted Navy Program Decision Meeting (NPDM, MS II).

c. (U) ALFS Engineering Development Models (EDM's) contract awarded.

d. (U) Commenced ALFS hardware and software design and development.

e. (U) Initiated detailed development test planning.

f. (U) Prepared and conducted hardware Preliminary Design Review (PDR).

g. (U) Commenced sonobuoy software development for integration purposes.

h. (U) Commenced SH-60F airframe hardware/software modification design.

i. (U) Designed modification of Hardware/Software Integration Facility (HSIF).

j. (U) Commenced preliminary ALFS/UYS-2 integration.

2. (U) FY 1993 PROGRAM:

a. (U) ALFS system development:

(1) (U) Continue hardware/software design and development.

(2) (U) Conduct Sonar System Critical Design Review (CDR).

(3) (U) Continue ALFS/UYS-2 integration.

(4) (U) Commence ALFS/UYS-2 system level testing.

b. (U) Award Airframe Integration Contract:

(1) (U) Conduct total system PDR.

(2) (U) Conduct Airframe CDR.

(3) (U) Commence airframe hardware/software modifications.

(4) (U) Conduct total system CDR.

c. (U) Commence contractor and government software/development testing.

3. (U) FY 1994 PLANS:

a. (U) Commence system integration testing.

b. (U) Commence ALFS pre-production unit deliveries.

c. (U) Validate/verify ALFS hardware/software performance as installed in two production aircraft.

d. (U) Conduct TEMPEST tests.

e. (U) Conduct Electromagnetic compatibility tests.

f. (U) Conduct system acoustic performance and baseline testing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H0485 PROJECT TITLE: ALFS

4. (U) PROGRAM TO COMPLETION: During this period, ALFS OPEVAL testing will be completed. Testing deficiencies will be analyzed and corrected. Production will commence in 1997. The first ALFS aircraft to be delivered to the fleet is planned for 1998.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Hughes Aircraft, Fullerton, CA; Sikorksky Aircraft Division, Stratford, CT; AT&T, Whippany, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

AP	11/91
ORD	12/91
IPS	12/91
TEMP	12/92
APBA	2/92

G. (U) RELATED ACTIVITIES: PE 0604212N, H1707 LAMPS Improvements; PE 0604507N, Enhanced Modular Signal Processor

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN LINE -13/14	241,978	172,171	186,472	CONT.	CONT.

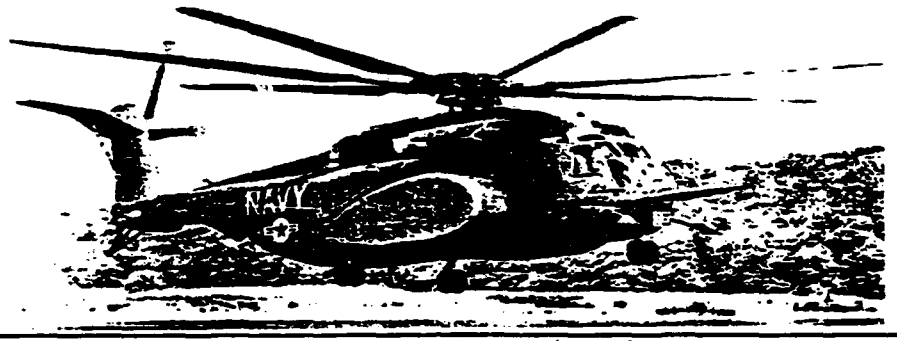
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

TECHEVAL	6/95
OPEVAL	5/96

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1109 PROJECT TITLE: CH/MH-53



POPULAR NAME: CH/MH-53

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	CDR 2 & 8/92			
T&E MILESTONES		PMQT 3/93 MQT-1 8/93	DT-IIIC 4/94 OT-IIIC 7/94 TRR 12/93	
CONTRACT MILESTONE				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7,330	10,618	3,099	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	1,023	571	470	CONT.	CONT.
GFE/ OTHER	463	449	2,018	CONT.	CONT.
TOTAL	8,816	11,638	5,587	CONT.	CONT.

B. (U) DESCRIPTION: This project provides for the development of an improved main gearbox (MGB) for the MH-53E. Improvements to the main gearbox include enhanced reliability and maintainability (increase time between scheduled removal from 1,250 hours to 2,050 hours). This project also provides for the development required to integrate a Global Positioning System (GPS) into the MH-53E. The integration of the GPS into the MH-53E will give the aircraft the capability to navigate in the national airspace and to conduct precise navigation using GPS while engaged in Airborne Mine Countermeasures (AMCM) operations. Aircraft components and systems to be improved include the helicopter drive system, #2 engine cooling, tail rotor disconnect coupling, engine air particle separators, main rotor head and the external cargo handling system.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) GPS: Preliminary design review held Oct 91. Aircraft for prototype installation delivered Mar 92 and prototype installation started. Critical design review (CDR) held Aug 92.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1109 PROJECT TITLE: CH/MH-53

b. (U) MGB: Completed engineering analysis/design, procurement of castings/forgings, and tool design and fabrication. Manufactured required parts. Conducted components test. CDR held Feb 92.

2. (U) FY 1993 PROGRAM:
a. (U) GPS: Complete prototype installation. Commence detailed software development and systems integration laboratory (SIL) testing.
b. (U) MGB: Perform preliminary military qualification test (PMQT), military qualification test (MQT) 1 and flight test. Test at increased power and exercise pyrowear bevel gear option.

3. (U) FY 1994 PLANS:
a. (U) GPS: Perform Test Readiness Reviews (TRR) Dec 93. Commence Technical testing (DT-IIIC) Apr 94 and Operational testing (OT-IIIC) Jul 94.
b. (U) MGB: Complete testing to qualify main gear box for higher power generated by the 419 engine. Prepare engineering test report.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Trenton, NJ CONTRACTORS: United Technologies Corporation, Sikorsky Aircraft Division, Stratford, CT; EER Systems, Vienna, VA; Horizons Technology, San Diego, CA; General Scientific Corp., Arlington, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: The GPS program schedule has been delayed due to difficulties encountered by the contractor in the development of the software. The software development process and schedule were altered to resolve these identified issues. The schedule will now reflect the commencement of DT in April 1994 vice July 1993.

3. (U) COST CHANGES: Not applicable for this submisssion.

F. (U) PROGRAM DOCUMENTATION:

1. (U) GPS:
a. (U) DCP No. 133 Rev B 5/79; TEMP (Rev. 2) 12/89
b. (U) Additional documentation not required. Program approved under extension of application for GPS installations.

2. (U) MGB: NPDM 11/86; Program documentation not required for non-ACAT program.

G. (U) RELATED ACTIVITIES: Program Element 0604777N Navigation/ID System.

H. (U) OTHER APPROPRIATION FUNDS:

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN LINE 31	1,450	0	10,356	35,522	47,328

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) GPS: TRR 12/93; DT-IIIC 4/94; OT-IIIC 7/94

2. (U) MGB: PMQT 3/93; MQT #1 8/93

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1378 PROJECT TITLE: AH-1 Aircraft

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1378	AH-1 ACFT	11,068*	9,599*	5,615	33,224	139,708

* Project designated W1378 in FYs 92 & 93.

B. (U) DESCRIPTION: The mission of the AH-1W attack helicopter is to provide close-in fire support and fire support coordination in aerial and ground escort operations during the ship-to-shore phase of amphibious operations and during subsequent operations ashore. AH-1 Cockpit Upgrade effort emphasizes cockpit workload reduction to increase margin of safety in night, nap-of-the-earth adverse weather operations. Integration includes on-board mission planning, digital fire control, self navigation, night targeting and automatic electronic countermeasure systems. As discrete systems have been added to the aircraft, pilot workload has progressively worsened. Board of Inspection and Survey has identified the lack of system integration as the most critical deficiency affecting mission completion. The Wing Tip station wiring is performed in conjunction with the development of the Advanced Rocket Control System (ARCS) providing the AH-1 with simultaneous air-to-air missile and air-to-ground capability and Advance Rocket System (ARS) delivery capability. AH-1 improvements include the integration of a stabilized fire control system with a state-of-the-art missile during FY 1993.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Night Targeting System (NTS) Development Testing (DT IIC) and Operational Testing (OT IIA).

b. (U) Obtained NTS Milestone IIA approval for Low Rate Initial Production.

c. (U) Began Wing Tip/ARCS wiring integration.

d. (U) Began NTS validation and verification for first two USMC trial kits.

2. (U) FY 1993 PROGRAM:

a. (U) NTS validation and verification completion for first two USMC trial kits.

b. (U) Complete NTS TECHEVAL and OPEVAL testing.

c. (U) Continue Wing Tip/ARCS wiring integration.

d. (U) Initiate acquisition planning development for the Cockpit Upgrade program.

3. (U) FY 1994 PLANS:

a. (U) Obtain NTS Milestone III approval for Full Rate Production.

b. (U) Complete Wing Tip/ARCS wiring and install into AH-1W.

c. (U) Conduct technical review of cockpit integration proposals and prepare documentation in support of MS II approval.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1378 PROJECT TITLE: AH-1 Aircraft

d. (U) Obtain cockpit integration MS II approval for Engineering and Manufacturing Development (E&MD) and award competitive contract.

4. (U) PROGRAM TO COMPLETION:

a. (U) Continue EMD efforts on the Cockpit Upgrade leading to Milestone III approval for Full Rate Production in FY 1998. RDT&E funding planned to complete in FY 1998.

b. (U) Participate in ARS DT/OT testing leading to initial rate production decision in FY 1996.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NADEP, Pensacola, FL; and NADEP, Jacksonville, FL; NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: ISRAEL AIRCRAFT INDUSTRIES, Tamam Plant, Yehud Industrial Zone, Israel; SEQUA, INC./KOLLSMAN, Merrimack, NH; BELL HELICOPTER, TEXTRON, INC., Ft. Worth, TX; Charles Stark Draper Laboratory, Cambridge, MA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. NTS	
a. (U) Operational Requirements Document	12/85
b. (U) Test and Evaluation Master Plan	4/88
c. (U) Integrated Program Summary	5/92
d. (U) Acquisition Plan	6/88
2. (U) Wing Tip Station	
a. (U) Operational Requirements Document	4/88
b. (U) Test and Evaluation Master Plan	1/93
c. (U) Acquisition Plan	7/91
3. (U) Cockpit Upgrade	
Operational Requirements Document	2/92

G. (U) RELATED ACTIVITIES: PE 0604603N, Air-to-Surface Munitions.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN LINE-34	142,026	75,423	74,944	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1707 PROJECT TITLE: LAMPS III IMP

PICTURE NOT AVAILABLE

POPULAR NAME: LAMPS Improvements - BLOCK II Upgrade

A. (U) SCHEDULE/BUDGET INFORMATION (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS II 3/93		MS III 12/97
ENGINEERING		SDR 5/93 SSR 8/93	PDR 10/93 CDR 4/94	TRR 2Q/95 PRR 2Q/97 AVION FLT TEST 2Q/95
T&E MILESTONES		IV&V 3/93		OT IIA 2Q/97 TECHEVAL 4Q/99 OPEVAL 2Q/00 DT II 3Q/95
CONTRACT MILESTONE	PHASE IB 3/92	E&MD Award PHASE II 3/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	24,746	29,624	40,327	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	7,411	4,746	4,773	CONT.	CONT.
GFE/ OTHER	1,619	65	200	CONT.	CONT.
TOTAL	33,776	34,435	45,300	CONT.	CONT.

B. (U) DESCRIPTION: The Block II Upgrade improves the capability of the LAMPS MK III Weapons System to provide battle group protection and adds significant capability in coastal littorals and regional conflicts. The Block II Upgrade will enter Engineering and Manufacturing Development (EMD) in FY93 and represents a significant avionics modification to the SH-60B greatly enhancing both primary mission areas of Anti-Submarine Warfare (ASW) and Anti-Surface Warfare (ASUW). The Airborne Low Frequency Sonar (ALFS) will be added to enhance the existing acoustic suite. ASUW effectiveness will be improved with the addition of a multi-mode radar which includes an inverse synthetic aperture radar (ISAR) mode to permit stand-off classification of hostile threats. An improved electronics surveillance measures (ESM) system will enable passive detection and targeting of radar sources not detectable with the current system. Aircrew and aircraft survivability in hostile environments will be significantly improved through software integration of the self-defense equipments. Provisions for a tactical data transfer (TDT) system to improve platform interoperability by rapid, secure transfer of mission information between multiple air and surface units is included in the upgrade.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1707 PROJECT TITLE: LAMPS III IMP

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Procured ALFS Engineering Development Model-(EDM).

b. (U) Initiated detailed development test planning.

c. (U) Began preliminary design of Block II aircraft modification.

d. (U) Conducted System Requirements Review.

e. (U) Initiated (Phase 1B) subsystem competitions for contractor furnished equipment including radar, ESM and upgraded controls and displays.

f. (U) Procured government furnished equipment.

g. (U) Prepared for MS II review.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct MS II review.

b. (U) Contractor procurement of developmental subsystems.

c. (U) Enter system design phase of Block II Upgrade:

(1) (U) System/software requirements and subsystem high level design (Phase II).

(2) (U) Aircraft modification design.

d. (U) Conduct System Design Review.

e. (U) Conduct System Software Review.

f. (U) Begin detailed planning for Developmental/Operational Testing.

g. (U) Begin hardware and software independent verification and validation (IV&V).

3. (U) FY 1994 PLANS:

a. (U) Conduct Preliminary Design Review (PDR).

b. (U) Conduct Critical Design Review (CDR).

c. (U) Begin laboratory integration and test phase.

d. (U) Begin software coding.

e. (U) Modify aircraft for avionics upgrade.

f. (U) Finalize System Software design.

g. (U) Enter subsystem development.

h. (U) Continue hardware and software independent verification and validation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW & Other Helo Developments
PROJECT NUMBER: H1707 PROJECT TITLE: LAMPS III IMP

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCEN FLTCOMBATDIRSSACT, Dam Neck, VA; NRL, Washington DC. CONTRACTORS: International Business Machines, Owego, NY; Sikorsky, Stratford, CT; AT&T, Whippany, NJ, for UYS-2; Hughes Aircraft, Fullerton, CA, for ALFS.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR	4/88
ORD	8/92
AP	5/92
TEMP	In Process
COEA	1/93

G. (U) RELATED ACTIVITIES:

1. (U) PE 0604212N, ASW and Other Helo Developments, Project H0485, ALFS.

2. (U) PE 0604507N, V1440 Enhanced Modular Signal Processor (integration into ALFS system).

3. (U) PE 0604261N, Acoustic Search Sensors.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN	4,175	12,223	4,606	CONT.	CONT.
APN LINE 11,12	266,722	234,534	216,426	CONT.	CONT.
APN LINE 32	25,020	34,872	46,064	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

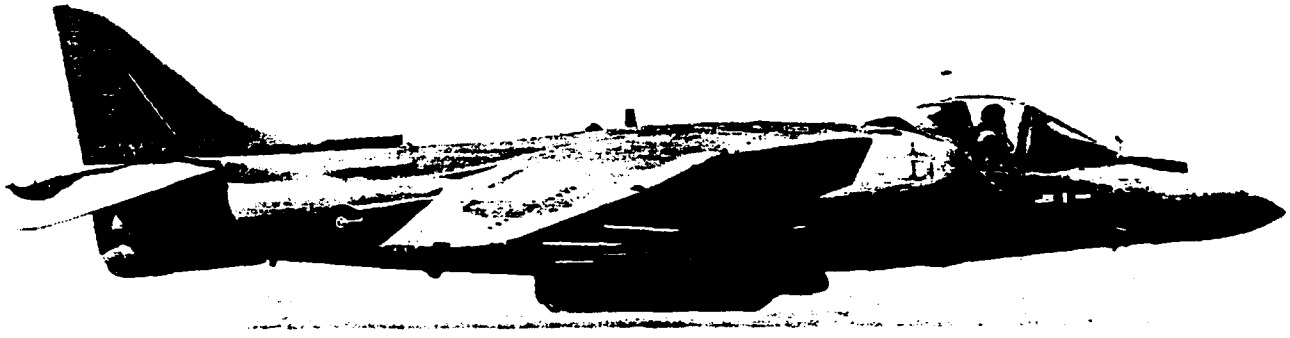
DTIIA	6/95
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TECHEVAL	9/99
OPEVAL	3/00

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: H0652

BUDGET ACTIVITY: 4
PROJECT TITLE: AV-8B



POPULAR NAME: HARRIER II

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		RADAR DEL 7/93		
ENGINEERING MILESTONES	1ST FLT RADAR 9/92		MAWS CDR 8/94	
T&E MILESTONES		R1 S/W *RTF 7/93	R2 SW RTF 12/93 R3 S/W RTF 7/94	
CONTRACT MILESTONES			MAWS AWD 1/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2,571	2,714	9,400	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	3,807	5,136	7,150	CONT.	CONT.
GFE/ OTHER	2,706	3,885	1,734	CONT.	CONT.
TOTAL	**9,084	11,735	18,284	CONT.	CONT.

* Release to Fleet
** Funded under W0652 in FY-92 and prior.

B. (U) DESCRIPTION: The program provides for the continued integration and test of existing weapons and sensors into the AV-8B, envelope expansion of day attack and night attack aircraft and the development and test to correct fleet software discrepancies. Testing the 100% Leading Edge Root Extension (LERX), a joint development with the United Kingdom (UK) which will provide increased instantaneous turn rate and combat capability, is underway. An effort is ongoing to upgrade and test the aircraft engine to a F402-RR-408 providing increased safety and supportability as well as increased hot-day performance. A current development effort, funded jointly by the Government of the United States (USG), Government of Italy (GOI) and Government of Spain (GOS), is underway to integrate and test the AN/APG-65 radar (currently in use on the F/A-18) to provide enhanced air-to-ground and air-to-air mission capability. An engineering effort will commence in FY 1994 to integrate the AAR-47 Missile Approach Warning System (MAWS) into the AV-8B Weapons System to provide increased capability to operate in a high threat environment. This MAWS integration will be conducted in close coordination with Air Force efforts to integrate the AAR-47 into the F-15 and F-16 aircraft.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: H0652 PROJECT TITLE: AV-8B

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued on-going Pre-Planned Product Improvement (P^3I) projects.

b. (U) Commenced development ground and flight testing of redesigned F402-RR-408 engine case leading to interim fleet operating clearance.

c. (U) Continued weapons integration/envelope expansion.

d. (U) Continued Radar Integration test planning and preparation of test facilities.

e. (U) Continued laboratory testing and integration of radar software.

f. (U) Radar aircraft first flight 9/92.

2. (U) FY 1993 PROGRAM:

a. (U) Continue on-going P^3I projects.

b. (U) Complete ground and flight testing of the F402-RR-408 redesigned engine case. Issue final fleet operating clearance.

c. (U) Commence contractor radar flight testing 10/92.

d. (U) Commence R1, R2 and R3 Software validation and verification efforts.

e. (U) Commence Radar Integration and Flight Testing (FQ&P, Loads, Avionics, OFP).

f. (U) Release Block 1 (R1) Radar Software to the USMC to provide Air to Ground Ranging mode for weapons delivery. R1 S/W RTF 7/93.

g. (U) Coordinate MAWS requirements with Air Force.

3. (U) FY 1994 PLANS:

a. (U) Continue on-going P^3I projects.

b. (U) Release Block 2 (R2) Radar Software to the USMC and GOI to provide Search, MAP, NAV and GMT Air-to-Surface radar modes. R2 S/W RTF 12/93.

c. (U) Award MAWS Integration contract 1/94.

d. (U) Commence MAWS Integration ground and flight test planning and preparation of drone test vehicle and facilities.

e. (U) Commence design and development of upgraded OFP software to integrate MAWS into the AV-8B Night Attack System.

f. (U) Conduct MAWS Integration Critical Design Review 8/94.

g. (U) Release Block 3 (R3) Radar Software to the USMC and GOI to provide Initial Operational Capability (IOC) with full Air-to-Surface and Air-to-Air radar modes. R3 S/W RTF and IOC 7/94.

h. (U) Commence validation/verification ground and flight testing of fully integrated Block 4 (R4) Radar Software correction of deficiencies prior to final release of joint USG/GOI/GOS software 4/95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)
PROJECT NUMBER: H0652 PROJECT TITLE: AV-8B

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV Patuxent River MD; NAVAIRWARCENWPNDIV China Lake CA; NAVAIRWARCENACDIV Trenton NJ; NAVAIRWARCENACDIV Indianapolis IN; NADEP Cherry Point NC; NATSF Philadelphia PA. CONTRACTORS: McDonnell Douglas Corporation, Saint Louis, MO; Rolls Royce PLC, Bristol, United Kingdom; Hughes Aircraft Company, Los Angeles, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
OR AV-8B 10/75; NIGHT ATTACK 10/84; RADAR 8/88
DCP 160 REV 1/87; PMP (RADAR) 7/90;
TEMP AV-8B REV 7/91; RADAR 8/92

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN-LINE 3/4	270,000	24,802	144,601	1,459,749	8,243,176
QTY	6	0	4	65	279
APN-LINE 24	19,551	6,518	22,797	171,903	276,759

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) A Memorandum of Understanding (MOU) between the Governments of the United States (USG) and the United Kingdom (UKG) entitled the "AV-8B/GR5 Agreement" was signed in 1981. Under the Agreement the USG and UKG fund their own program and share in the cost of changes common to AV-8B and GRmk5 aircraft. USG procures AV-8B aircraft from McDonnell Aircraft Company who subcontracts the Aft Fuselage from British Aerospace. The UKG procures its GRmk5 aircraft from British Aerospace who subcontracts the Forward Fuselage and Wing from McDonnell Aircraft Company. In July 1987 a supplement to the MOU was signed detailing AV-8B Night Attack cooperative development. In November 1988 a supplement to the MOU was signed covering joint development of a 100% LERX.

2. (U) A MOU with the Government of Spain (GOS) and the Government of Italy (GOI) for the integration and test of the AN/APG-65 radar in the AV-8B aircraft was signed in September 1990. A production, remanufacturing and in-service support MOU (USG/GOI/GOS) was signed in December 1992.

J. (U) TEST AND EVALUATION:

	RELEASE TO FLEET
R1 S/W	7/93
R2 S/W	12/93
R3 S/W	7/94
R4 S/W	4/95
RADAR/NIGHT ATTACK S/W	3Q/96

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standards Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1857	Calibration Standards	3,269	3,688	3,378	CONT.	CONT.
W0572 1/	Joint Services/Navy Standard Avionics Components and Subsystems	11,335	7,867	10,346	CONT.	CONT.
W1842	Aircraft Gas Engine Turbine Facility	1,846	0	0	CONT.	CONT.
	TOTAL	16,450	11,555	13,724	CONT.	CONT.

1/ Previously funded under PE 0604203N

B. (U) DESCRIPTION: Project W0572, Joint Service/Navy Standard Avionics: This project addresses the proliferation in Naval Aviation of unique avionics equipment that increases with each new or modified aircraft. This proliferation of unique Contractor Furnished Equipment (CFE), due to non-availability of off-the-shelf Government Furnished Equipment (GFE), has resulted in a growing cost burden in the areas of development, procurement, logistics, and maintenance. This project addresses the issue by developing common avionics for new programs and retrofit programs, if applicable. All acquisition approaches are followed for the least-cost solution to this need, including joint programs, GFE breakout of peculiar items for broad use, foreign and non-development item investigations (funded under those headings when appropriate) and, when practicable and cost effective, dedicated development efforts. These products have application to new architecture "integrated avionics" aircraft, and also older technology "black box" or federated aircraft with major new efforts directed at bridging the gap between these technologies. This forward and retrofit application of common avionics technology is required to maximize aircraft capabilities at a minimum procurement and support cost. The program will specifically address in-service-out-of-production avionics with costly reliability and maintainability deficiencies and includes planning for the development of components/subsystems which have high reliability, are easily maintained and have low life cycle costs. An example of a past successful task under this project is the Standard Central Air Data Computer (SCADC) jointly developed with the Air Force and now in production as a common system on Navy and Air Force aircraft. Using an integrated common module approach, the reliability of SCADC is 10 to 50 times greater than the 13 types of air data computers it replaced. This project unit also funds Navy participation and activities involving the Joint Service Review Committee (JSRC) for Avionics Standardization.

(U) Project S1857, Calibration Standards: This project is a Navy-wide program to develop required field level calibration standards (hardware) in all major measurement technology areas. It funds Navy lead-service responsibilities in the DOD metrology RDT&E program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standards Development
PROJECT NUMBER: W0572 PROJECT TITLE: Joint Services/Navy Standard Avionics Components and Subsystems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0572	Joint Services/Navy Standard Avionics Components and Subsystems	11,335	7,867	10,346	CONT.	CONT.

B. (U) DESCRIPTION: The Joint Service/Navy Standard Avionics Components and Subsystems project provides for the identification, design, development, test, evaluation and qualification of standard avionics for Navy use and wherever practicable use across all services. Standard avionics systems include the Standard Attitude Heading and Reference System (SAHRS), Ground Proximity Warning Systems (GPWS) for Tactical Aircraft (TACAIR) and Helicopters (HELO), a joint service program development with the Air Force; Compass/Attitude Heading Reference System (C/AHRS), and a joint service Solid State Barometric Altimeter (SSBA). Beginning in FY 1992, the Low Probability of Intercept (LPI) Altimeter was initiated. Future user needs analysis, including joint service requirements, will continue. Standard avionics systems are procured and installed on many aircraft, including F/A-18, F-14, A-6, EA-6B, AV-8B, E-2C, P-3, T-45, CH-46, M/CH-53, SH-60B/F, HH-60, SH-3, UH-1N, S-3 and KC-130.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed specification development for LPI Altimeter.

b. (U) Performed simulator flight test demonstration for GPWS TACAIR.

c. (U) Began development of GPWS HELO algorithm in AN/AYK-14 for SH-60B.

d. (U) Started qualification testing for C/AHRS.

e. (U) Provided program management support for SSBA.

f. (U) Validated and verified aircraft integration test deficiencies for SAHRS.

g. (U) Completed concept alternatives for Common Recording System (CRS) and Naval Aircraft Collision Warning System.

h. (U) Transferred AN/ARC-210 embedded Downed Aircrew Locating System (DALS) under PE 0204163N, Fleet Communications.

i. (U) Completed GPWS HELO demonstration tests on an SH-3.

2. (U) FY 1993 PROGRAM:

a. (U) Continue GPWS TACAIR software testing by simulator and flight tests.

b. (U) Continue qualification testing for C/AHRS.

c. (U) Award GPWS HELO Engineering & Manufacturing Development (E&MD) contract.

d. (U) Complete E&MD development for SAHRS.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standards Development
PROJECT NUMBER: W0572 PROJECT TITLE: Joint Services/Navy Standard Avionics Components and Subsystems

3. (U) FY 1994 PLANS:

a. (U) Start Technical Evaluation (TECHEVAL) for C/AHRS.

b. (U) Continue E&MD development of GPWS HELO.

c. (U) Complete GPWS TACAIR algorithm development; transition capability to aircraft platforms.

d. (U) Conduct risk assessment for LPI Altimeter.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA, Patuxent River, MD, and Indianapolis, IN. CONTRACTORS: SAHRS: Kearfott/Astronautics Corp., Little Falls, NJ; C/AHRS: Smiths Industries, Grand Rapids, MI; LPI Altimeter and GPWS HELO: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: LPI Altimeter MS II has shifted from 93/3Q to 95/1Q to accommodate demonstration and validation phase in compliance with DOD Instruction 5000.2. CRS MS III has changed to 00/3Q and reflects program initiation in FY 1997 vice FY 1993.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

PROGRAM	TOR/MNS	OR/ORD	AP	TEMP
GPWS TACAIR		01/87	N/A	N/A
GPWS HELO		01/87	07/92	DRAFT
SAHRS		N/A	07/89	03/91
C/AHRS		01/86	01/91	06/91
LPI Altimeter	09/90	DRAFT	DRAFT	

G. (U) RELATED ACTIVITIES: A tri-service formal charter exists to promote joint development of standard avionics components and subsystems through the Joint Services Review Committee (JSRC) on Avionics Standardization. Separate JSRC memorandums of agreement have been established for the SAHRS, GPWS, DALS, C/AHRS and SSBA.

H. (U) OTHER APPROPRIATION FUNDS: Application airframe appropriations that will use these systems include: F/A-18, F-14, A-6, EA-6B, AV-8B, E-2C, P-3, T-45, CH-46, M/CH-53, SH-60B/F, HH-60, SH-3, UH-1N, S-3 and KC-130.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) MILESTONE SCHEDULE:

PROGRAM	MS I	MS II	MS III
GPWS HELO		93/2Q	97/4Q
SAHRS		85/2Q	N/A
C/AHRS		91/3Q	96/2Q
LPI Altimeter	94/3Q	95/1Q	97/2Q

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standards Development
PROJECT NUMBER: S1857 PROJECT TITLE: Calibration Standards

C. (U) DESCRIPTION: This project provides the engineering development of measurement reference/calibration standards (hardware) required to ensure measurement accuracy in support/maintenance of new advanced technology weapon systems and associated support equipment. These individual tasks have been assigned to the Navy as lead service responsibilities as part of a Joint Service/DoD program.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed development of 10 standards.
b. (U) Continued development of 3 Electro-optical standards.
c. (U) Started development of 1 Microwave/Millimeter wave, 2 Physical/Mechanical and 1 Electro-Optical standards.

2. (U) FY 1993 PROGRAM:
a. (U) Complete development of 6 standards in support of electromagnetic hazard test sets, infrared (IR) detection systems, fiber optic power measurement, fiber optic sensors, pilots oxygen breathing system analysis measurements, and gas leak detector systems.
b. (U) Continue development of 1 Electro-Optical standard.
c. (U) Start development of 3 Electric/Electronics, 7 Physical/Mechanical, and 7 Electro-Optics standards.

3. (U) FY 1994 PLANS:
a. (U) Complete development of 4 standards in support of the calibration of Consolidated Automated Support System IR measurement systems, boiler water/feedwater salinity measurement systems, and diode sources and detectors utilized in fiber optic systems, and the electro-optic polarization standard.
b. (U) Continue development of 2 Electric/Electronics, 6 Physical/Mechanical, and 4 Electro-Optical standards.
c. (U) Start development of 1 Electric/Electronics, 1 Physical/Mechanical and 1 Electro-Optical standards.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWAC, Corona, CA; NAVSURFWARCEN DET, Annapolis, MD; Navy Primary Standards Laboratory, San Diego, CA; NRL, Washington, DC. OTHER GOVERNMENT: National Institute of Standard and Technology, Gaithersburg, MD.

F. (U) RELATED ACTIVITIES: This joint service project develops national, depot, intermediate, and field level calibration hardware for Army, Navy, Air Force, and Marine systems and support equipment. DoD related Program Elements: Army PE 63001A (METCAL) and Air Force PE 72207F (Depot Maintenance), PE 0603215C (Limited Defense Systems (SDIO)), PE 0603218C (Research Support Activities (SDIO)).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604217N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: S-3 Weapon System Improvement
PROJECT NUMBER: H0489 PROJECT TITLE: S-3 WSIP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0489	S-3 (WSIP)	0*	1,095	4,187	CONT.	CONT.

* $4.0M (FY 1991-1993) Nunn amendment, funded under RDT&E, Defense Agencies (P.E. 0603790D)

B. (U) DESCRIPTION: The current program provides FY 1993 continuation of a series of progressive modular improvements which began with the S-3 Weapon System Improvement Program (WSIP) Phase I (S-3A modified to S-3B configuration). Based upon the S-3 WSIP Operational Requirements Document, the full program achieves prioritized components of the required multi-mission operational capability through time-phased selective mission avionics/processing upgrades. Initial Nunn funded development focused on the Co-Processor Memory Unit (CPMU) hardware, a joint U.S./Canadian industrial base development program which provides the core processing capability and open architecture required for future modular S-3B modification. This program will complete CPMU integration and test and rewrite existing Tactical Mission Program code into Ada high order language. Subsequent development will incorporate enhanced weapon capability and initiate satellite communications data fusion.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable under this PE, however CPMU development is ongoing under Nunn amendment program.

2. (U) FY 1993 PROGRAM:

a. (U) Independent verification/validation, S-3B specific platform ground testing to verify the functionality and initial aircraft integration of CPMU hardware/resident firmware.

b. (U) Complete systems engineering plan for Air Deployed Active Receiver hardware and software integration.

3. (U) FY 1994 PLANS: Begin Ada software development for CPMU based on existing AN/AYK-10 CMS-2 software code. Commence initial flight testing for CPMU hardware utilizing translated CMS-2 software.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE - NAVAIRWARCENACDIV, Warminster, PA and Patuxent River, MD. CONTRACTORS - Lockheed Aeronautical Systems Company, Marietta, GA; Paramax, St. Paul, MN; Paramax, Winnipeg, Canada; Canadian Commercial Corporation, Ottawa, Canada.

E. (U) RELATED ACTIVITIES: PE 0603790D (Nunn funds) - CPMU (previously Mass Memory Unit) and PE 0604261N, Acoustic Search Sensors.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Project Agreement (PA) between U.S. Navy/Canadian Department of Industry, Science and Technology for development of CPMU, signed 2 Jun 1991. Total R&D funding: Canadian, $4.3M (U.S. $); OSD $4.0M, Navy, $3.5M. Development contract signed with Paramax, St Paul, MN on 20 Nov 1991; with Paramax, Winnipeg, Canada, on 20 Dec 1991. This is a Canadian prime/U.S. subcontractor relationship in accordance with the PA.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0532	Fleet Air Ocean Equipment	2,724	2,797	2,516	CONT.	CONT.
R1740	Air/Ocean Survey Engineering	*1,235	*1,158	1,228	CONT.	CONT.
X1752	Tactical Environmental Support System - TESS (ENG)	*2,439	*2,241	2,385	CONT.	CONT.
	TOTAL	6,398	6,196	6,129		

B. (U) DESCRIPTION: This program element provides for the engineering development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters essential to the optimum employment of Naval warfare systems. The program element also develops upgrades and improvements to the shipboard and shore based Tactical Environmental Support System - TESS(3). Engineering development of oceanographic survey sensors is also performed under this program element.

* Project R1740 previously funded in PE 0604704N. Project X1752 previously funded in PE 0604230N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering
PROJECT NUMBER: X0532 PROJECT TITLE: Fleet Air Ocean Equipment

C. (U) DESCRIPTION: This project provides for the engineering development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters. Major emphasis areas include tactical workstations, the Automated Surface Observing System (ASOS), the Marine Corps Meteorological Mobile Facility (METMF), the AN/SMQ-11 satellite receiver/recorder and other satellite ground equipment, weather radars and the engineering development of new sensors such as active and passive atmospheric profilers for incorporation into the Shipboard Meteorological and Oceanographic Observing System (SMOOS).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed sensor engineering for SMOOS TECHEVAL.

b. (U) Began engineering development of the Navy Tactical Command Systems-Afloat (NTCS-A) Integrated Tactical Environmental Subsystem (NITES).

2. (U) FY 1993 PROGRAM:

a. (U) Complete TECHEVAL and achieve Milestone III for SMOOS.

b. (U) Begin engineering development of Light Detection and Ranging (LIDAR) atmospheric profiler.

c. (U) Continue engineering development of NITES.

3. (U) FY 1994 PLANS:

a. (U) Begin engineering development of the High Resolution Interferometer Sounder (HIS) passive profiler.

b. (U) Continue engineering development of LIDAR profiler and NITES.

c. (U) Continue AN/SMQ-11 and METMF system engineering.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NRL, Washington, DC; NAVELEXCEN, Vallejo, CA; NAVAIRWARCENACDIV, Indianapolis, IN. CONTRACTORS: Lockheed, Austin, TX.

F. (U) RELATED ACTIVITIES: PE 0603207N, Air/Ocean Tactical Application - Provides advanced development of many related systems.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 158	14,632	12,030	10,522	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering
PROJECT NUMBER: X1752 PROJECT TITLE: Tactical Environmental Support System - TESS (ENG)

C. (U) DESCRIPTION: This project develops the Navy's computer-based tactical shore and shipboard capability used to predict and assess the impact of the atmospheric and oceanographic environment on the performance of platforms, weapons and sensor systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Achieved Milestone III (Full Rate Production).

b. (U) Completed DT-IIIA and DT-IIIB.

c. (U) Initiated Lead Laboratory function at NRL.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Lead Laboratory function at NRL.

b. (U) Integrate new or revised applications programs into P3I block upgrades.

c. (U) Begin conversion of software to DOD X-Windows standard.

d. (U) Perform hardware engineering, procure hardware, and begin hardware upgrades of fielded systems afloat and ashore to achieve DOD X-Windows compatibility.

3. (U) FY 1994 PLANS:

a. (U) Continue Lead Laboratory function at NRL.

b. (U) Continue integrating new and revised application programs into P3I block upgrades.

c. (U) Continue conversion of software to X-Windows standard.

d. (U) Continue installations to upgrade fielded system to X-Windows compatibility.

e. (U) Begin engineering studies for next generation TESS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NCCOSC WC ISE DIV, Vallejo, CA. CONTRACTOR: Lockheed, Austin, TX.

F. (U) RELATED ACTIVITIES: PE 0603207N, Air/Ocean Tactical Application - provides atmospheric and oceanographic computer models used to generate data in support of Navy Command and Control, Data Base Management Systems and satellite data processing software.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 158	15,542	13,434	3,391	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering
PROJECT NUMBER: R1740 PROJECT TITLE: Air/Ocean Survey Engineering

C. (U) DESCRIPTION: This program provides engineering development of modern oceanographic survey sensor technologies specifically developed in response to Fleet needs for tactical oceanographic data to support a variety of warfare areas and operations and systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Tested Ambient Noise Sensor (ANS) drifter, completed development of 300 M Deep Temperature Tail mini-drifter, and initiated wind speed/direction sensor development.
b. (U) Conducted testing of Arctic Oceanographic Buoy (AOB), Spring 92.
c. (U) Conducted integration of drifting buoy data into fleet display and acquisition hardware.
d. (U) Transitioned expendable conductivity-temperature depth probe (XCTD) to NAVOCEANO.

2. (U) FY 1993 PROGRAM:

a. (U) Continue wind speed/direction development on mini-drifting buoys.
b. (U) Complete testing of ANS, 300M Temperature Tail mini drifting data buoys (MDDBs).
c. (U) Continue testing of ice penetration package in AOB.
d. (U) Initiate Compact Meteorological and Oceanographic Drifter CMOD/TZ/Thermistor ANS MDDB prototype design.

3. (U) FY 1994 PLANS:

a. (U) Complete and transition air expendable ice penetrator sensor.
b. (U) Complete testing CMOD/TZ/ANS MDDB, initiate deep string (600M) thermistor chain option.
c. (U) Initiate 6.4 transition of expendable optical probe from PE 0603207N.
d. (U) Complete wind speed/wind direction sensor for MDDB.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV Indianapolis, IN. CONTRACTORS: Sparton of Canada, London, Ontario, Canada; U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, NH; METOCEAN Data Systems, Ltd., Dartmouth, Nova Scotia, Canada.

F. (U) RELATED ACTIVITIES: PE 0602435N, Ocean and Atmospheric Technology; PE 0603207N, Air/Ocean Tactical Application.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: $2.0M U.S./Canadian Defense Development Sharing Program (DDSP) agreement for joint development of ice penetrator (AOB). $2.7M U.S./Canadian DDSP for development of mini-drifting data buoy, signed May 91. Cost sharing is 50% by Canada.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1152	P-3 Sensor Integration	9,379	7,500	5,235	CONT.	CONT.
H1588	P-3 UPDATE IV Avionics	30,148	5,525	0	0	508,975
H2132	Engine Development	36,400	0	0	0	36,400
H2180	P-3 ASUW Improvements	0	0	9,899	CONT.	CONT.
TOTAL		75,927	13,025	15,134	CONT.	CONT.

B. (U) DESCRIPTION: This program provides upgrades to the P-3C's aircraft systems to enhance its surface and subsurface tracking, classification, and attack capability. The P-3C Sensor Integration (H1152) Project develops improved acoustic software to process more advanced active and passive sonobuoys and increase the operational capability of the P-3C UPDATE III Acoustic System by the addition of advanced algorithms. The P-3 UPDATE IV Avionics (H1588) Project was terminated after FY 1993. The P-3 Anti-Surface Warfare (ASUW) Improvements Program (H2180) is a new start program to be initiated in FY 1993 using FY 1992 funding. This program will develop software and hardware necessary for CP-2044 (P-3 UPDATE III main aircraft computer) integration of existing stand-alone ASUW systems which will be procured beginning in FY 1994. The upgrades include improved non-acoustic sensors and tactical communications to significantly increase standoff targeting, classification and survivability, and an increase in over-the-horizon threat identification.

FY 1994 RDT&E, NAVY DECRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: H1152 PROJECT TITLE: P-3 Sensor Integration

PICTURE NOT AVAILABLE

POPULAR NAME: P-3 SENSOR INTEGRATION

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES		TMS/Broadband (A4.8/C4.8) CDR 4/93		
T&E MILESTONES	Post CHEX OT III 6/92			A4.8/C4.8 DT/OT III 4QTR95/2QTR96
CONTRACT MILESTONES			OMNI RFP 10/93	OMNI AWD 1QTR95

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,964	4,726	3,415	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	4,808	2,774	1,820	CONT.	CONT.
GFE/ OTHER	607	0	0	CONT.	CONT.
TOTAL	9,379	7,500	5,235	CONT.	CONT.

B. (U) DESCRIPTION: Primarily a software upgrade, this project will increase the operational capability of the P-3C UPDATE III Acoustic System by integrating the current hardware/software configuration with advanced sonobuoys and detection algorithms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Post CHEX OT III and ACAP (release software version 5.0).

b. (U) Generated requirements concept and software specification for the incorporation of the Acoustic Intercept System (AIS), ACAP (release software version 8.0).

c. (U) Modified baseline Tactical Mission Software (TMS) design specification for software version A4.8.

FY 1994 RDT&E, NAVY DECRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: H1152 PROJECT TITLE: P-3 Sensor Integration

d. (U) Developed requirements and design specifications for Broadband (software version C4.8).

2. (U) FY 1993 PROGRAM:

a. (U) Complete Critical Design Review for TMS (software version A4.8).

b. (U) Complete Critical Design Review for incorporation of Broadband (software version C4.8) processing.

3. (U) FY 1994 PLANS:

a. (U) Commence coding and debugging of TMS (software version A4.8).

b. (U) Commence coding and debugging of Broadband (software version C4.8) capability.

c. (U) Exercise final option for OMNIBUS contract for systems engineering support.

d. (U) Release RFP to compete OMNIBUS contract.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTORS: IBM, Manassas, VA; Computer Sciences Corporation, Warminster, PA; Pacer, Bedford, MA; PARAMAX, St. Paul, MN; RBC, Incorporated, Arlington, Va.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Due to restructuring of AIS in FY 1992-1999, DT III for TMS replaces DT II for TMS/AIS in 8/95.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TEMP 12/84
NDCP 6/81

G. (U) RELATED ACTIVITIES: Program Element 0604261N - Acoustic Search Sensors developing software and acoustic algorithms.

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

(U)	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(OSIP 80-84)					
APN-5	8,560	6,955	24,075	5,350	70,062

I. (U) INTERNATIONAL COOPERATION AGREEMENTS: Not applicable.

J. (U) TEST & EVALUATION: Post CHEX OT III - 6/92
TMS/Broadband DT III - 4QTR95
TMS/Broadband OT III - 2QTR96

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: H2180 PROJECT TITLE: P-3 ASUW Improvements

PICTURE NOT AVAILABLE

POPULAR NAME: P-3 ASUW IMPROVEMENTS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS II 11/93	
ENGINEERING MILESTONES				
T&E MILESTONES				DT/OT IIIA 1QTR97
CONTRACT MILESTONES			OMNI RFP 10/93 RFP 10/93 AWD 3/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT		0	6,429	CONT.	CONT.
SUPPORT CONTRACT		0	0	CONT.	CONT.
IN-HOUSE SUPPORT		0	3,470	CONT.	CONT.
GFE/ OTHER		0	0	CONT.	CONT.
TOTAL		0	9,899	CONT.	CONT.

B. (U) DESCRIPTION: This new start project develops software necessary for CP-2044 (P-3 Update III main aircraft computer) integration of existing stand-alone ASUW systems which will be procured beginning in FY 1994. The project will initially address the on-line display of Inverse Synthetic Aperture Radar (ISAR), Tactical Receive Equipment (TRE), and Over-the-Horizon Airborne Sensor Information Systems (OASIS III) information which will reduce aircrew workload. This software provides for the automatic transmission of P-3 fused tactical data to on-scene commanders via various voice and data networks, which will provide for a significant increase in over-the-horizon threat identification and tactical situation awareness for both the on-scene commander and component/service/national command centers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Conduct NPDM/Milestone II in November 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: P-3 Modernization Program
PROJECT NUMBER: H2180 PROJECT TITLE: P-3 ASUW Improvements

b. (U) Exercise final option for OMNIBUS contract for systems engineering support.

c. (U) Release RFP to compete OMNIBUS contract.

d. (U) Release RFP for CP-2044 software development.

e. (U) Award level-of-effort contract for CP-2044 software development.

f. (U) Develop systems requirement documentation for CP-2044 software P^{3}I program.

g. (U) Coordinate and provide program management services for CP-2044 software P^{3}I program.

h. (U) Develop and test modifications to the P-3 software lab facility to incorporate ASUW unique systems for future software Independent Verification and Validation activities.

i. (U) Develop and verify Operator Machine Interface (OMI) specifications.

j. (U) Develop Patrol Avionics Test Lab test tools and procedures necessary for ASUW system software verification.

k. (U) Provide training and trainer support as required for new or modified ASUW P^{3}I systems.

l. (U) Provide logistics support for new or modified systems developed for ASUW P^{3}I.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTORS: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Draft Mission Need Statement 1/93

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APN-5 (OSIP 29-94)	0	0	146,759	458,058	598,817

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST & EVALUATION: DT/OT IIIA (FOT&E) 1QTR97

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDCET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0486	ASW Operations Center (ASWOC)	12,371	5,687	4,505	CONT.	CONT.
X0709	NCCS (TFCC)	16,565	6,866	7,692	CONT.	CONT.
X2009	OBU/OSG	2,365	2,696	2,189	CONT.	CONT.
X2041	Operations Support System (OSS)	7,882	8,418	11,433	CONT.	CONT.
X0521 *	Shipboard Tact Intell Proc	2,076	2,367	4,816	CONT.	CONT.
TOTAL		41,259	26,034	30,617		

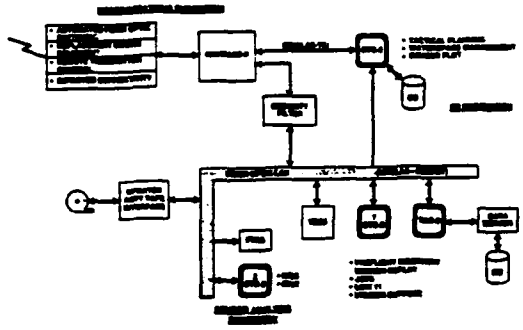
B. (U) DESCRIPTION: This program develops and upgrades the Navy's Command and Control (C2) information management systems supporting commanders afloat and Ashore. Included among these C2 systems are: the unified command centers of CINCPAC and CINCLANT, the Navy Command Center, the Fleet command centers of CINCLANTFLT, CINCPACFLT and CINCUSNAVEUR, the Submarine Operating Authority (SUBOPAUTH) command center, the command centers supporting the Ashore Sector Commander, the Fleet Ocean Surveillance Information Centers (FOSICS) and Fleet Ocean Surveillance Information Facilities (FOSIFS), Tactical Flag Command Centers (TFCC) afloat and the command and control suites of various combatant ship classes. These projects develop information processing and display systems for afloat and ashore commanders providing decision makers the ability to make rapid, informed tactical decisions. TCS develops systems which fuse tactical data between shipboard organic sensors and ashore and space-based non-organic sensors. TCS includes total system definitization to include each of the major afloat and ashore command centers and the integration of warfare systems within them. The functions provided by TCS are consistent with the Navy's Over-The-Horizon Detection, Classification, and Targeting Architecture.

*TRANSFERRED FROM PE: 0205670N

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: ASW Operations Center (ASWOC

ASWOC ARCHITECTURE



POPULAR NAME: ASWOC

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			IIIA	CONT.
ENGINEERING MILESTONES		Test Syst (Obj I) ASWOC Brunswick		CONT.
T&E MILESTONES		DTIIA	OTIIA	CONT.
CONTRACT MILESTONES	Various milestones to support an Evolutionary Acquisition integration by NESEA, St. Inigoes.			CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7,543	4,122	2,883	CONT.	CONT.
SUPPORT CONTRACT	904	590	382	CONT.	CONT.
IN-HOUSE SUPPORT	3,924	975	1,240	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	*12,371	5,687	4,505	CONT.	CONT.

* $2,174K which is included in the $12,371 FY92 allocation in accordance wit Congressional language for OTH-T efforts.

B. (U) DESCRIPTION: The Anti-Submarine Warfare Operations Centers (ASWOCs) are nodes of the Navy Command and Control System (NCCS) Ashore and provide the Ashor Sector Commander with the capability to plan and execute his assigned missions, including maritime surveillance, Anti-Surface Warfare, Over-the-Horizon-Targetin (OTH-T), ASW and special operations. The ASWOC system was initially established to support the unique requirements of the P-3C aircraft. The ASWOCs currently provide tactical equipment and facilities for mission planning, command and control, post flight sensor analysis and mission reporting to U.S. and allied commands ashore and afloat. The ASWOC Command, Control and Communications (C^3) Modernization effort will upgrade message and data processing capabilities to support simultaneous aircraft missions, improve systems availability, interface with NCCS Ashore theater data bases, improve systems interoperability with U.S. (joint) and allied operating forces, and support new aircraft capabilities. Thi program assures the existing ASWOC system remains interoperable with updated aircraft, sensors and weapons systems. The FY 92 OTH-T effort (not affiliated with ASWOC) encompasses the ability to conduct long-range, real time targeting

using tactical and intelligence sources which are achieved by maintaining an interoperable relationship among sensors, communications, information processing nodes, navigation systems, and weapon control systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed installation and training at designated ASWOCs for Objective 1 Incremental Fleet Release i.0.2: mission support aids (computer aided search).

b. (U) Completed integration, testing, documentation, and delivery to first operational site (ASWOC Brunswick) of Objective I Incremental Fleet Release i.0.3: Data Server, Security Management Shell.

c. (U) Developed DTC-2 software for replay of Tactical Mission Extract tapes from P-3 aircraft, generation of preflight insertion tapes for P-3C aircraft, and support of aircrew briefing and safety of flight.

d. (U) Captured and completed integration engineering for United States Message Text Format (USMTF) message parsing and generation software, Data Server Software updates, word processing software, remote communications control software, Joint Operational Tactical System (JOTS) Unified Build, and NCCS Government Off-the-Shelf Software (GOTSS) updates.

e. (U) Initiated design/development and ASWOC contact processing capability integrity USMTF and mission replay software with JOTS unified build.

f. (U) Initiated development of P-3 (ASQ-212 release) support software.

g. (U) Developed automated message processing software to support on-line AUTODIN, air-to-ground, point-to-point, and SATCOM connectivity.

h. (U) Developed/integrated and tested SATCOM DTC-2 interfaces and control software.

i. (U) Supported ASW GLOBIXS demonstration of waterspace management software.

j. (U) Captured/developed DTC-2 Link 11 software.

k. (U) Completed system testing, documentation, and installation at first operational site of Incremental Fleet Release i.0.4 to add: Data Server System updates, mission support aids, Aircrew Brief, ASWOC Tape Operations System (ATOS) and Preflight Insertion Data (PID) software (P-3), SATCOM and AUTODIN/LDMX interface.

l. (U) Completed development, testing and initial installations of Inverse Synthetic Aperture Radar (ISAR) analysis workstations,

m. (U) Developed OTH-T Airborne Sensor Interface System (OASIS) targeting suites for the EP-3 (Outlaw Story Teller) and S-3 (Outlaw Viking) and fielded the SH-60B (Outlaw Seahawk).

n. (U) Conducted Radiant Outlaw feasibility study (LADAR for target identification and location).

o. (U) Provided fleet system engineering to validate specific sensor-to-shooter targeting delivery paths within OTH-T architecture.

p. (U) Conducted certification testing of OTH-T systems at reconfigurable land-based test site in accordance with OPNAVINST 9410.5.

2. (U) FY 1993 PROGRAM:

a. (U) Complete installation of Incremental Fleet Release i.0.4 and ISAR workstations at designated ASWOCs.

b. (U) Capture and integrate Data Server System updates, ASW Tactical Decision Aids, JOTS updates, and GOTSS updates into i.0.4 software.

c. (U) Integrate acoustic and emitter data bases into data server software.

d. (U) Develop/integrate system management and database administration capabilities.

e. (U) Continue development of mission replay and PID software.

f. (U) Continue development/integration of Link 11 software.

g. (U) Complete system testing, documentation, training and installation at the first operational site for Incremental Fleet Release i.0.5 to add: Data Server updates, SATCOM and AUTODIN/LDMX interfaces, Mission Replay (P-3C), ATOS updates, PID software (P-3C), acoustic/emitter data bases, correlation software, and tactical decision aids (computer aided search).

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: ASW Operations Center (ASWOC)

h. (U) Achieve ADP security accreditation.
i. (U) Achieve AUTODIN Category III certification.
j. (U) Install an Operational Test Configuration and conduct DTIIA for the ASWOC C³ Modernization Objective I System (Software Release i.0.5) at the first operational site.

3. (U) FY 1994 PLANS:
a. (U) Complete OT&E(IIA) and achieve a Milestone IIIA decision.
b. (U) Install Objective I Systems (Software Release 1.0) at ASWOC sites.
c. (U) Capture and integrate Data Server System updates, ASW Tactical Decision Aids, JOTS updates, and GOTSS updates.
d. (U) Continue automation of message processing to support AUTODIN, air-to-ground, point-to-point and SATCOM connectivity.
e. (U) Develop/Integrate PID and Mission Replay software for aircraft systems.
f. (U) Complete integration of DTC-2-based Link 11 software module and obtain certification.
g. (U) Capture/integrate TADIXS B interface.
h. (U) Develop/integrate Tactical Environmental Support System (TESS) interface.
i. (U) Continue systems integration, testing, documentation of an Incremental Software Release 1.1.1 to incorporate: message processing automation upgrades, tactical decision aids (updates), TADIXS B interface, PID (ASQ-212 and S-3B), Generic Mission Replay, and integrated Link 11 capabilities.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXSYSENGACT, St. Inigoes, MD; NCCOSC RDTE DIV, San Diego, CA; NAVELEXSYSCENs, Charleston, SC and Vallejo, CA; NAVAIRWARCENACDIV, Warminster, PA; NCTSI, San Diego, CA. CONTRACTORS: Potomac Systems Engineering, Inc., Annandale, VA; Inter-National Research Institute, Arlington, VA; Booz-Allen Hamilton, Bethesda, MD; Digital Systems Corp., Walkersville, MD; MITECH Corp., Arlington, VA; Systems Technology & Applied Research Corp, Falls Church, VA; SAIC, Inc., McLean, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement #117-094-86	08/86	ASW Master Plan (Draft)	07/92
Computer Resources Life Cycle Management Plan (CRLCMP)	08/90	Program Change Approval Document (PCAD)	08/90
Decision Coordinating Paper (DCP)	10/90	ASWOC TEMP #911-2 (Draft)	05/92
Acquisition Plan (A/P) #90-15-1	06/91		

G. (U) RELATED ACTIVITIES:
PE 0603708N: ASW Signal Processor: The ASW Signal Processors aboard P-3 and S-3 type aircraft generate acoustic data tapes for analysis by the ASWOC Fast Time Analyzer System (FTAS).
PE 0604261N: S-3 Weapon System Improvement: ASWOC maintains interoperability with S-3 weapon systems and future improvements.
PE 0604219N: Airborne ASW Developments: ASWOC maintains support for new airborne ASW capabilities developed for P-3 and S-3 aircraft.
PE 0604221N: P-3 Modernization: ASWOC maintains interoperability with, and fully supports P-3 system changes and enhancements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0486 PROJECT TITLE: ASW Operations Center (ASWOC)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					-
OPN T4350/T4371/ T4380/T4776/T4777 (Subset Line 105)	18,441	30,241	1,880	CONT.	CONT.
OPN WH046/WH048/ WH049/WH050/WH830/WH776/WH777 (Line 66)	28,278	18,750	6,638	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

a. (U) FY 1993 Q4: Install an Operational Test Configuration and conduct DTIIA for the ASWOC C^3 Modernization Objective I System (Software Release 1.0) at the first operational site.

b. (U) FY 1994 Q1: Complete OT&E(IIA) and achieve a Milestone IIIA decision.

c. (U) FY 1996 Q4: Install an Operational Test Configuration for ASWOC C^3 Modernization Objective II (Software Release 1.1.2) at the first operational site and conduct DTIIB.

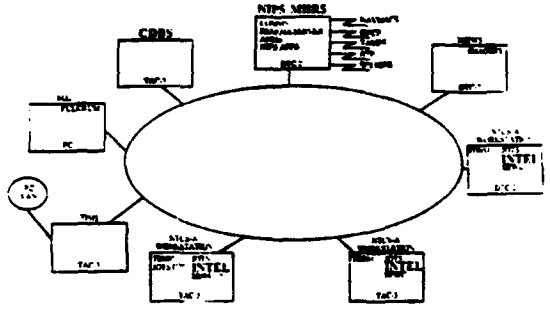
d. (U) FY 1997 Q1: Conduct OTIIB (OPEVAL) and achieve a Milestone IIIB decision.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0521 PROJECT TITLE: Shipboard Tactical Intelligence Processing (STIP)

NTCS-A 2.0 CONFIGURATION

(INTEL Perspective)



POPULAR NAME: STIP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS-IIIA 06/92	MS-IIIB 01/93		CONT.
ENGINEERING MILESTONES	SOFTWARE UPDATE	SOFTWARE UPDATE	SOFTWARE UPDATE	CONT.
T&E MILESTONES	DT-IIA OT-IIA	DT-IIB OT-IIB	DT-IIC OT-IIC	CONT.
CONTRACT MILESTONES	EXERCISE OPTION	AWARD NEW CONTRACT	EXERCISE OPTION	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	873	1,410	1,833	CONT.	CONT.
SUPPORT CONTRACT	0	312	0	CONT.	CONT.
IN HOUSE SUPPORT	1,108	559	2,727	CONT.	CONT.
GFE/ OTHER	95	86	256	CONT.	CONT.
TOTAL	2,076*	2,367*	4,816	CONT.	CONT.

* In FY92 and 93, STIP was originally funded in PE 0205670N, Tactical Intelligence Processing.

B. (U) DESCRIPTION: Shipboard Tactical Intelligence Processing System (STIP) is an integrated tactical intelligence shipboard processing system which is the central database for the Tactical Flag Command Center (TFCC), Space and Electronic Warfare Commander (SEWC) and tactical mission planning systems. Developing this integrated database server provides for data distribution (dynamic update of Naval Warfare Tactical Data Base (NWTDB) and Military Integrated Intelligence Data System/Intelligence Data Base (MIIDS/IDB)) and integration with digital map and imagery systems. STIP began interface development with the Joint Services Imagery Processing - Navy (JSIPS) in FY 1990.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued integration of Naval Intelligence Processing System (NIPS) and MIIDS/IDB files and extensions.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0521 PROJECT TITLE: Shipboard Tactical Intelligence Processing (STIP)

b. (U) Completed development of improved digital imagery/transmission capability for Fleet Imagery Support Terminal (FIST).

c. (U) Completed Initial Operational Test and Evaluation (IOT&E) of NIPS 1.0.

d. (U) Continued integration of NIPS functions into Navy Tactical Command System-Afloat (NTCS-A).

e. (U) Completed development of NIPS-DIWS (Digital Imagery Workstation) interface in support of JSIPS-N developments.

2. (U) FY 1993 PROGRAM:

a. (U) Complete integration cf NIPS Central Data Base Server/Advanced Message Handler (CDBS/AMH) into NTCS-A 2.0.

b. (U) Commence development of CDBS/AMH for NTCS-A 3.0.

c. (U) Commence development of database support for Tactical Decision Aids (TDAs) in the CDBS. Commence integration of mission planning requirements into the CDBS.

d. (U) Commence NIPS/DIWS integration and test.

e. (U) Complete development of improved digital imagery/transmission capabilities to FIST.

3. (U) FY 1994 PLANS:

a. (U) Complete development of CDBS/AMH for NTCS-A 3.0.

b. (U) Complete NIPS/DIWS integration and test.

c. (U) Commence development of real time updates to CDBS/AMH.

d. (U) Commence integration of Compartmented Mode Workstation functionality into NIPS/NTCS-A.

e. (U) Commence integration of CD ROM/scanner multimedia devices into NTCS-A.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXACT, St. Inigoes, MD; NAVELEXSYSENGACT DET, Philadelphia PA.; OPTEVFOR, Norfolk, VA. CONTRACTORS: Planning Research Corp,. McLean, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

NIPS TEMP	NOV 91
NIPS OR	JUN 89
FIST TEMP	JUL 86
FIST OR	APR 84

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0521 PROJECT TITLE: Shipboard Tactical Intelligence Processing (STIP)

G. (U) RELATED ACTIVITIES: PE 0604231N, Tactical Command System, Navy Tactical Command Systems-Afloat. STIP is the central database server for NTCS-A.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994* ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE #77	16,217	7,506	0	CONT.	CONT.

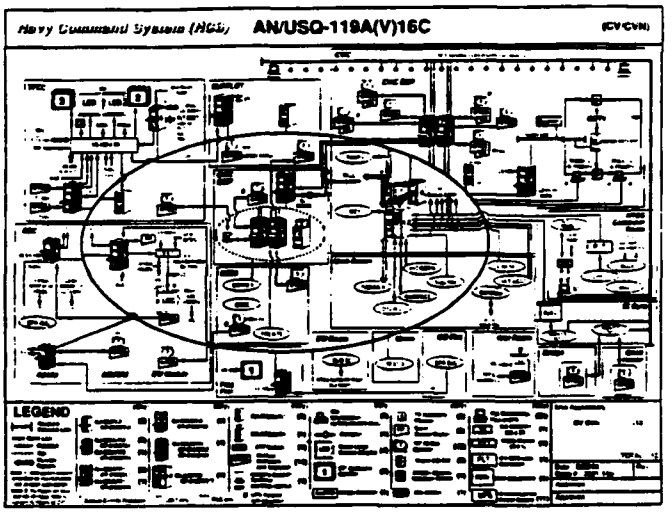
* Beginning in FY94, NIPS OPN funds are reprogrammed to OPN Line #84 (NTCS-A).

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: NTCS-A/NIPS OT will be conducted each year, FY92-FY95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: NCCS (TFCC)



POPULAR NAME: NTCS-A

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS-IIIC 05/93	MS-IIID 09/94	CONT.
ENGINEERING MILESTONES	SOFTWARE UPDATE	SOFTWARE UPDATE	SOFTWARE UPDATE	CONT.
T&E MILESTONES	DT-IIC OT-IIC	DT-IIC1 OT-IIC1	DT-IID OT-IID	CONT.
CONTRACT MILESTONES	EXERCISE OPTION	AWARD NEW CONTRACT	EXERCISE OPTION	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	14,177	5,591	5,761	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	1,844	968	1,677	CONT.	CONT.
GFE/ OTHER	544	307	254	CONT.	CONT.
TOTAL	16,565	6,866	7,692	CONT.	CONT.

B. (U) DESCRIPTION: The Navy Tactical Command System - Afloat (NTCS-A) program consolidates the formerly identified Tactical Flag Comand Center (TFCC), Afloat Correlation System (ACS), Electronic Warfare Coordination Module (EWCM), Joint Operational Tactical System (JOTS), Prototype Ocean Surveillance Terminal (POST) and Naval Intelligence Processing System (NIPS) programs and provides a tactical command, control, communications, computers and intelligence (C4I) system to U.S. Navy Ships. This system provides the Tactical Command Center (TCC) pillar of the Copernicus Architecture to Numbered Fleet Commanders (NFC), Officers in Tactical Command (OTC), Composite Warfare Commanders (CWC), Subordinate Warfare Commanders (SWC), Commander Amphibious Task Force (CATF), Commander Landing Force (CLF), and Commanding Officers/Tactical Action Officers (CO/TAO). It also integrates joint service command and control projects as they apply to Navy afloat requirements. Efforts include design, integration, and test of Tactical Decision Aids (TDAs) and Tactical Intelligence Analytical Aids, in a multi-level secure mode, to provide the Battle Group/Force Commanders with warfighting Command and Control capabilities.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0709

BUDGET ACTIVITY: 5
PROJECT TITLE: NCCS (TFCC)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated development and integration testing of the correlator-tracker upgrades for insertion into the unitary software baseline.

b. (U) Initiated developmental testing of the all source SCI/GENSER security network and developmental integration and testing of the FY 1993 unitary software release.

c. (U) Continued design, development, integration, and testing of additional TDAs for counter-targeting/counter surveillance, communications countermeasures, tactical intelligence analytical tools and collection management.

d. (U) Continued development and test of upgrades to the Advanced Correlator-Tracker.

e. (U) Continued integration and test of Command, Control, Communications and Intelligence (C3I) TDAs into the software baseline.

f. (U) Continued developmental and operational testing of the annual unitary software release.

g. (U) Continued integration and test of emergent fleet C3I TDA's.

h. (U) Completed transition of POST into the NTCS-A baseline.

i. (U) Initiated integration of US Air Force Software Modules for processing Air Tasking Orders and to display target locations on US Navy workstations at sea, for the Joint Navy Interoperability with the USAF.

j. (U) Initiated development of Battle Group Passive Horizon Extension System (BGPHES) (XN-2) prototype.

k. (U) Initiated fabrication of initial Common High Bandwidth Data Link Surface Terminal (CHBDL-ST) system. Initiate efforts to establish a land based test site.

l. (U) Initiated integration of US Marine Corps/Navy Joint Interoperability Requirements to include interfaces with Position, Location and Reporting System (PLRS) and Intelligence Analysis System (IAS).

2. (U) FY 1993 PROGRAM:

a. (U) Continue to support the tenets of the Copernicus Architecture by fully developing and implementing the open systems architecture support as initiated by consolidation of Command and Control (C^2) and intelligence programs into NTCS-A.

b. (U) Continue integration of USAF Software Modules for processing Air Tasking Orders and to display target locations on US Navy workstations at sea, for the Joint Navy Interoperability with the USAF.

c. (U) Continue integration of USMC/Navy Joint Interoperability Requirements to include interfaces with PLRS and IAS.

d. (U) Initiate and complete Operational Testing and deployment of the all source (SCI/GENSER) network. Initiate the incorporation of necessary aspects of multi-level security within the NTCS-A system.

e. (U) Initiate developmental integration and testing of the FY 1993 unitary software release.

f. (U) Initiate integration of NTCS-A onboard submarines.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE:NCCS (TFCC)

g. (U) Integrate functionalities of EWCM, Advanced Tactical Processor (ATP) and Strike Plot into the Space and Electronic Warfare Commander (SEWC) Module (a subordinate warfare commander). Continue the development and integration of organic Electronic Support Measures (ESM) capabilities and correlation in NTCS-A.

3. (U) FY 1994 PLANS:

a. (U) Continue to support the tenets of the Copernicus Architecture by fully developing and implementing the open systems architecture support as initiated by consolidation of C^2 programs into NTCS-A.

b. (U) Investigate the architecture necessary to support distributed world-wide data base access to all fleet users to support the 'Pull' tenet of the Copernicus Architecture.

c. (U) Complete development of downsized JOTS. Test downsized JOTS at sea and in the field.

d. (U) Developmental integration and testing of the FY 1994 unitary software release.

e. (U) Continue to develop C^4I TDAs and perform advanced integration and testing of those TDAs.

f. (U) Continue to integrate additional video source information into workstation. Complete the integration and test of single workstation with radar video and NTCS-A tactical pictures overlayed and merged.

g. (U) Initiate software development to incorporate multi-media (i.e., imagery, audio and cable grade video) capability into workstation.

h. (U) Initiate development of communications control software packages for effective communications control.

i. (U) Continue development of SEW and Cryptologic support and analysis tools for incorporation into the software release 5 and succeeding software releases.

j. (U) Continue integration of NTCS-A onboard submarines.

k. (U) Developmental and operational integration and testing of the FY 1994 unitary software release.

l. (U) Initiate the incorporation of necessary aspects of multi-level security within the NTCS-A system.

m. (U) Continue NTCS-A 3.0 development to include full SCI JOTS/NIPS. Merge functionality and video distribution capabilities of closed circuit TV (CCTV) into NTCS-A. Test NTCS-A 3.0 at sea and complete the integration of CCTV into NTCS-A.

n. (U) Absorb functionality of Cryptologic Combat Support Console (CCSC).

o. (U) Initiate integration of Extended Position Location Reporting System (XPLRS) into NTCS-A 3.0.

p. (U) Initiate integration of all digital imagery products such as TAMPS, PIES, PIXS, MDS, and VIEWS into an Imagery LAN based on NTCS-A VIEWS architecture.

q. (U) Initiate development of advanced tactical decision aids in Anti-Air Warfare (AAW).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE:NCCS (TFCC)

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, D.C.; NAVAIRWARCENACDIV, Warminster, PA; OPTEVFOR, Norfolk, VA. CONTRACTORS: INRI, YORKTOWN, VA; SAIC, VIENNA, VA; TIBURON SYSTEMS, SAN JOSE, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:-

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

NTCS-A Acquisition Plan	07/92
NPDM	04/91
TFCC TEMP	11/92
JOTS TEMP	08/89

G. (U) RELATED ACTIVITIES: PE 0604231N, Tactical Command System, Shipboard Tactical Intelligence Processing (STIP) allows access to the centralized intelligence database file.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE #84	38,139	44,932	33,787	CONT.	CONT.

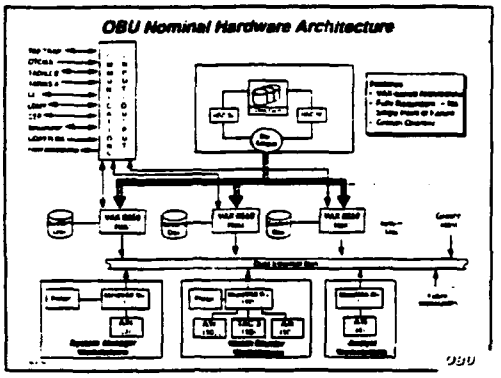
I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Yearly OT&E as necessary to support the Evolutionary Acquisition strategy.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2009

BUDGET ACTIVITY: 5
PROJECT TITLE: OBU/OSG



POPULAR NAME: OSIS BASELINE UPGRADE (OBU)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		ARB NPDM	NPDM	CONT.	
ENGINEERING MILESTONES	SDR	SDR	SDR	CONT.	
T&E MILESTONES	DT-IIC OT-IIC		DT-IID OT-IID OT-IIC(1)	CONT.	
CONTRACT MILESTONES	PHASE II COMPLETED PHASE III COMMENCED			CONT.	
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	PROGRAM TOTAL
MAJOR	540	855	767	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	1,675	1,691	1,272	CONT.	CONT.
GFE/ OTHER	150	150	150	CONT.	CONT.
TOTAL	2,365	2,696	2,189	CONT.	CONT.

B. (U) DESCRIPTION: The Ocean Surveillance Information System (OSIS) Baseline Upgrade (OBU) development is a subsystem of the Navy Command and Control System (NCCS) Ashore. OBU provides for the analysis of intelligence information from multiple sources to produce a comprehensive report of foreign forces and potential hostile activity. OSIS provides positional data and operational intelligence to commanders at all levels. It consists of two Joint Intelligence Centers, two Fleet Ocean Surveillance Information Facilities (FOSIFs), a software support activity, and a training site. OBU functions encompass establishing and maintaining technical characteristics and performance data on hostile weapons platforms systems, collecting non-organic data from ashore and afloat sensors, developing an all-source tactical picture, and analyzing intelligence information. The data derived from this process is disseminated as an Operational Intelligence (OPINTEL) product to the operating forces for tactical threat warnings, decision making support, and support of Over-the-Horizon-Targeting.

(U) OBU uses the Joint Logistics Commander's Guidance of March 1987 on Evolutionary Acquisition as the strategy for future software development which includes a plan for incremental achievement of desired capability building on the core system provided by OBU Phases I and II. The OBU Phase III EA strategy will provide a mechanism for adding future capabilities including the incorporation of proven fleet initiated prototypes.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2009 PROJECT TITLE: OBU/OSG

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted DT-IIC.

b. (U) Conducted OPEVAL OT-IIC.

c. (U) Began workstation upgrade.

d. (U) Continued evaluation of prototype functional enhancements.

e. (U) Completed Phase II.

f. (U) Commenced Phase III software development.

2. (U) FY 1993 PROGRAM:

a. (U) Begin to develop prototype and update baseline.

b. (U) Continue evaluation of prototype functional enhancements.

c. (U) Deploy graphics workstation and alphanumeric workstation upgrade prototypes.

d. (U) Begin development of security architecture for target DODIIS compliant (open) systems.

e. (U) Continue Phase III software development.

3. (U) FY 1994 PLANS:

a. (U) Address OT-IIC discrepancies.

b. (U) Conduct OT-IIC Relook.

c. (U) Conduct DT-IID.

d. (U) Conduct OT-IID.

e. (U) Continue to develop prototype and update baseline.

f. (U) Continue evaluation of prototype functional enhancements.

g. (U) Complete workstation upgrade.

h. (U) Continue Phase III software development.

i. (U) Commence transition to file server architecture.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2009 PROJECT TITLE: OBU/OSG

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Specific Operational Requirements	SEP 70
OBU Navy Decision Coodinating Paper	MAY 87
OSIS Decision Coordinating Paper	JAN 90
OBU ACQUISITION PLAN	JAN 90
OBU TEMP 240-5	NOV 92

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN BA2 Correlation Upgrade	2,680	796	350	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: U.S. Navy has entered into agreements with the Japan Maritime Self Defense Force, the Royal Navy in the United Kingdom, and the Royal Australian Navy in Australia for delivery of OBU under Foreign Military Sales (FMS) provisions.

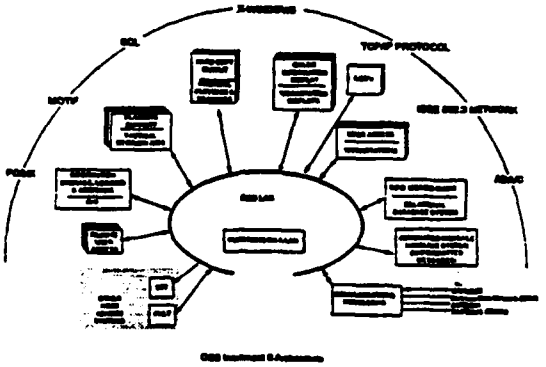
J. (U) TEST AND EVALUATION:

FY 92	DT-IIC	MAJOR UPGRADES	05/92
	OT-IIC	MAJOR UPGRADES	06/92
FY 94	DT-IID	MAJOR UPGRADES	05/94
	OT-IID	MAJOR UPGRADES	06/94
	OT-IIC(1)	Corrections to OT-IIC deficiencies	11/93

*Each major upgrade/enhancement will undergo formal testing by OPTEVFOR.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)



POPULAR NAME: Operations Support System (OSS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		ASNPR 6/93 INCII, III		CONT.	
ENGINEERING MILESTONES	INC II PDR INCR I IOC	INC II/III PDR/CDR	INCII/III PDR/CDR	CONT.	
T&E MILESTONES	DT-II 1B & 2B OT-IIA			CONT.	
CONTRACT MILESTONES		INCR II/III CONTRACT AWARDS		CONT.	
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5,802	6,122	7,990	CONT.	CONT.
SUPPORT CONTRACT	0	150	150	CONT.	CONT.
IN-HOUSE SUPPORT	1,980	2,146	3,275	CONT.	CONT.
GFE/ OTHER	100	0	0	CONT.	CONT.
TOTAL	7,882*	8,418	11,415	CONT.	CONT.

*$600K was provided from $7,882 allocated to this project in accordance with Congressional language for OTH-T efforts.

B. (U) DESCRIPTION: The Chief of Naval Operations (CNO), Fleet Commanders in Chief (CINCs) and Unified Commanders (USCINCLANT and USCINCPAC) require a single, integrated command and control system at the Navy Command Center (NCC), Fleet Command Centers (FCC), and the Unified Command Centers, respectively, to receive, process, display and assess the readiness and disposition of own, neutral, and potentially hostile forces. The OSS Program uses the Joint Logistics Commanders Guidance of March 1987 on Evolutionary Acquisition (EA) as the strategy for development. The EA concept includes a plan for incremental achievement of desired capability, early fielding of initial incremental operational capability and continual feedback from the users. OSS Increment I integrates existing prototype command center support systems on a Local Area Network (LAN) and provides a baseline capability to designated OSS sites. Increment II will develop an integrated, logistically supportable, and cost effective single system, which includes Ocean Surveillance Information System (OSIS) Baseline Upgrade (OBU) interface, Navy Worldwide Military Command and Control System (WWMCCS) Software Standardization (NWSS) replacement status of forces data (Status of Readiness and Training System (SORTS), Casualty Reporting (CASREP),

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

Movement Reporting (MOVREP), and Employment Scheduling (EMPSKD)) current system functionality improvement, and latest state-of-the art Commercial Off The Shelf (COTS) technologies to local as well as remote users. Increment III will transition Shore Targeting Terminal (STT) and Force High Level Terminal (FHLT) functionality to OSS and will incorporate Employment Scheduling System (ESS) and Information Presentation and Distribution System (IPDS) capabilities. Intra and inter-service Command, Control, Communication and Computer integration will be established and achieved through the implementation of OSS at six NCC sites and two Unified Commands.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued Increment II Full Scale Engineering Development of Copernicus architecture.
b. (U) Designed, developed, tested and integrated software for workstation database, communications, and decision aid functions.
c. (U) Designed, developed and tested remote user access and NWSS common routines such as Route Generation and Land Mass avoidance.
d. (U) Conducted Developmental Test and Evaluation, and Navy Interoperability testing for Increment I. Prepared for Assistant Secretary of the Navy (ASN) Program Review.
e. (U) Continue design and development of Casualty Reporting (CASREP) message processing.
f. (U) Developed, tested, integrated and implemented tactical module (JOTS Unification) Ashore Command Center System (ACCS) Baseline under X Windows.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct OTH-T interoperability testing and operational test (OT-IIA) on Increment I baseline.
b. (U) Continue to prepare for ASN Program Review for Increment II and III.
c. (U) Implement CASREP, consolidated history at CNO, remote user access and NWSS common routines.
d. (U) Begin Limited Acquisition phase for Increment II - continue system engineering efforts to perform system definition, design and implementation. Coordinate with other program managers on Increment III designs.
e. (U) Conduct analysis on state-of-the art multi-level security (MLS) COTS packages. Conduct developmental testing on 93-1 software release. Develop trusted code for Incoming Message logger and Outgoing Message logger.
f. (U) Design, develop, test, integrate and conduct Preliminary Design Review (PDR) on Employment Scheduling (EPSKD), Movement report (MOVREP) positional processing, tactical module, decision aid functions.
g. (U) Conduct Interoperability test with new release of tactical module, Unified Build (UB) for ACCS and design, develop and integrate upgrades.
h. (U) Design, develop, integrate selected existing decision aid functions into OSS, route generation, land mass avoidance, closest point of approach, and estimated position.
i. (U) Commence upgrading equipment at OSS sites to next generation capability (i.e. TAC3 Workstation).
j. (U) Continue evolving OSS into Copernicus architecture.
k. (U) Execute Cooperative Development MOA with SACLANT.

3. (U) FY 1994 PLANS:

a. (U) Conduct Critical Design Reviews (CDRs) on remaining Increment II components, including MOVREP, position report, and Status of Readiness and Training (SORTS) message processing. Conduct PDRs/CDRs on FHLT, STT, ESS, and other Increment III components.
b. (U) Complete design documents and implementation plans for completing the transition of NWSS to OSS.

FY 1994 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command System (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

c. (U) Perform system engineering and analysis to upgrade the OSS LAN to a Government Open Systems Interconnect Profile (GOSIP) compliant architecture in conjunction with IPDS. Implement final OSS-JOPES interface.

d. (U) Develop, test and field Release 94-1 containing MOVREP, position report and SORTS message processing, NCCS Ashore/OSS node communications, priority NCRs from previous releases. Develop, test and field incremental FHLT, STT, and ESS capabilities at OSS Sites as appropriate.

e. (U) Integrate Tactical Decision Aids (TDAs) and Artificial Intelligence applications developed through other programs.

f. (U) Begin design for complete OSS site inter-connectivity for Diagnostic and other Data exchange.

g. (U) Continue integrating TAC-3 products and state of the art large screen displays, video switches and briefing technology into the OSS architecture.

h. (U) Continue evolution of OSS into Copernicus architecture.

i. (U) Conduct Navy and Joint Interoperability Certification Tests.

j. (U) Explore requirements for expanding the scope of OSS to include additional Joint, Allied (NATO and other), Foreign (through FMS cases) and Navy users. Execute Cooperative Development MOA with SACLANT.

k. (U) Develop and Upgrade joint requirements in support of the Command Center Improvement Program (CCIP).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Science Applications International Corp (SAIC), McLean, VA

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
OSS Operational Requirement 12/87 OSS Acquisition Plan 8/92
OSS Computer Resources Life Cycle Management Plan (CRLCMP) 11/92
OSS Decision Coordinating Paper 9/89 OSS TEMP 12/92
OSS Operational Logistic Support Summary (OLSS) 6/92

G. (U) RELATED ACTIVITIES: PE 0303152N: WWMCCS ADP Modernization (WAM)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN 105	8,194	5,392	9,605	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: OT-IIB is planned for FY 95 on OSS Increment II (NWSS transition to OSS). OT-IIB is planned for FY 97 to verify completion of Increment III (FHLT, ESS, STT integration). OT-IID is planned for FY 99 to verify completion of Increment IV.
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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/FX
PROJECT NUMBER: D2129 PROJECT TITLE: A/FX Development

PICTURE NOT AVAILABLE

POPULAR NAME: A/FX

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands) Note: The A/FX funding profile continues to reflect notional schedule and cost estimates.

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		DAB Prog. Rev. 5/93	MS-I 5/94	CONT.
ENGINEERING MILESTONES				CONT.
T & E MILESTONES				CONT.
CONTRACT MILESTONES	CE&D 12/91	CE&D EXT. 12/92	D&V 6/94	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT		52,961	377,379	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT		42,039	21,839	CONT.	CONT.
GFE/ OTHER		60,884			
Total	0	155,884	399,218	CONT.	CONT.

B. (U) DESCRIPTION: This program, in concert with F/A-18E/F, will fulfill present-day A-6, F-14 and F/A-18C/D missions. A/FX will meet this objective by introducing a common Navy/Air Force aircraft with superior range, survivability and other characteristics to counter the threat for year 2007 and beyond. Moreover, as a joint program, A/FX is slated to replace the Air Force F-117's, F-15E's and F-111's. The primary missions of the multi-mission aircraft will be Strike Warfare, Anti-Surface Warfare and Anti-Air Warfare. The aircraft will be capable of locating, identifying and destroying heavily defended targets in all weather conditions, using conventional and nuclear weapons in an environment of multi-layered surface and airborne defensive systems. This aircraft will operate from aircraft carriers and land bases, day and night. The A/FX aircraft will make maximum possible use of common avionics specifications addressed by Joint Integrated Avionics Working Group (JIAWG). The A/FX will carry a family of joint weapons currently in development, including JSOW/JDAM, TSSAM, and AIM-9X.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (The following were executed with FY 1991 funds in FY 1992):

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/FX
PROJECT NUMBER: D2129 PROJECT TITLE: A/FX Development

a. (U) Awarded 5 Concept Exploration and Definition (CE&D) contracts for approximately $20 million each in December 1991.

b. (U) Finalized Memorandum of Understanding with Air Force for Air Force participation in A/FX Program.

c. (U) Participated in JIAWG efforts.

d. (U) Began preparation of Demonstration and Validation (D&V) solicitation.

e. (U) Conducted Cost and Operational Effectiveness Analysis (COEA) for A/FX.

f. (U) Began government evaluation of CE&D trade studies.

g. (U) Began preparation of common US Navy/Air Force (USN/USAF) Operational Requirement Document (ORD).

h. (U) Began preparation for Defense Acquisition Board (DAB) Program Review.

2. (U) FY 1993 PROGRAM:

a. (U) Continue CE&D efforts.

b. (U) Participate in JIAWG development.

c. (U) Complete common USN/USAF ORD.

d. (U) Participate in DAB Program Review.

e. (U) Release D&V solicitation.

f. (U) Continue COEA to support MS-I.

g. (U) Prepare for designation as a Joint Program pending USAF statement of its acquisition plans at MS-I and subsequent DAB direction.

h. (U) Prepare for a DAB MS-I review.

3. (U) FY 1994 PLANS:

a. (U) Conduct source selection.

b. (U) Participate in DAB MS-I.

c. (U) Award and manage D&V contracts. Two competitive D&V prototype contracts are planned.

(1) (U) Prepare for initial Systems Requirement Reviews.

(2) (U) Begin demonstration and validation of the design concepts and technology to be incorporated in the designs.

(3) (U) Begin risk reduction activities in manufacturing, materials, propulsion, and avionics.

d. (U) Perform government evaluation of D&V efforts.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N
PROGRAM ELEMENT TITLE: A/FX
BUDGET ACTIVITY: 4
PROJECT NUMBER: D2129
PROJECT TITLE: A/FX Development

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD, Warminster, PA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVAVNDEPOT, Jacksonville, FL; AEDC, Tullahoma, TN. CONTRACTOR: FOR CE&D: Rockwell International Corp, Los Angeles, CA; McDonnell Douglas Corp, St. Louis, MO; Lockheed Corp, Marietta, GA; Grumman Aerospace Corp, Bethpage, NY; and General Dynamics, Ft. Worth, TX. FOR D&V: Will be determined at MS-I.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: DAB Program Review changed from 9/92 to 5/93. Milestone I changed from 5/93 to 5/94. By and large, the slips were the result of a mandated change in acquisition strategy and the change of administration.

F. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TOR 6/91
MNS 6/91
ADM 7/91
JORD 11/92

G. (U) RELATED ACTIVITIES: In compliance with Congressional direction, JIAWG efforts are supported by PE 0604239F, Advanced Tactical Fighter; PE 0604223A, Light Armed Scout Helicopter, and the A/FX program. PE 0604242F, Advanced Strike/Interdiction (A/FX) supports USAF unique requirements for the A/FX program. There is no unnecessary duplication of effort.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Test and Evaluation Master Plan not established until MS-I.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0602	ECHO	14,355	18,581	18,672	CONT.	CONT.
W0672	ENEWS	6,422	10,457	11,185	CONT.	CONT.
	TOTAL	20,777	29,038	29,857	CONT.	CONT.

* W0602 and W0672 were previously funded under PE 0604255N.

B. (U) DESCRIPTION: This program consolidates the design, fabrication and integration of naval threat radar simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic Developmental and Operational Test and Evaluation (DT&E/OT&E) environments to test Tri-Services Electronic Warfare (EW) systems and defensive tactics. These projects develop former Soviet and Free-World Anti-Air and Anti-Ship weapon systems simulators in accordance with the Services requirements and General Accounting Office and Congressional recommendations.

(U) The W0602 Project, EW Environment Simulation (ECHO) provides airborne system component level Test and Evaluation (T&E) at the Electronic Combat Simulation and Evaluation Laboratory (ECSEL), Naval Air Warfare Center - Weapons Division (NAVAIRWARCENWPNDIV), Pt. Mugu, CA. ECHO also provides a secure anechoic closed loop T&E facility for fully integrated, aircraft installed systems testing at the EW Integrated Systems Test Laboratory (EWISTL) at the Naval Air Warfare Center - Aircraft Division (NAVAIRWARCENACDIV), Patuxent River, MD. Included in this project is the T&E of airborne systems and tactics in flight, against the open air range at the Electronic Combat Range (ECR) complex located at the Naval Air Warfare Center - Weapons Division (NAVAIRWARCENWPNDIV), China Lake, CA.

(U) The W0672 Project, Effectiveness of Navy EW Systems (ENEWS), is a Department of the Navy (DON) unique project that supports testing of Ship Self Defense efforts which have received high visibility and support during Congressional review of the budget. ENEWS provides T&E of surface and subsurface shipboard systems and tactics in digitally modeled battle scenarios at the component, fully integrated single ship, multi-ship and full-up multi-platform battle group levels. ENEWS also provides a secure anechoic closed loop T&E facility specifically designed to test shipboard systems at the stand alone component or fully integrated systems level. Included in this project are flyable Infrared and Radio Frequency simulators flown on a specially configured EP-3B aircraft to provide at sea open air T&E of systems and tactics. All ENEWS assets are developed and maintained by the Naval Research Laboratory (NRL), Washington, D.C.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0602 PROJECT TITLE: EW Environment Simulation (ECHO)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0602	ECHO	14,355	18,581	18,672	CONT.	CONT.

B. (U) DESCRIPTION: The objective of this project is development of necessary simulation facilities and approaches to allow determination of the effectiveness of Electronic Warfare (EW) in real world engagement situations and to support the introduction of modern, effective systems into Naval Aviation. The heavy use of test resources by all Services demonstrates the importance of these assets. The Navy has been very successful in executing all of its major programs, and to date have had no major technical problems.

(U) The ECHO project is unique in that it is the only program within the Department of Defense (DoD) which develops and provides Naval threat assets for Testing and Evaluation (T&E) and is a critical part of the Office of the Secretary of Defense (OSD) Test Resource Master Plan. The OSD Master Plan employs many ECHO project resources for planning, analysis, testing and verification of airborne EW equipment.

(U) This project directly supports the T&E requirements for the following programs as identified in the FY93 DoD EW Master Plan: High Speed Anti Radiation Missile, ALR-67/Advanced Special Receiver (ASR), ALQ-126B, ALQ-162, EA-6B ADVCAP, Integrated Defensive Avionics Program (IDAP), Advanced Airborne Expendable Decoy (AAED), Integrated Naval EW System (INEWS), AVR-2, ARR-47, as well as other Tri-Service EW systems with initial operational capability dates in the 1990's.

(U) This project also provides for the development of an Integrated Air Defense T&E capability to be fielded at each of the three sites comprising the Navy's Tri-Center complex: Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), China Lake and Pt. Mugu in CA, and the Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV), Patuxent River, MD.

(U) T&E resource requirements are coordinated through the OSD CROSSBOW-S committee to avoid duplication of effort among the services. The Navy Tri-Center approach to T&E resource development ensures project efficiency by cost reductions achievable through common development efforts which provide consistent, repeatable test results between test Centers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Continued OSD directed threat simulator validation program.
   b. (U) Continued EW simulation systems engineering investigation.
   c. (U) Continued antenna modification to the Simulator.
   d. (U) Continued development of the Generic Acquisition Radar (GAR).
   e. (U) Continued development of the laboratory EW/Acquisition radar simulations.
   f. (U) Terminated development of the Communications Environment Simulator (CES).

2. (U) FY 1993 PROGRAM:
   a. (U) Continue OSD directed threat simulator validation program.
   b. (U) Continue EW simulation systems engineering investigation.
   c. (U) Continue antenna modification to the Simulator.
   d. (U) Complete development of the GAR.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0602 PROJECT TITLE: EW Environment Simulation (ECHO)

e. (U) Continue development of the laboratory EW/Acquisition radar simulations.
f. (U) Commence development of the CES.
g. (U) Initiate development of the Expanded Threat Environment Simulator.
h. (U) Initiate development of the J-Band Advanced Technology Simulator (JBATS).
i. (U) Initiate development of the Electronic Surveillance Measures and Electronic Countermeasures (ESM/ECM) simulation.
j. (U) Initiate development of the Infrared (IR) Seeker simulation.

3. (U) FY 1994 PLANS:
a. (U) Continue OSD directed threat simulator validation program.
b. (U) Continue EW simulation systems engineering investigation.
c. (U) Complete antenna modification to the Simulator.
d. (U) Complete development of the laboratory EW/Acquisition radar simulations.
e. (U) Continue development of the CES.
f. (U) Continue development of the Expanded Threat Environment Simulator.
g. (U) Continue development of the JBATS.
h. (U) Complete development of the ESM/ECM simulation.
i. (U) Complete development of the IR Seeker simulation.
j. (U) Initiate Laser Tracking System development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

I (U) WORK PERFORMED BY: IN-HOUSE: Electronic Combat Range (ECR) at NAVAIRWARCENWPNDIV, China Lake, CA; the Electronic Combat Simulation and Evaluation Laboratory (ECSEL) at NAVAIRWARCENWPNDIV, Pt. Mugu, CA; and the Electronic Warfare Integrated Systems Test Laboratory (EWISTL) at NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTOR: Not applicable.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Successful execution of the OSD Resource Enhancement Program Expedient project has provided the core module technology expected to be developed through the simulator development. As a result, the J-7 , and Transmitter/Antenna simulator development has been combined and redesignated JBATS. The JBATS will perform other simulations in addition to the J-7 at a cost greatly reduced from the original J-7 estimate.

2. (U) Schedule changes: The EW/Acquisition Radar simulation program now includes fielding a common system at the third Tri-Center site (NAVAIRWARCENACDIV, Patuxent River, MD) and will conclude in FY 1994 instead of FY 1993.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD 306-091; 24 Jul 1992

G. (U) RELATED ACTIVITIES: Navy efforts under this project are coordinated with other service requirements through the OSD Joint Executive Committee on Air Defense Threat Simulators (EXCOM), the OSD CROSSBOW-S Committee and the Joint Coordination Group for Electronic Warfare/Joint Coordination Group for Test and Evaluation (JCGEW/JCGT&E).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0602 PROJECT TITLE: EW Environment Simulation (ECHO)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0672 PROJECT TITLE: Effectiveness of Navy EW Systems (ENEWS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0672	ENEWS	6,422	10,457	11,185	CONT.	CONT.

B. (U) DESCRIPTION: The objective of the Effectiveness of Navy EW Systems (ENEWS) project is the development and application of necessary simulation assets to determine the effectiveness of Electronic Warfare (EW) in real-world engagement situations and primarily supports the introduction of modern, effective shipboard EW systems, and tactics for the surface Navy. The heavy use of ENEWS resources by NAVSEA and other developers speaks to the overall importance of these assets. The project provides support for EW system design, Development Test (DT), Operational Test (OT), and the development of tactics. Its quick reaction capabilities have had great impact on crisis situations such as the Falklands conflict, the Iran Harpoon threat, the Persian Gulf crisis, and Operation Desert Shield/Storm.

(U) The primary threat to surface ships is Anti-Ship Missile (ASM) systems. The ENEWS project is unique in that it is the only project within the Department of Defense (DoD) dedicated to developing and providing assets to Test and Evaluate (T&E) the effectiveness of shipboard EW systems and tactics against ASM's.

(U) The ENEWS project is a critical part of the Office of the Secretary of Defense (OSD) Test Resource Master Plan. This plan employs many of the ENEWS assets for planning, analysis, testing and verification of shipboard EW systems and tactics. During FY 1993 and FY 1994 ENEWS is projected to provide T&E support for Combat Systems at Sea Qualification Testing (CSSQT) for CG-66, CG-67, CG-68, DDG-52 and CV ships. DT and OT support will be provided for the SLQ-32 (V)3 Upgrade, SLQ-32 PHASE improvements, SLQ-32 ADCAP upgrade, SLQ-32 (V)4/(V)5, SIDEKICK, RAIDS, OUTLAW BANDIT systems, MATES, and other Ship Self-Defense initiatives including RDT&E 6.3A Advanced Technology Demonstrations.

(U) Computer simulation and modeling, hardware in the loop (HITL) test facilities, and ASM simulators flown on a specially configured EP-3B aircraft are the major program assets. Resources are used in combination to measure EW system effectiveness in a cost efficient manner.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Continued systems readiness for T&E.
   b. (U) Continued upgrade of ENEWS reference library.
   c. (U) Continued digital modeling/scenario development.
   d. (U) Continued controller upgrade.
   e. (U) Continued Infrared High Resolution Camera.
   f. (U) Continued .

2. (U) FY 1993 PROGRAM:
   a. (U) Continue systems readiness for T&E.
   b. (U) Continue upgrade of ENEWS reference library.
   c. (U) Continue digital modeling/scenario development.
   d. (U) Continue controller upgrade.
   e. (U) Complete Infrared High Resolution Camera.
   f. (U) Complete .
   g. (U) Commence ALQ-170 Variants simulator.
   h. (U) Commence ALQ-170 simulator.
   i. (U) Complete ALQ-170 simulator.
   j. (U) Initiate Low Probability or Intercept (RF) Seeker.
   k. (U) Initiate instrumentation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0672 PROJECT TITLE: Effectiveness of Navy EW Systems (ENEWS)

l. (U) Initiate simulator.
m (U) Initiate H-pod simulator.
n. (U) Initiate simulator.
o. (U) Initiate simulator.
p. (U) Initiate simulator.

3. (U) FY 1994 PLANS:
a. (U) Continue systems readiness for T&E.
b. (U) Continue upgrade of ENEWS reference library.
c. (U) Continue digital modeling/scenario development.
d. (U) Continue controller upgrade.
e. (U) Continue ALQ-170 Variants simulator.
f. (U) Complete ALQ-170 simulator.
g. (U) Continue Low Probability of Intercept (RF) Seeker.
h. (U) Complete instrumentation.
i. (U) Continue simulator.
j. (U) Continue H-pod simulator.
k. (U) Continue simulator.
l. (U) Continue simulator.
m (U) Continue simulator.
n. (U) Commence ALQ-170 simulator.
o. (U) Commence ALQ-170 simulator.
p. (U) Initiate simulator validation.
q. (U) Initiate ALQ-170 simulator.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC. CONTRACTOR: Not applicable.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: The completion date of the ALQ-170 Variants simulator has been extended in order to encompass all known RF variants. was combined with the project and received a modified seeker design which includes the . It has been redesignated .

2. (U) Schedule changes: Accelerated the ALQ-170 simulator due to shift in priorities. This shift will delay the completion of the ALQ-170 simulator, and the simulator. Other schedules have been accelerated/delayed based on the technology changes previously noted and priority shifts.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: NAPDD 307-091; 24 Jul 1992

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604256N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Threat Simulator Development
PROJECT NUMBER: W0672 PROJECT TITLE: Effectiveness of Navy EW Systems (ENEWS)

J. (U) MILESTONE SCHEDULE:

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N Budget Activity: 6
PROGRAM ELEMENT TITLE: Target Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A0609	AERIAL TARGET SYSTEMS DEVELOPMENT	5,821	15,699	15,319	CONT.	CONT.
A0610	WEAPON SYSTEM T&E TRAINING DEV/PRC	12,221	14,007	14,428	CONT.	CONT.
A0611	SUPERSONIC SEA SKIMMING TARGET (SSST)	*2,600	6,176	6,103	0	270,993
S0612	SURFACE TARGET DEVELOPMENT	1,563	1,733	1,624	CONT.	CONT.
	TOTAL	22,205	37,615	37,474	CONT.	CONT.

B. (U) DESCRIPTION: This program funds the development and procurement of aerial and surface targets associated with the Target Augmentation and Auxiliary Systems (TA/AS) necessary to duplicate or simulate threat characteristics in support of weapons systems test and evaluation and fleet training. Included within this program element are joint QF-4 development; BQM product improvement upgrade renamed Subsonic Aerial Target; upgrade of MQM-8G Extended Range (ER) maneuver and various TA/AS development (Project A0609); procurement of QF-4N, a TA/AS for Navy Weapons Systems Test and Evaluation (Project A0610); development of the Supersonic Sea Skimming Target (Project A0611); and continued development of surface towed targets, improved target control system and an anti-radiation missile target (Project S0612).

* Reflects Supersonic Low Altitude Target Program

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: A0609 PROJECT TITLE: Aerial Target Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A0609	AERIAL TGT SYS DEV	5,821	15,699	15,319	CONT.	CONT.

B. (U) DESCRIPTION: Aerial Target Systems and associated Target Augmentation Systems (TAS) and auxiliary systems are developed in response to the need to test and provide training for anti-air-warfare and anti-surface warfare systems required to defend fleet surface and air units in a hostile environment. The threat envelope covered extends from the surface to 100K feet for speeds from the low subsonic range to MACH 4.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued TAS kit integration into the Navy Standard Tow Target System (NSTTS) (TDU-34, RMK-34).
b. (U) Continued joint QF-4 Engineering Manufacturing Development (EMD).
c. (U) Continued development of ULQ-21/decoy Electronic Counter Measures (ECM) module.
d. (U) Initiated pre-milestoned (MS) documentation of tri-service Non-cooperative Aerial Vector Scorer (NAVS).
e. (U) Completed BQM-74C upgrade to BQM-74E Mobile Sea Range.

2. (U) FY 1993 PROGRAM:

a. (U) Continue TAS Kit integration into NSTTS.
b. (U) Continue joint QF-4 EMD.
c. (U) Initiate EMD phase of NAVS.
d. (U) Continue development of ULQ-21/ECM modules.
e. (U) Initiate pre-MS I documentation of Subsonic Aerial Target (SAT).
f. (U) Initiate development to upgrade MQM-8G(ER) maneuver capability.
g. (U) Develop support plans for conversion/flight demonstration of SS-N-2d/22 missiles.

3. (U) FY 1994 PLANS:

a. (U) Complete TAS Kit integration into NSTTS.
b. (U) Initiate EMD phase of the SAT program.
c. (U) Continue NAVS EMD development.
d. (U) Continue Joint QF-4 EMD.
e. (U) Continue development of ULQ-21/ECM modules.
f. (U) Complete upgrade MQM-8G(ER) maneuver capability.
g. (U) Continue support plan development for conversion/flight demonstration of SS-N-2d/22 missiles.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake and Point Mugu, CA; NAVAIRWARCENACDIV, Warminster, PA and Lakehurst, NJ; NAVAVNDEPOT, Cherry Point, NC and North Island, CA; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: Northrop, Ventura, CA; Motorola, Scotsdale, AZ; Southwest Aerospace, Santa Ana, CA; Marquardt, Van Nuys, CA.

E. (U) COMPARISON WITH FY 1993 AMENDED PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: A0609 PROJECT TITLE: Aerial Target Systems Development

2. (U) Schedule Changes: The change in acquisition strategy of the SAT will delay the EMD contract award from FY 1993 to FY 1994, however, this delay allowed the funding of the MQM-8G(ER) maneuver capability in FY 1993. Additionally, the estimated cost of the SAT program necessitated the rescheduling of the AQM-37 aircraft integration program start to FY 1996. Approval of Operational Requirements Document delayed MS of NAVS from 3rd Quarter FY 1992 to 3rd Quarter FY 1993. Problems encountered during developmental testing of DTIII (flight testing of TAS Kits) delayed MS III. Low Rate Initial Production (LRIP) tow bodies will be used for Initial Operating Capability (IOC).

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	MISSION NEED STATEMENTS (MNS)
NAVS	11/92
SAT	1/93
MQM-8G(ER)	7/92

G. (U) RELATED ACTIVITIES: PE 0603715D, AIM-9M; PE 0604372N, New Threat Upgrade (Tartar/Terrier); PE 0604366N, Standard Missile Improvements (Standard Missile 1 and 2); and PE 0604755N, Ship Self Defense (Close In Weapon System (CIWS) (PHALANX)).

(U) Systems currently in test and evaluation: PE 0604314N, Advanced Medium Range Air-to-Air Missiles (AMRAAM); PE 0604366N, Standard Missile Improvements (Standard Missile Improvement, Block II upgrade); and PE 0604755N, Ship Self Defense (NATO Sea Sparrow).

(U) There is no duplication of effort between this project and others within the Navy or Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN Line 14	173,342	164,299	114,407	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

	I	II	III	IOC
TA/AS RMK-34 (KITS)	N/A	FY83/2Q	FY94/1Q	FY94/2Q
BQM-74 E (BFT)	N/A	FY88/2Q	FY91/3Q	FY93/3Q
BQM-74E (MSR)	N/A	FY88/2Q	FY92/4Q	FY94/3Q
NAV SCORER	N/A	FY93/3Q	FY96/3Q	FY97/4Q
SAT	N/A	FY93/3Q	FY98/1Q	FY00/1Q
NSTTS PI	N/A	FY95/1Q	FY97/4Q	FY98/1Q
AQM-37 A/C INTEG	N/A	FY96/4Q	FY99/3Q	FY00/3Q
MQM-8G(ER) Upgrade	N/A	FY93/2Q	FY95/1Q	FY96/3Q

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: A0610 PROJECT TITLE: Weapon System T&E Training Dev/Prc

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A0610	WPN SYS T&E TRNG DEV/ PRC	12,221	14,007	14,428	CONT.	CONT.

B. (U) DESCRIPTION: This project provides development and procurement of aerial targets used solely for test and evaluation of Naval Weapons Systems which closely replicate current and projected threats to fleet units in the anti-air warfare and anti-surface warfare environments. This replication must include characteristics related to size, performance envelope, and electromagnetic and infrared signatures. As threats change, changes must be made to keep the targets as threat representative as possible. This is done in response to changes in the requirements of the developers of naval weapons systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Converted 5 F-4N aircraft into QF-4N targets.

b. (U) Procured 10 Advanced Radar Missile Scorers (ARMS) and 1 ground station.

2. (U) FY 1993 PROGRAM:

a. (U) Convert 6 F-4N aircraft into QF-4N targets.

b. (U) Procure 10 ARMS.

3. (U) FY 1994 PLANS:

a. (U) Convert 6 F-4N aircraft into QF-4N targets.

b. (U) Procure 10 ARMS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA and Point Mugu, CA; NAVAIRWARCENACDIV, Warminster, PA and Lakehurst, NJ; NAVAVNDEPOT, Cherry Point, NC and North Island, CA; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: Cambridge Consultants Ltd, Cambridge, England.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENTS BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: The successful introduction of the Advanced Missile Scorer System (ARMS) allowed the Navy to discontinue procurement of the firing error indicator (FEI) scorers. The ARMS replaces the FEI scorer.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

QF-4N TEMP (#1172) 9/85

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: A0610 PROJECT TITLE: Weapon System T&E Training Dev/Prc

G. (U) RELATED ACTIVITIES: Test and evaluation of current in-service weapons systems: PE 0603715D AIM-9M; PE 0604372N New Threat Upgrade (Tartar/Terrier); PE 0604366N Standard Missile Improvements (Standard Missile 1 and 2); and PE 0604755N Ship Self Defense (Close In Weapon System (PHALANX)).

(U) Systems currently in test and evaluation: PE 0604314N Air-to-Air Missiles (AMRAAM); PE 0604366N Standard Missile Improvements (Standard Missile II block upgraded); PE 0604755N Ship Self Defense (5in Rolling Airframe Missile); and PE 0604755N (NATO Sea Sparrow).

(U) There is no duplication of effort between this project and others within the Navy or DoD.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: S0612 PROJECT TITLE: Surface Target Development

C. (U) DESCRIPTION: This project develops required seaborne target systems and their related target augmentation systems in support of air-to-surface and surface-to-surface weapons test and evaluation and fleet training.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued Command and Control Augmentation development.

b. (U) Continued Ship Simulator Platform. (Completed test bed alternatives.)

c. (U) Continued Weapons System/Emitter Interface.

d. (U) Continued Anti-Radiation Missile Emitter (ARME).

e. (U) Continued Surface Target Radar Simulator (STRS).

2. (U) FY 1993 PROGRAM:

a. (U) Continue Command and Control Augmentation development.

b. (U) Continue Ship Simulator Platform (configuration selection).

c. (U) Continue Weapons System/Emitter Interface.

d. (U) Complete ARME.

e. (U) Continue STRS.

3. (U) FY 1994 PLANS:

a. (U) Continue Command and Control Augmentation development.

b. (U) Complete Ship Simulator Platform.

c. (U) Continue Weapons System/Emitter Interface.

d. (U) Continue STRS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Point Mugu, CA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 185	5,272	8,151	0	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604258N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Target Systems Development
PROJECT NUMBER: A0611 PROJECT TITLE: Supersonic Sea Skimming Target (SSST)

C. (U) DESCRIPTION: This project provides for the development and procurement of a Supersonic Sea Skimming Target (SSST) to simulate the current and future supersonic Anti-Ship Cruise Missile (ASCM) threat to support Test and Evaluation (T&E) and fleet training.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Began close out of the Supersonic Low Altitude Target (SLAT) development contract.

b. (U) Initiated Milestone-0 (MS-0) documentation for SSST.

2. (U) FY 1993 PROGRAM:

a. (U) Award concept exploration and definition study contracts to three contractors for analysis and documentation of possible system approaches to fulfill the SSST requirement. These studies will include trade-off analysis of capability versus requirement and cost.

b. (U) Initiate Cost and Operational Effectiveness Analysis (COEA) study for SSST.

c. (U) Complete close out of SLAT contract.

3. (U) FY 1994 PLANS:

a. (U) Complete concept exploration and definition studies.

b. (U) Perform evaluation of contractor studies, program planning and documentation for MS-I.

c. (U) Perform SSST COEA.

4. (U) PROGRAM TO COMPLETION: Not applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake and Point Mugu, CA; NAVAIRWARCENACDIV, Warminster, PA and Lakehurst, NJ; NAVSURFWARCENDIV, Indian Head, MD and Dahlgren, VA; NAVAIRWARCENACDIV, Patuxent River, MD and Trenton, NJ. CONTRACTOR(S): TBD.

F. (U) RELATED ACTIVITIES: T&E of current in-service weapons systems: PE 0604755N Ship Self Defense (Close In Weapons System).

(U) Systems currently in T&E: PE 0604366N Standard Missile Improvements; PE 0604314N Advanced Medium Range Air-to-Air Missile (AMRAAM) and PE 0604755N Ship Self Defense (NATO Sea Sparrow).

(U) Proposed systems: PE 0604366N Standard Missile Improvements (Standard Missile II Block Upgrades).

(U) There is no duplication of effort between this project and others within the Navy or DoD.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0478	Expendable, Reliable Acoustic Path Sonobuoy (ERAPS)	5,163	814	0	0	31,444
H0480	ASW Sensors and Processing	10,050	18,714	17,562	CONT.	CONT.
H2000	Air Deployed Active Receiver (ADAR)	8,748	12,426	14,213	22,318	67,801
	TOTAL	23,961	31,954	31,775	CONT.	CONT.

B. (U) DESCRIPTION:

(U) H0480 - This project provides improved air ASW mission effectiveness through engineering development of hardware and software associated with acoustic systems, sensors, processing, post-processing, data recording, and displays for air ASW platforms. Key objectives: improved detection, classification, localization and tracking; and increased capacity and flexibility to handle multi-sensor data. Programs being funded during the period identified are the Acoustic Intercept System (AIS) which is a full spectrum acoustic processor and the Generic Acoustic Stimulator System (GASS) which is a ocean, sensor and target modeling combination that will couple with all ASW trainers. Other programs being funded are the Advanced Active Sonobuoy (AAS), which is a potential replacement for Directional Command Active Sonobuoy System (DICASS) in harsh water and the Improved Bistatic Extended Echo Ranging (IEER) active source for the ADAR.

(U) H2000 - The ADAR sonobuoy is an expendable air launched acoustic receiver utilized by ASW aircraft. The ADAR sonobuoy functions as the acoustic receiver for the IEER system. IEER is a mono/multistatic acoustic sensor system that utilizes an ASW aircraft, supporting acoustic source, and acoustic receiver in a coordinated ASW search and surveillance mission. The ADAR sonobuoy will also be capable of functioning in a passive mode to track high speed targets.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0480 PROJECT TITLE: ASW Sensors & Processing



POPULAR NAME: ASW S&P

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM					MS-II 3Q/95
	AIS				MS-III 4Q/99
MILESTONES	GASS			MS-II 3/94	MS-III 3Q/97
ENGINEERING	GASS	SDR	CDR	FULL SCALE	PDR/CDR
MILESTONES	GASS	2/92	3/93	SDR 6/94	2Q/95 - 3Q/95
T&E	AIS			DT/OT I 4/94	
MILESTONES	GASS			EMD DEMO 12/93	TEE 1Q/97
CONTRACT					
MILESTONES	GASS			EMD AWARD 6/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2.491	7.211	8.378	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	7.559	11.503	9.184	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	10.050	18.714	17.562		

B. (U) DESCRIPTION: This project provides improved air ASW mission effectiveness through engineering development of hardware and software associated with acoustic systems, sensors, processing, post-processing, data recording, and displays for air ASW platforms. Key objectives: improved detection, classification, localization and tracking; and increased capacity and flexibility to handle multi-sensor data. Programs being funded during the period identified are the Acoustic Intercept System (AIS) which is a full spectrum acoustic processor and the Generic Acoustic Stimulator System (GASS) which is a ocean, sensor and target modeling combination that will couple with all ASW trainers. Other programs being funded are the Advanced Active Sonobuoy (AAS), which is a potential replacement for Directional Command Active Sonobuoy System (DICASS) in harsh water and the Improved Bistatic Extended Echo Ranging (IEER) active source for the Air Deployed Active Receiver (ADAR).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) AIS

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0480 PROJECT TITLE: ASW Sensors & Processing

(1) (U) Completed AIS/P-3 Update III software Program Performance Specs (PPS) and Interface Design Specs (IDS).

(2) (U) Began DEM/VAL software effort to complete Full Spectrum Processing (FSP).

(3) (U) Procured Commercial Off The Shelf (COTS) hardware.

(4) (U) Commenced data collection effort.

b. (U) GASS

(1) (U) Developed interface and performance specifications.

(2) (U) Initiated development of the prototype unit.

(3) (U) Conducted System Design Review (SDR) for prototype.

2. (U) FY 1993 PROGRAM:

a. (U) AIS

(1) (U) Continue software effort to complete FSP.

(2) (U) Continue data collection efforts.

(3) (U) Continue to procure COTS hardware.

b. (U) GASS

(1) (U) Conduct Critical Design Review (CDR) for prototype.

(2) (U) Procure prototype hardware.

(3) (U) Conduct Software/Hardware interface demonstration of prototype.

(4) (U) Initiate EMD phase procurement and preparation.

3. (U) FY 1994 PLANS:

a. (U) AIS

(1) (U) Complete DEM/VAL software effort.

(2) (U) Conduct performance demonstration test and training.

(3) (U) Install hardware into aircraft.

(4) (U) Begin DT/OT I.

(5) (U) Begin EMD Request for Proposal (RFP) development.

b. (U) GASS

(1) (U) Conduct test readiness review (TRR) for prototype.

(2) (U) Complete prototype demonstrations.

(3) (U) Conduct MS-II documentation and decision meeting.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0480 PROJECT TITLE: ASW Sensors & Processing

(4) (U) Award contract for full scale pre-production units.

(5) (U) Conduct SDR for full scale pre-production units.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN; NAVAIRWARCENACDIV, Warminster, PA; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; ONR, Arlington, VA; NAVAIRWARCENACDIV, Patuxent River, MD; PATWINGSLANT DET JAX, Jacksonville, FL. CONTRACTOR: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: The AIS schedule changed due to the restructure of the program. AIS MS-II slipped from 2Q/92 to 3Q/95 and MS-III slipped from 4Q/96 to 4Q/99.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

AIS		GASS	
ORD	12/91	TDRD	07/91
AP	10/91	ASR	12/92
TEMP	03/92	AP	02/93
COEA	04/92	IPS	(In Process)

G. (U) RELATED ACTIVITIES: Program Element 0603254N, ASW Systems Development; Program Element 0604221N, P-3 Modernization Program (host platform).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

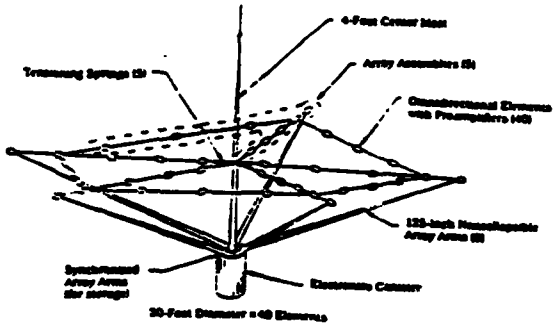
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

AIS		GASS	
TECHEVAL	3Q/98	Pre-EMD DEMO	1Q/94
OPEVAL	1Q/99	TEE	1Q/97

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H2000 PROJECT TITLE: Air Deployed Active Receiver (ADAR)



POPULAR NAME: ADAR

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS-II 5/92			MS-III 10/98
ENGINEERING MILESTONES				PDR 20/95 CDR 40/95
T&E MILESTONES				TECHEVAL 20/97 OPEVAL 40/97
CONTRACT MILESTONES	EMD AWARD 7/92			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,981	5,651	8,589	10,853	33,811
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	4,349	5,914	3,968	7,307	26,897
GFE/ OTHER	418	861	1,656	4,158	7,093
TOTAL	8,748	12,426	14,213	22,318	67,801

B. (U) H2000 - The Air Deployable Active Receiver (ADAR) sonobuoy is an expendable air launched acoustic receiver utilized by ASW aircraft. The ADAR sonobuoy functions as the acoustic receiver for the Improved Extended Echo Ranging (IEER) system. IEER is a mono/multistatic acoustic sensor system that utilizes an ASW aircraft, supporting acoustic source, and acoustic receiver in a coordinated ASW search and surveillance mission. The ADAR Sonobuoy will also be capable of functioning in a passive mode to track high speed targets.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Milestone II (MS-II)

b. (U) Awarded Engineering and Manufacturing Development (EMD) contract.

c. (U) Continued ADAR Air Common Acoustic Processing (ACAP) (UYS-1) software development.

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H2000 PROJECT TITLE: Air Deployed Active Receiver (ADAR)

d. (U) Continued S-3B/ADAR design and integration.

2. (U) FY 1993 PROGRAM:

a. (U) Complete contractor High Level design.

b. (U) Initiate contractor engineering tests.

c. (U) Continue S-3B/ADAR integration.

d. (U) Continue ADAR ACAP software integration.

3. (U) FY 1994 PLANS:

a. (U) Complete contractor engineering tests.

b. (U) Continue S-3B/ADAR integration.

c. (U) Continue ADAR ACAP software integration.

d. (U) Initiate contractor development tests.

4. (U) PROGRAM TO COMPLETION: Complete TECHEVAL/OPEVAL in FY 1997 and initiate production procurement in FY 1998.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCENDIV, Crane, IN; NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTOR: ERAPSCO (MAGNAVOX, Ft Wayne, IN; SPARTON, Jackson, MI).

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

AP	7/91
ORD	3/92
TEMP	5/92
IPS	5/92
COEA	5/92

G. (U) RELATED ACTIVITIES: Program Element 0603254N, ASW Systems Development

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

TECHEVAL	9/96-3/97
OPEVAL	5/97-7/97

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N
PROGRAM ELEMENT TITLE: V-22

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars In Thousands)

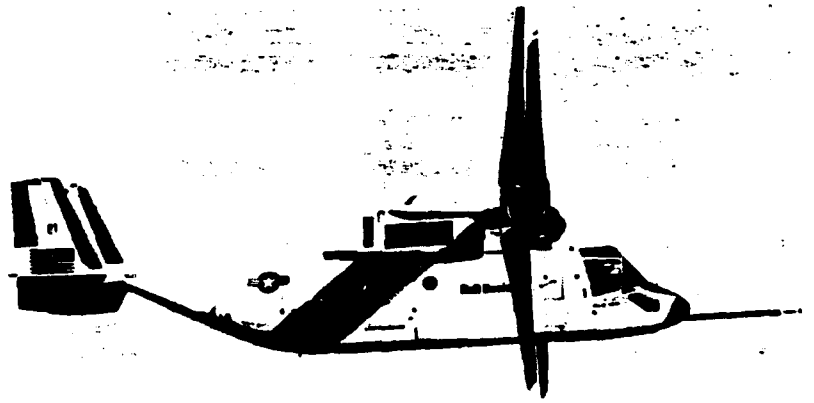
PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1425	V-22	758,708	714,418	77,551	CONT.	CONT.
W2088	MLR	22,000	9,330	4,744	0	36,074
	TOTAL	780,708	723,748	82,295	CONT.	CONT.

B. (U) DESCRIPTION: This program will execute the V-22 Engineering and Manufacturing Development (EMD) program and the Medium Lift Replacement (MLR) program with the purpose of defining the replacement vehicle for the CH-46 helicopter in the Marine Corps. The V-22 project funds the design, development and test of six V-22 Osprey aircraft. The MLR project funds concept exploration studies to define alternate designs to meet the MLR operational requirement.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N
PROGRAM ELEMENT TITLE: V-22
PROJECT NUMBER: H1425

BUDGET ACTIVITY: 4
PROJECT TITLE: V-22



POPULAR NAME: V-22

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars In Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				CONT.
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES	Awarded 10/92 (airframe) Awarded 12/92 (engine)			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	669.800	714.418	15.242	CONT.	CONT.
SUPPORT CONTRACT	27.589	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	51.520	0	60.642	CONT.	CONT.
GFE/ OTHER	9.799	0	1.667	CONT.	CONT.
TOTAL	758.708	714.418	77.551	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of this program is to continue the design, development and test of the V-22. Under an Engineering and Manufacturing Development (E&MD) contract awarded in October 1992, the contractor team will modify two existing developmental aircraft and will manufacture four additional aircraft incorporating weight and cost reduction features. The aircraft will utilize the Government Furnished Equipment (GFE) T406 engines. Flight test will be conducted through Operational Evaluation (OPEVAL) in the FY 1997/1998 timeframe; however, no decision on production and fleet introduction has been made.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: EMD letter contracts for the manufacture of four aircraft and testing through OPEVAL was awarded October 1992; for the associated engines in December 1992.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: V-22
PROJECT NUMBER: H1425 PROJECT TITLE: V-22

2. (U) FY 1993 PROGRAM: The FY 1993 funds will be placed on both the EMD airframe and engine contracts upon definitization in early FY 1994. The FY 1993 funds are sufficient to cover the EMD airframe FY 1994 funding requirements. Contract performance is being monitored by in-house activities (executed with FY 1992 funds). The contractor will complete cost reduction trade studies. Conduct system requirements review.

3. (U) FY 1994 PLANS: Monitor contractor performance. Contractor will conduct risk reduction flight tests with 2 aircraft from full scale development and will begin fabrication and assembly of four new developmental aircraft. Conduct preliminary design review and critical design reviews for the new design.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; Patuxent River, MD; Indianapolis, IN; Lakehurst and Trenton, NJ; NAVAUNDEPOT CHPT Cherry Point, NC. CONTRACTORS: Bell-Boeing, Arlington, VA; Allison Gas Turbine Division; General Motors Corp., Indianapolis, IN

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Joint Services Operational Requirement (JSOR) - approved Operational Requirement (O/R) for V-22. Awaiting Joint Required Operational Capabilities (JROC) validation.

2. (U) Medium Lift Replacement Operational Requirements Document (MLR ORD) - Draft O/R for MLR, to be validated by JROC after completion of Cost and Operational Effectiveness Analysis (COEA) in first quarter FY 1994.

3. (U) TEMP - To be completed and approved prior to program milestone review in first quarter FY 1994.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: V-22
PROJECT NUMBER: W2088 PROJECT TITLE: Medium Lift Replacement

PICTURE NOT AVAILABLE

POPULAR NAME: MLR

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars In Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MSO-92			CONT.
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES	Awarded 10/92 (Concept Exploration)			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	19.629	0	0	0	19.629
SUPPORT CONTRACT	0	1.000	1.000	0	2.000
IN-HOUSE SUPPORT	2.371	8.330	3.744	0	14.445
GFE/ OTHER	0	0	0	0	0
TOTAL	22.000	9.330	4.744	0	36.074

B. (U) DESCRIPTION: The Medium Lift Replacement (MLR) will replace the U.S. Marine Corps (USMC) CH-46E and the CH-53A/D. The MLR's primary mission will be to provide assault transport of the USMC and their equipment during amphibious operations and subsequent operations ashore at night, in adverse weather, in a Nuclear-Biological-Chemical environment and over long distances in a high threat environment. The MLR Program is conducting Concept Exploration (CE) studies addressing modifications to existing helicopters and new helicopter designs to meet the USMC MLR Operational Requirements Document (ORD). The results of these studies and similar information on cost and performance of the V-22 will be utilized in a COEA to determine the most cost effective solution to the USMC MLR requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) August 1992, a Milestone 0 review was held and the concept exploration and definition of the MLR program was approved. Under Secretary of Defense (Acquisition) also directed that a COEA be conducted.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: V-22
PROJECT NUMBER: W2088 PROJECT TITLE: Medium Lift Replacement

b. (U) The Center for Naval Analysis was directed by Assistant Secretary of the Navy (Research, Development, and Acquisition) to conduct the COEA.

2. (U) FY 1993 PROGRAM:

a. (U) Eight cost plus fixed-fee contracts for CE studies were awarded in October 1992. Three sole source contracts (approximately $1M per aircraft type) were awarded to Sikorsky Aircraft (H-53 and H-60), Boeing Helicopter Co. (H-46 and 47) and E.H. Industries (EH 101), to look at derivatives of existing aircraft. Five contracts (approximately $3M each) were awarded to Boeing Helicopters, Sikorsky Aircraft, McDonnell-Douglas Helicopter Division, Piasecki Aircraft Corporation and Bell Helicopter-Textron, Inc. to look at new helicopter designs. The results of these CE studies are required for the COEA.

b. (U) The COEA which addresses V-22, new helo, modified helo and existing capability, is presently underway and will continue into the 4th quarter FY 93.

3. (U) FY 1994 PLANS:

a. (U) Complete COEA report October 1993.

b. (U) Finalize MLR Operational Requirements Document.

c. (U) Defense Acquisition Board Program Review.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; Patuxent River, MD; Indianapolis, IN; Lakehurst, NJ; and Trenton, NJ; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: Bell Helicopters, Fort Worth, TX; Boeing Helicopters, Philadelphia, PA; McDonnell-Douglas Helicopter Division, Mesa, AZ; Piasecki Aircraft Corp., Essington, PA Sikorsky Aircraft, Stratford, CT; E.H. Industries, London, England.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) COEA 10/93

2. (U) MLR ORD - Draft O/R for MLR. To be validated by JROC after COEA and prior to next milestone review.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0606	Aircrew Systems Development	21,149	20,694	11,126	CONT.	CONT.

B. (U) DESCRIPTION: The Aircrew Systems Development program provides Engineering and Manufacturing Development (EMD) of Aviation Life Support Systems to protect aircrews from current known and future threats including: directed energy weapons, chemical/biological/radiological agents/fallout, ballistic projectiles, temperature extremes, heat/fire, low concentration oxygen environments, high dynamic forces during emergency egress, and high "G" forces. The program also provides development for the following capabilities: aircrew emergency communications, head protection, inflight restraint, emergency egress and descent, escape and evasion, and survival and rescue. Acquisition initiatives include competition, the application of streamlining, use of non-development items, joint and tri-service developments, and the pursuit of NATO/allied cooperative ventures to expedite introduction into Navy and Marine Corps fixed and rotary wing aircraft, reduce costs, and promote commonality.

(U) SUBPROJECTS:

1. (U) IN-FLIGHT SYSTEMS: On Board Oxygen Generating System (OBOGS), Advanced Tactical Life Support System (ATLSS) renamed Navy Combat Edge (NCE), Advanced Technology Crew Station (ATCS), Advanced Integrated Life Support System (AILSS), Advanced Aircrew Oxygen Delivery System (AAODS) and Solid Chemical Oxygen Emergency System.

2. (U) ESCAPE/CRASH SAFETY: Naval Aircrew Common Ejection Seat Pre-Planned Product Improvement (NACES P^3I), Advanced Crashworthy Aircrew Seat System (ACASS), and Joint Inflatable Body and Head Restraint System (IBAHRS).

3. (U) SURVIVAL AND RESCUE: Passenger Anti-Exposure Survival System (PAESS), Extreme Cold Weather Improvement Program (ECWIP), Joint Global Positioning System (GPS) Survival Radio, Helicopter Emergency Egress Device System (HEEDS) P^3I and Joint PRC-90-2 Survival Radio Upgrades.

4. (U) SPECIAL MISSION EQUIPMENT: Joint Laser Eye Protection Visor (LEPV) and Naval Aircrew Eye Respiratory Protection (NAERP).

5. (U) MISSION SPECIFIC: Helicopter Helmet Replacement Program (HHRP), Aircrew Integrated Survival Armor Protection (AISAP), Cats-Eye Emergency Detachment System (CEEDS) and Joint Integrated Night Vision/Helmet Mounted Display (INVHMD).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) OBOGS: Completed Pre-Planned Product Improvement (P^3I) monitor design, conducted aircraft fit checks and initiated Development Testing (DT). NCE: Initiated DT, initiated identification of aircrew medical qualification requirements. Awarded Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) hardware contract. ATCS: Completed DT design guidelines and specification revisions.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

b. (U) NACES P³I: Conducted design analysis for high speed escape system, continued DT for restraint system, completed trade study of improved sequencer and commenced development of passive leg restraint system. Conducted DT for high speed escape system. ACASS: Assessed and evaluated crashworthy improvements and emergency egress procedures, updated specification data package. IBAHRS: Awarded contract, initiated joint DT.

c. (U) PAESS: Completed DT and prepared Engineering Change Proposal (ECP). ECWIP: Initiated trade off analysis for extreme cold weather protection.

d. (U) NAERP: Completed AV-8B TECHEVAL.

e. (U) HHRP: Awarded contract for OPEVAL, conducted OPEVAL. AISAP: Completed Phase II DT. CEEDS: Formalized specification, completed data and ILS documentation package. Initiated helmet and airframe ECP's.

2. (U) FY 1993 PROGRAM:

a. (U) OBOGS: Continue DT on the P³I monitor. NCE: Conduct TECHEVAL. ATCS: Program being re-scoped for joint effort.

b. (U) NACES P³I: Continue DT for restraint system and passive leg restraint. ACASS: Detailed analysis and assessment of rotary wing crashworthy improvements and emergency egress. IBAHRS: Continue joint DT and initiate ECP's.

c. (U) PAESS: System deficiencies identified and redesign initiated. ECWIP: Conduct DT. HEEDS P³I: Initiate DT. Joint PRC-90-2 Improvements: Commence joint EMD.

d. (U) NAERP: Initiate competitive Non-Developmental Item (NDI) request for proposal. LEPV: Prepare procurement documentation, conduct DT for day visor.

e. (U) HHRP: MSIII. AISAP: Complete Phase III DT and prepare/approve ECP. CEEDS: Complete seat integration tests and approve ECP's.

3. (U) FY 1994 PLANS:

a. (U) OBOGS: Complete DT, prepare/approve ECP's. NCE: Complete DT, conduct operational assessment. ATCS: Continue joint efforts.

b. (U) NACES P³I: Continue DT for restraint system and passive leg restraint, initiate ECP's. ACASS: Continue analysis and assessment of rotary wing crashworthy improvements and emergency egress. IBAHRS: Complete joint DT and approve ECP's, approval for Low Rate Initial Production.

c. (U) ECWIP: Continue DT and initiate operation assessment for candidate items. HEEDS P³I: Continue DT. Joint PRC-90-2 Improvements: Complete EMD.

d. (U) NAERP: Evaluate proposals and conduct DT on acceptable candidates. LEPV: Conduct OPEVAL, ECP for day visor.

e. (U) Joint INVHMD: Monitor only.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA and Indianapolis, IN; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: Martin Baker Aircraft Co, Ltd., Middlesex, England; Litton Industries, Davenport, IA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: The acquisition strategy for combat edge and extreme cold weather improvement programs have changed. The upgrades to these two projects will be done via product improvement ECP's vice the formal ACAT milestone process. NAERP program restructured to competitive NDI best value.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

	OR	TEMP	ECP		OR	TEMP	ECP
OBOGS	4/75	5/83	11/93	ECWIP	8/86	N/A	7/94
NCE	2/92	6/92	N/A	GPS	10/94	6/95	N/A
ATCS	9/89	N/A	N/A	HEEDS P^{3}I	6/84	8/93	N/A
AILSS	10/94	8/95	N/A	PRC-90-2	12/86	N/A	6/98
INVHMD	2/86	TBD	N/A	LEPV	6/86	N/A	6/94
AAODS	10/94	8/95	N/A	NAERP	11/86	10/93	N/A
NACES P^{3}I	2/83	12/89	6/96	HHRP	1/88	5/90	N/A
ACASS	9/88	N/A	10/96	AISAP	3/88	N/A	8/93
IBAHRS	9/88	N/A	10/94	CEEDS	2/86	N/A	9/93
PAESS	8/86	N/A	8/94				

G. (U) RELATED ACTIVITIES: P.E. 0603216N, Aviation Survivability. Related Air Force efforts supported by P.E. 0604706F, Life Support Equipment; and Army efforts supported by P.E. 0604713A, Combat Feeding, Clothing, and Equipment. Coordinated through the Office of the Secretary of Defense sponsored Tri-Service Life Support Research, Development, Testing & Evaluation Steering Committee.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

	II	III
HHRP		4Q/93
NAERP		1Q/97
HEEDS P^{3}I		4Q/96
INVHMD		2Q/99
AAODS	3Q/95	4Q/99
AILSS	3Q/95	1Q/01

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development

A. (U) RESOURCES: (Dollars in Thousands)

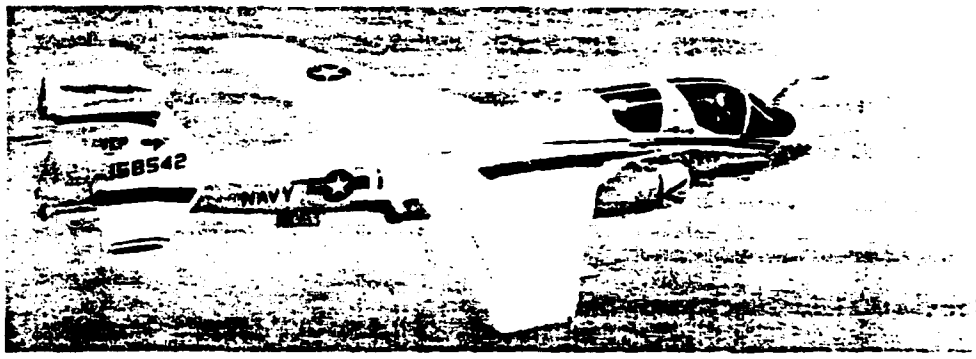
PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0066	Communications/Non-Communications Countermeasures Support	147	43	0	0	12,515
C1961	Mobile Electronic Warfare Support System (MEWSS)	997	0	0	5,557	13,323
E0556	EW Counter Response	23,661	70,832	45,951	CONT.	CONT.
E0619	ASPJ Common Development 1/	2,258	7,171	8,361	0	280,400
E2175	Tactical Air Electronic War	0	40,501	67,931	CONT.	CONT.
R1742	EW Technical Development and Testing	918	1,000	841	CONT.	CONT.
R1882	Datalink Vulnerability Analysis (DVAL)	1,192	742	1,177	CONT.	CONT.
W0638	Airborne Defensive ECM	44,501	14,088	4,589	CONT.	CONT.
TOTAL		73,674	134,377	128,850	CONT.	CONT.

1/ Previously funded under W0638

B. (U) DESCRIPTION: This program element (PE) includes development of Electronic Warfare (EW) systems for United States Navy (USN), United States Marine Corps (USMC), USMC helicopters, surface combatants, data link vulnerability assessments, USMC communications and non-communications jammers, and development and testing of EW devices for emergency contingencies.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROGRAM NUMBER: E0556 PROJECT TITLE: EW Counter Response



POPULAR NAME: EA-6B ADVANCED CAPABILITY (ADVCAP)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONE		IIA(ADVCAP) 7/93		III (BAND 2/3) 1Q/95 III (ADVCAP) 1Q/97
ENGINEERING MILESTONES				
T&E MILESTONES		DT IIF/OT IIA 3/93 (ADVCAP)	DT IIH/OT IIB 12/93/4/94 (BAND 2/3)	DT IIH 1Q/96(ADVCAP) OT-IIC 4Q/96
CONTRACT MILESTONES		LRIP(ADVCAP) 7/93		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	12.993	48.584	16.260	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	10.668	22.248	29.691	CONT.	CONT.
GFE/ OTHER					
TOTAL	23.661	70.832	45.951	CONT.	CONT.

B. (U) DESCRIPTION: The EA-6B Weapon System is designed for jamming and destruction of enemy landbased, shipborne and airborne command, control and communications (C3) and radars associated with early warning, target acquisition, surveillance, anti-aircraft artillery, and air-to-surface, surface-to-surface and surface-to-air missiles. In this capacity, it will support carrier based tactical aircraft and battle group operations in dense radar controlled environments. The efforts under this PE provide for the electronic countermeasure response to these advanced threat weapon systems and C3 networks which are expanding in density and technical complexity. This PE funds the continuing development or integration of all EW systems for the EA-6B Electronic Countermeasures Support Aircraft and includes enhancements to the air vehicle to accommodate these EW improvements. Major efforts include the development and integration into the EA-6B of a new ADVCAP Receiver Processor Group (RPG), a Communications Countermeasures Set (AN/ALQ-149), an Upgraded Universal Exciter (UEU), a Coherent Countermeasures (COCM) Capability, Proforma Countermeasures (PCM) Capability and Band 2/3 Transmitter.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROGRAM NUMBER: E0556 PROJECT TITLE: EW Counter Response

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued software development and logistics support for the RPG and ALQ-149 (ADVCAP).

b. (U) Continued integration of the RPG/ALQ-149 on the EA-6B ADVCAP.

c. (U) Commenced the UEU Program.

d. (U) Continued the COCM and PCM Programs.

e. (U) Conducted developmental and operational testing to support RPG and ALQ-149 Milestone IIA decision planned for FY 1993.

f. (U) Continue qualification testing, Reliability Development Tests (RDT) and EMI testing on RPG.

g. (U) Continued Technology Upgrade for TEAMS (TUT) Tactical EA-6B Mission Support (TEAMS) and ADVCAP TEAMS (ATEAMS) integration.

2. (U) FY 1993 PROGRAM:

a. (U) Continue software development, logistics and test support for RPG and ALQ-149 (ADVCAP).

b. (U) Continue integration of the RPG and ALQ-149 on the EA-6B ADVCAP.

c. (U) Continue UEU Development Program.

d. (U) Continue COCM and PCM programs for the EA-6B.

e. (U) Continue contractor acceptance test for Band 2/3.

f. (U) Complete delivery of Band 2/3 Engineering Development Models (EDM) 1 through 5.

g. (U) USN complete Band 2/3 qualification and Electro Magnetic Interference (EMI) testing.

h. (U) Continue TUT and ATEAMS integration.

i. (U) Begin groundwork for integration of Software Development Station (SDS) at Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), Point Mugu, CA.

j. (U) Complete OT-IIA testing of ALQ-149/RPG in support of Milestone IIA.

k. (U) Initiate vehicle enhancement program (VEP) carrier suitability and development testing.

l. (U) Initiate ADVCAP ALQ-149 Non-Recurring Engineering (NRE).

m. (U) Initiate Information File (I-File) advanced development for ADVCAP tactical software.

3. (U) FY 1994 PLANS:

a. (U) Accept delivery of five UEU EDMs.

b. (U) Continue TUT and ATEAMS integration.

c. (U) Complete the UEU development program.

d. (U) Complete Band 2/3 Transmitter Technical Evaluation/Operational Evaluation (TECHEVAL/OPEVAL) (Dec 93/Apr 94) to support Milestone III decision planned for FY-1995.

e. (U) Commence integration of UEU into Improved Capability (ICAP) II.

f. (U) Continue lab preparation work for Software Development Station (SDS) at NAVAIRWARCENWPNDIV, Point Mugu, CA.

g. (U) Continue COCM and PCM programs for the EA-6B. Level of effort commensurate with available funds.

h. (U) Continue software development, logistics and test support for RPG and ALQ-149 (ADVCAP).

i. (U) Continue Weapons System Software Activity (WSSA) support of integration of the RPG and ALQ-149 on the EA-6B ADVCAP at NAVAIRWARCENWPNDIV, Pt. Mugu, CA.

j. (U) Complete VEP development testing.

k. (U) Initiate ADVCAP,ALQ-149 NRE.

l. (U) Continue I-File advanced development for ADVCAP tactical software.

m. (U) Continue software support, logistics and test support for RPG and ALQ-149 (ADVCAP).

4. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Pt. Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NRL, Washington, DC; NAVAIRWARCENACDIV, Trenton, NJ; NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENACDIV, Indianapolis, IN; and NAVSURFWARCENDIV, Crane, IN; COMOPTEVFOR, Norfolk, VA. CONTRACTORS: Grumman Aircraft Systems Division, Bethpage, NY; Sanders Associates, Nashua, NH; AIL Systems,Inc., Deer Park, NY; PRB Associates, Hollywood, MD; Teledyne MEC, Mountain View, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES:

(a) EA-6B ADVCAP milestone IIA low rate initial production (LRIP) decision changed from June 1992 to July 1993. This change is required as a result of the delay in completion of the OT-IIA (Operational Assessment) for the ALQ-99 RPG and ALQ-149 Communications Countermeasures Set. ADVCAP introduction into development test, DT-IIH, will be delayed to November 1995 as a result of the LRIP change.

(b) EA-6B Band 2/3 milestone III full rate production decision changed from February 1993 to November 1994. This change is required as a result of the delay in both the completion of United States Navy qualification and EMI testing and subsequent introduction into TECHEVAL/OPEVAL to support the milestone decision.

3. (U) COST CHANGES: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROGRAM NUMBER: E0556 PROJECT TITLE: EW Counter Response

F. (U) PROGRAM DOCUMENTATION: The RPG and UEU Navy Decision Coordinating Paper (NDCP) was approved in 1985/4Q. The ALQ-149/NDCP was approved in FY 1988/2Q. TEMP 604 has been consolidated into the RPG TEMP (157-10 Revision 2) along with the UEU and Band 2/3 Transmitter. This will be the EA-6B ADVCAP TEMP and will address each of the individual Research and Development (R&D) programs. Approved by the Office of the Secretary of Defense (OSD) 27 May 1992.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT					
APN-LINE 2	115,104	482,787	77,586	6,036,771	13,810,976

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: ADVCAP

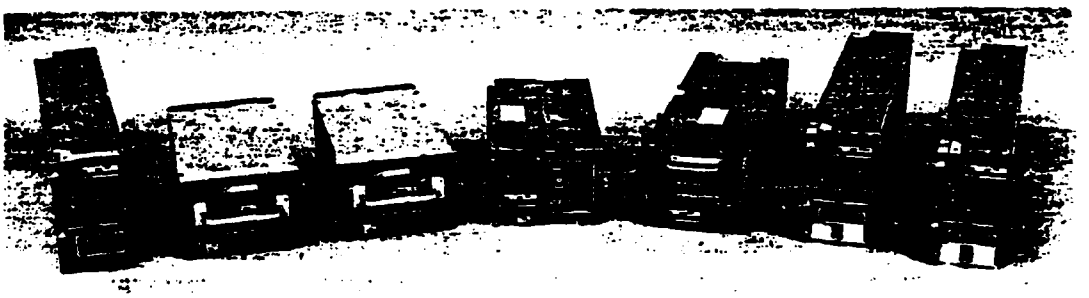
	MO/YR
OT IIA(OPERATIONAL TEST)	Completed
DT-IIH(TECHEVAL)	11/95
OT IIC(OPEVAL)	7/96
OT IIIC Final Operational Test and Evaluation (FOT&E)	9/99

BAND 2/3	MO/YR
DT IIH(TECHEVAL)	12/93
OT IIB (OPEVAL)	4/94

UEU	MO/YR
OT IIIA(ICAP II FOT&E)	3/95
OT IIIB(ADVCAP FOT&E)	9/99

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: E0619* PROJECT TITLE: ASPJ Common Dev



POPULAR NAME: AIRBORNE SELF-PROTECTION JAMMER (ASPJ)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	PCA 10/91			
T&E MILESTONES	OT-IID	OPEVAL F-14D 9/93		
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT		4.060	5.474	0	101.056
SUPPORT CONTRACT	321	178	0	0	69.366
IN-HOUSE SUPPORT	1.937	2.933	2.887	0	79.878
GFE/ OTHER					30.100
TOTAL	2258	7.171	8.361	0	280.400

*This project was previously funded under W0638.

B. (U) DESCRIPTION: The ASPJ, designated AN/ALQ-165, is a defensive electromagnetic countermeasure system for self-protection of tactical aircraft (F/A-18, F-14, F-16) which would increase the probability of mission success and survivability when confronted by modern diversified radar-controlled weapon systems. The ASPJ is compatible with integrated system concepts, is capable of installation in existing aircraft, and is software reprogrammable to keep pace with changing threat scenarios, improved aircraft and support equipment systems, and alternative technologies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed OPEVAL.

2. (U) FY 1993 PROGRAM: ASPJ baseline system testing only.

3. (U) FY 1994 PLANS: Review current operational requirements for TACAIR Defensive Electronic Countermeasures (DECM).

4. (U) PROGRAM TO COMPLETION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: E0619 PROJECT TITLE: ASPJ Common Dev

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVAIRWARCENWPNDIV, China Lake, CA.; NAVAIRWARCENACDIV Indianapolis, IN. CONTRACTORS: Prime contractor is the Joint Venture of ITT, Avionics Division in Nutley, NJ and Westinghouse in Baltimore, MD with the Joint Venture Headquarters in Nutley, NJ; Smith's Industries, Florham Park, NJ (F-14, F/A-18, and F-16 rack manufacturer). Associated contractors include Grumman Aerospace Corporation, Bethpage, Long Island, NY (F-14); McDonnell Douglas Corporation, St. Louis, MO (F/A-18).

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: P3I efforts canceled due to negative OPEVAL findings.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

DCP: Signed by OSD June 1991.
TEMP: Signed by D,OT&E on 9 January 1992.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: E2175 PROJECT TITLE: Tactical Air Electronic War

PICTURE NOT AVAILABLE

POPULAR NAME: TACAIR EW

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM	ALR-67 (V)3 AAED/ IDAP			MSIIA 7/94 MSIIA 1/94	MSIIB 3Q95 MSIII 3Q96 MSIII 1Q95
ENGINEERING MILESTONES	ALR-67 (V)3		DCR 5/93		
T&E MILESTONES	ALR-67 (V)3 AAED/IDAP		DT/OT 3/93-2/94 DTIIE 6/93 TECHEVAL 8/93	TECHEVAL 5/94-12/94 OPEVAL 6/94	OPEVAL 3Q95
CONTRACT MILESTONES	ALR-67 (V)3 AAED/IDAP			OPTII 7/94 LRIP 2/94	OPTIII 3Q95 AFP 2Q95

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	23,909	51,300	CONT.	CONT.
SUPPORT CONTRACT	0	290	475	CONT.	CONT.
IN-HOUSE SUPPORT	0	14,430	13,206	CONT.	CONT.
GFE/OTHER	0	1,872	2,950	CONT.	CONT.
TOTAL	*0	40,501	67,931	CONT.	CONT.

* FY 1992 funding is under project W0638.

B. (U) DESCRIPTION: This project develops various EW equipment including Radar Warning Receivers (RWR) and DECM. Numerous laboratory EW efforts (hardware and software), improvements to existing EW systems, Electronic Warfare Software Support Activity (EWSSA) and system integration efforts for the ALR-67(V)3 (ASR), ALQ-156A Integrated Defense Avionics Program (IDAP), and ALE-50 (AAED) programs are funded under this project.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Refer to project W0638 for Program Accomplishments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: E2175 PROJECT TITLE: Tactical Air Electronic War

2. (U) FY 1993 PROGRAM:

a. (U) ALR-67(V)3: Continue EMD. Deliver 7 systems for test.

b. (U) AAED/IDAP: DT Test, Live Fire Test, Aircraft Integration Test, System Qual Test, TECHEVAL.

3. (U) FY 1994 PLANS:

a. (U) ALR-67(V)3: Conduct DT/OT flight testing; continue EMD; procure additional test articles for OPEVAL.

b. (U) AAED/IDAP: Continue EMD/DT/OT/OPEVAL; MSIIA LRIP.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVAIRWARCENWPNDIV, China Lake, CA.; NADEP Jacksonville, FL; NAVAIRWARCENACDIV, Indianapolis, IN and Lakehurst, NJ. CONTRACTORS: Prime contractors are RAYTHEON Goleta, CA; Lockheed Sanders Nashua, NH; Hughes Aircraft, Los Angeles, CA; Grumman Aerospace, Bethpage, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: ALR-67 LRIP delayed from FY 1994 to FY 1995.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: ALR-67(V)3/TEMP 0521-1 dtd 2/14/87, AAED/IDAP/TEMP 1224-01 dtd 3/27/88.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

		FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)	OPN Line 152		16,000	17,687	CONT.	CONT.
	APN Line 50	57,460	63,850	0	CONT.	CONT.

(U) PROCUREMENT: Applicable airframe appropriations will have these EW systems installed for training and tactical self-protection. Potential users include F-14, AV-8B, EP-3E, F/A-18, A6E.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

	DT/OT	TECHEVAL	OPEVAL
1. (U) ALR-67(V)3	2Q/93	3Q/94	3Q/95
2. (U) AAED/IDAP	3Q/93	4Q/93	3Q/94

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: R1742 PROJECT TITLE: EW Technical Development and Testing

C. (U) DESCRIPTION: Establishes a standing research group for developing and testing low cost, high payoff EW systems to meet warfighting requirements during crisis situations. The goal is to develop and provide such systems in a twelve month period during non-crisis conditions and be able to surge to a 30 day response during crisis conditions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: A five element direction finding array which operates over with an angular accuracy of between degrees was assembled.

a. (U) The system was integrated into a pod mounted assembly compatible with the SH-60B.

b. (U) Provisions were made to allow integration of this system with a feature extraction processor.

c. (U) The system capabilities were demonstrated under laboratory and conditions.

2. (U) FY 1993 PROGRAM: Develop and test an airborne pod which generates a , to protect rotary and fixed wing aircraft from

3. (U) FY 1994 PLANS: Develop and demonstrate a miniature self protection jammer capable of combating

is a fundamental and robust ECM technique, however, it has been Recent advances in technology suggest that this may now be achievable in a very small volume package and suitable for many EW applications.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington D.C.; NAVAIRWARCENACDIV, Patuxent River, MD; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Alloy Surfaces Co., Wilmington, DE.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: R1882 PROJECT TITLE: Datalink Vulnerability Analysis (DVAL)

C. (U) DESCRIPTION: DVAL is the only program in the Navy that evaluates anti-jam capabilities in Navy electromagnetically dependent systems during the developmental stages of the acquisition cycle. It identifies methods for reducing signal vulnerabilities to hostile exploitation. It is also employed after fleet introduction for use in developing countermeasure tactics. In FY 1994, it will incorporate another facet of vulnerability assessment, an Electronic Counter-Countermeasures (ECCM) Requirements and Assessment Manual (ERAM) which when completed, will provide a tool for program sponsors and managers to clearly state ECCM requirements "up front" in the R & D process. ERAM consists of five manuals (increments) providing realistic engagement scenarios and measures of effectiveness to facilitate writing of contract specifications, defining of testing environments and provision of tools for fleet training and tactics.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Continued development of Common High Band Data Link (CHBDL) DVAL susceptibility reports.
b. (U) Completed analysis of HAVE QUICK system.
c. (U) Performed CLASSIC RAPTOR test and analysis.
d. (U) Developed Military Strategic Tactical and Relay Satellite (MILSTAR) FOT&E test concept.
e. (U) Performed PIANO System susceptibility testing.
f. (U) Completed summary Joint Tactical Information Distribution System (JTIDS) susceptibility report.

2. (U) FY 1993 PROGRAM:
a. (U) Complete CHBDL susceptibility reports, ending project.
b. (U) Complete PIANO assessment with report on at-sea collection and analysis.
c. (U) Complete final JTIDS susceptibility report with recommendations.
d. (U) Develop DVAL MILSTAR test plan Channel Ground Airborne Radio System (SINCGARS).
e. (U) Begin pre-test analysis of Battle Group Cooperative Engagement Capability (BGCEC).
f. (U) Begin pre-test analysis of the Tactical Intelligence/Integrated Special Intelligence Communications Subsystems (TACINTEL II/INSICOM).

3. (U) FY 1994 PLANS:
a. (U) Complete pre-test analysis of BGCEC and TACINTEL II/INSICOM. Begin susceptibility assessments of these systems.
b. (U) Utilizing test plan developed in FY 1993, perform collection and analysis of MILSTAR during FOT&E (per COMOPTEVFOR request) and produce final report.
c. (U) Publish ERAM Increment V; produce draft of Joint ARMY/NAVY developed ERAM Communications Annex; release revision 2, ERAM Increment III; release revision 3, ERAM Increment II.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: ERAM work performed by NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

F. (U) RELATED ACTIVITIES: PE 0603261N, Tactical Airborne Reconnaissance.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: W0638 PROJECT TITLE: Airborne Defensive ECM

PICTURE NOT AVAILABLE

POPULAR NAME: TACTICAL AIRBORNE EW

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES					
ENGINEERING MILESTONES	ASR/ ALR-67	(4) SYS DEL 9/92			
	AAED/ IDAP	FLT TEST 7/92			
T&E MILESTONES	ASR/ ALR-67	BENCH TEST 2/92			
	ALQ-164	OPEVAL 4/92			
CONTRACT MILESTONES					

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	29.416	4.370	2.569	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	14.585	9.718	2.020	CONT.	CONT.
GFE/ OTHER	500	0	0	CONT.	CONT.
TOTAL	44.501	14.088	4.589	CONT.	CONT.

B. (U) DESCRIPTION: This project develops various EW equipments including Radar Warning Receivers (RWR), DECM, Countermeasures dispenser systems Radio Frequency Countermeasures (RFCM) and Third-World threat training simulators for use by the Fleet Electronic Warfare Support Group (FEWSG). RFCM, IR jammers, expendable devices (flares, chaff and electronic expendables), laser warning receivers and missile warning equipments are to increase aircraft survivability and former Soviet threat training simulators for use by FEWSG. Numerous laboratory EW efforts (hardware and software), improvements to existing EW systems, Electronic Warfare Software Support Activity (EWSSA) and system integration efforts are funded under this project.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: W0638 PROJECT TITLE: Airborne Defensive ECM

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) ALR-67/Advanced Special Receiver (ASR): Continued Engineering and Manufacturing Development (EMD); delivered 2 Brassboard systems. Performed Brassboard testing FY92/2Q-4Q. Delivered 2 Service test models 4Q-FY92.

b. (U) FEWSG: Continued FEWSG Mission and Tactical Simulations Development (TSD) avionics. Completed AN/ALT-40 upgrade program.

c. (U) Advanced Airborne Electronic Decoy (AAED)/IDAP: Continued EMD, first flight IDAP/A6E.

d. (U) ALE-47: Conducted F/A-18D OPEVAL and production long-lead decision. Continued HH-60H Test and Evaluation (T&E). Conducted FOT&E.

e. (U) RFCM: Continued technique development.

f. (U) EWSSA: Continued software development and development of EWSSA lab facilities FY92.

g. (U) APR-39A(XE-2): Conducted OPEVAL.

h. (U) ALQ-164: Completed OPEVAL. Introduced to fleet.

2. (U) FY 1993 PROGRAM:

a. (U) FEWSG: Continue FEWSG mission and TSD avionics upgrades. Initiate dual-mode AN/ALQ-170 development.

b. (U) ALE-47: Continue FOT&E on various Navy aircraft. Production decision 1Q/FY93

c. (U) IR Decoys, IRCM and LASER CM: Participate with Air Force in Joint Advanced development.

d. (U) EWSSA: Continue software development and development of EWSSA lab facilities.

e. (U) Electro-Optical Countermeasures (EOCM): Monitor Defense Advanced Research Projects Agency advanced development.

f. (U) RFCM: Continue technique development.

g. (U) Beginning in FY 1993 ALR-67 ASR, AAED and IDAP will be under E2175 and ASPJ will be under E0619.

h. (U) APR-39(XE-2): Incorporate corrections to OPEVAL deficiencies and enter DT/OT.

3. (U) FY 1994 PLANS:

a. (U)FEWSG: Continue AN/ALQ-170 dual mode development. Initiate FEWSG Airborne Electronic Warfare Systems (FAEWS) Electronic Support Measures (ESM) upgrades; continue AN/ULQ-21S development; complete B Band Enhancement for AN/ALQ-167 and AN/AST-6; initiate Adaptive Cross Polarization development for AN/ALQ-167; complete airborne intercept/steerable antenna development; initiate pre-launch lock-on development; initiate dual mode transmit development for AN/AST-6.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electronic Warfare Development
PROJECT NUMBER: W0638 PROJECT TITLE: Airborne Defensive ECM

b. (U) EWSSA: Continue software development and development of EWSSA Lab facilities.

c. (U) APR-39 (XE-2): Continue and complete OT.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Point Mugu CA; NAVAIRWARCENACDIV, Patuxent River MD; NAVAIRWARCENACDIV, Indianapolis IN; NAVAIRWARCENACDIV, China Lake CA; NRL, Washington DC; NAVAIRWARCENACDIV, Warminster PA; NAVSURFWARCENDIV, Crane IN; NAVAIRWARCENACDIV, Trenton NJ. CONTRACTORS: Grumman Aerospace, Bethpage NY; Sanders Associates, Nashua NH; Raytheon, Goleta CA; Westinghouse, Baltimore MD; ITT, Nutley NJ; Tracor, Austin TX; Loral Infrared and Imaging Systems, Lexington MA; Hughes Aircraft, Los Angeles CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: APR-39A(XE2) MS III was delayed from 1Q/93 to 3Q/94 to allow time for correction of OPEVAL deficiencies.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: FEWSG/Master Plan CINCLANTFLT N95/5273 dtd 9/3/91

G. (U) RELATED ACTIVITIES: PE 0604270F, Joint Service programs: ALE-47 Air Force Lead.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
APN Line-41	18,093	6,729	27,495	CONT.	CONT.

* This line reflects FEWSG procurement funds.

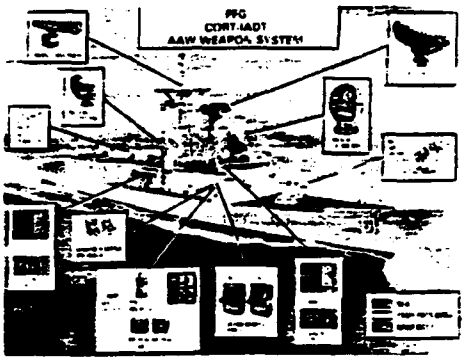
(U) Applicable airframe appropriations will have these EW systems installed for training and tactical self-protection. Potential users include EA-6A, EP-3J, EA-6B, F-14, F/A-18 AND A6-E.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604301N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 92 FIRE CONTROL SYSTEM (FCS) UPGRADE
PROJECT NUMBER: S0179 PROJECT TITLE: MK 92 FCS UPGRADE



POPULAR NAME: CORT

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	MID-LIFE CDDR			
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,650	1,376	734	CONT.	CONT.
SUPPORT CONTRACT	0	0	0		
IN-HOUSE SUPPORT	328	455	329	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	1,978	1,831	1,063	CONT.	CONT.

B. (U) DESCRIPTION: This program element supports development, integration and testing of improvements to the FCS MK 92 Mod 2 and the FCS MK 92 Mod 6 Coherent Receiver Transmitter (CORT) Upgrade. This program includes system engineering, integration and testing of all components of the FFG 7 Class Anti-Ship Missile Defense (ASMD) mid-life upgrade.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed and tested corrections to deficiencies noted in FFG 61 DT/OT. Fixes are installed on FFG 61 and all other applicable ships.

b. (U) Determined that the Standard Missile-1 Block VI B is applicable for incorporation in FFG MK 92 Mod 6 Coherent Receiver Transmitter/ Integrated Automatic Detection and Tracking (CORT/IADT) ships. Developed at-sea test plans and evaluation milestones. Conducted at sea testing.

c. (U) Continued embedded trainer development.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604301N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: MK 92 FIRE CONTROL SYSTEM (FCS) UPGRADE
PROJECT NUMBER: S0179 PROJECT TITLE: MK 92 FCS UPGRADE

d. (U) Completed re-compile and certification of the Fire Control Systems (FCS) MK 92 Mod 6 computer program.

e. (U) Developed and evaluated FCS MK 92 tactical improvements includin Guard Gate, Priority Engage and Sector Scan; conducted at-sea testing in FFG 48.

f. (U) Continued development of a heavy duty transmission for the Combined Antenna System (CAS).

g. (U) Supported higher echelon strategy in defining roles within ship self defense distribution.

h. (U) Initiated feasibility studies for MK 92 Mod 6 improvements in Target Acquisition/ Search and Processing.

i. (U) Initiated studies to develop an improved automatic weapon scheduler for FCS MK 92 Combat system integration.

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of the FCS MK 92 MOD 6 Frigate AAW Weapon System Trainer (FAST) to support FFG-7 Class Battle Force Tactical Training (BFTT) program milestones. Evaluate FCS MK 92 MOD 6 FAST Advanced Development Model (ADM) at the land-based test facility. Plan execution of FCS MK 92 MOD 6 FAST ADM testing at-sea.

b. (U) Evaluate FCS MK 92 MOD 6/Standard Missile-1 Block VIB concept at sea firing test (completed in September 1992) in support of FY 94 IOC milestones

c. (U) Plan execution and support of FCS MK 92 MOD 6/Standard Missile-1 Block VIB full up round at-sea firing test in support of FY 94 IOC milestones.

d. (U) Support FCS MK 92 MOD 6/ Standard Missile-1 Block VIB full up round at-sea firing test in support of FY 94 IOC milestones.

e. (U) Evaluate and at-sea test CAS antenna heavy duty transmission.

f. (U) Evaluate potential to utilize today's off the shelf technology t resolve Multiple Internal Clutter (MIC) and other detection problems.

g. (U) Support analysis/tradeoff studies to coordinate and define element roles for the FFG 7 AAW Weapon System with the ship self defense strategy.

3. (U) FY 1994 PLANS:

a. (U) Continue evaluation of FCS MK 92 MOD 6 FAST in preparation for production prototype procurement FY 96 milestone. Conduct FCS MK 92 Mod 6 FAST ADM at-sea testing.

b. (U) Evaluate Standard Missile-1 Block VIB full up round at sea test data.

c. (U) Develop an improved automatic weapon system scheduler for FCS MK 92 Combat System integration.

d. (U) Evaluate the potential to utilize today's off the shelf technology to resolve MIC and other problems.

e. (U) Support analysis/tradeoff studies to coordinate and define element roles for the FFG 7 AAW Weapon System with the ship self defense strategy.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604301N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK 92 FIRE CONTROL SYSTEM (FCS) UPGRADE
PROJECT NUMBER: S0179 PROJECT TITLE: MK 92 FCS UPGRADE

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMOPTEVFOR, Norfolk, VA; NAVSURFWARCENDIV, Port Hueneme, Ca; NAVAIRWARCENWPNDIV, Pt Mugu, Ca; NAVAL WARFARE ASSESSMENT CENTER, Seal Beach, Ca; SURFACE WARFARE DEVELOPMENT GROUP, Norfolk, Va; Naval Research Laboratory Washington, D.C. CONTRACTORS: Paramax Systems Corporation, Great Neck, NY; Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Vitro Corporation, Silver Spring, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost change: Not applicable.

F. (U) PROGRAM DOCUMENTATION: TEMP 107-2

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN #168	13,692	18,614	698	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

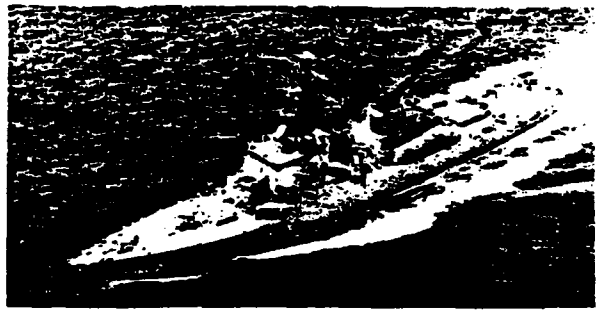
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
K1447	COMB SYS IMPR	54,533	76,261	77,055	CONT.	CONT.
K1776	AWS MODS	6,761	6,895	2,683	CONT.	CONT.
K1937	DDG WPN DEV	31,211	27,389	24,257	5,831	162,754
	TOTAL	92,505	110,545	103,995	CONT.	CONT.

B. (U) DESCRIPTION: The AEGIS Combat System provides immediate and effective capability to counter the current and expected air, surface and sub-surface threats as articulated in Naval Maritime Intelligence Center (NAVMIC) Threat Assessments #012-91 and #018-91 dated September 1991. Since the CG 47 and DDG 51 ships extend into the 21st century, changes in the threat capability and advances in technology such as fiber optics and distributed architecture, local area networks will require corresponding Weapon System and Combat System changes. This program provides the Combat System engineering and selected weapons development necessary for such a continued increase in the capability of the AEGIS Combat System in AEGIS cruisers and destroyers. It will also allow later ships of these classes to take advantage of maturing equipments and weapons systems being developed in other Navy research and development programs. Modifications of AEGIS Weapon System computer programs must be made to integrate these capabilities into the AEGIS Combat System so that battle effectiveness will be retained against the evolving threat. Weapon and Combat System upgrades will be backfitted into CG 47 Class and DDG 51 Class ships already in the Fleet.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1447 PROJECT TITLE: Combat Systems Improvements



POPULAR NAME: AEGIS COMBAT SYSTEMS IMPROVEMENTS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		M/S III		CONT.
ENGINEERING MILESTONES	B/L5 PHI PDRII 11/91 B/L5 PHI CDR 3/92 B/L5 PHII PDR 6/92	B/L5 PHI SQT 7/93 BL5 PHII CDR 12/92 B/L5 PHIII SDR 2/93 B/L5 PHIII PDR 6/93	B/L5 PHII SQT 9/94 BL5/PHIII CDR 1/94 B/L6 SDR 10/93 B/L6 PDR 4/94	CONT.
T&E MILESTONES	DT-IIIA 10/91 OT-IIIA 1-2/92 SPY-ID DT-IIE 10/91 SPY-1D OT-IIE 1-2/92	None	None	CONT.
CONTRACT MILESTONE		B/L5 PHII Award 11/92	B/L5 PH III Award 12/93	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	44,998	66,301	66,816	CONT.	CONT.
SUPPORT CONTRACT	246	256	256	CONT.	CONT.
IN-HOUSE SUPPORT	9,289	9,704	9,983	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	54,533	76,261	77,055	CONT.	CONT.

B. (U) DESCRIPTION: This project provides AEGIS Cruiser and Destroyer Combat System upgrades to integrate new equipments and systems to maintain pace with the threat and to capture advances in technology such as fiber optics and distributed architecture. The ships are upgraded in blocks and the Combat System in baselines. Baseline 2 (CG 52-58) consisted of the Vertical Launching System, TOMAHAWK Weapon System, and Anti-Submarine Warfare upgrades. Baseline 3 (CG 59-64) included the AN/SPY-1B radar and AN/UYQ-21 consoles. Baseline 4 (CG 65-73) integrated the AN/UYK-43/44 computers with superset computer programs

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1447 PROJECT TITLE: Combat Systems Improvements

developed for the DDG 51. Baseline 4 is the base Combat System for DDG 51-67. Baseline 5 is targeted for FY 92 ships and includes the Joint Tactical Information Distribution System (JTIDS)/Command and Control Processor (C^2P), TADIL J, Combat Direction Finding, Tactical Data Information Exchange System (TADIX B), AN/SLQ-32(V)3 Active Electronic Countermeasures and AEGIS Extended Range (ER) Missile. Baseline 5 will be developed in three steps (phases): Phase I integrates AEGIS ER and supports the missile Initial Operational Capability; Phase II integrates all planned upgrades except for JTIDS so they can be backfitted into Baseline 4 ships (the computer programs can operate in Baseline 4 ships whether any or all of the Baseline 5 new systems are installed); Phase III integrates JTIDS into the AEGIS Combat System. Baseline 6 is planned for the last ship in FY 94 and will include embarked helicopters, Evolved SEASPARROW Missile (ESSM), Fiber Optics as applied to Data Multiplexing System (DMS) and Interior Voice Communications System (IVCS), and implementation of affordability initiatives. The AEGIS Combat System will continue to be upgraded at approved intervals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted SPY-1D Technical and Operational Evaluation (TECHEVAL/OPEVAL) Development Test/Operational Test IIE (DT/OT-IIE) in ARLEIGH BURKE.

b. (U) Performed element test, evaluation, demonstration and qualification of OJ663 console variant of the AEGIS Display System computer program in Baseline 4 Phase II Ships. Conducted demo and Element Qualification Testing.

c. (U) Conducted Preliminary Design Review (PDR) II and Critical Design Review (CDR); completed design specifications, and commenced computer program coding, debugging and testing for AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I) at the Combat System Engineering Development (CSED) Site.

d. (U) Commenced Design specifications to integrate Baseline 5 Phase II (less JTIDS) into the Combat System. Conducted PDR.

e. (U) Commenced system definition to integrate JTIDS into the AEGIS Combat System (Baseline 5 Phase III).

f. (U) Commenced system definition to integrate Evolved SEASPARROW Missile into the AEGIS Combat System (Baseline 6) at the CSED Site.

2. (U) FY 1993 PROGRAMS:

a. (U) Complete computer program coding, debugging and testing of AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I).

b. (U) Conduct system demonstration of AEGIS ER computer programs for integration into the AEGIS Weapon System at the CSED Site.

c. (U) Complete design specifications and conduct CDR of Baseline 5 Phase II (less JTIDS). Commence computer program coding, debugging and testing at CSEDS for integration into AEGIS Combat System.

d. (U) Complete system definition, conduct System Design Review (SDR) and PDR, and commence design specifications for Baseline 5 Phase III (with JTIDS).

e. (U) Perform system definition to integrate Baseline 6 upgrades into the AEGIS Combat System (except efforts for ESSM).

3. (U) FY 1994 PLANS:

a. (U) Complete Baseline 5 Phase II computer program coding, debugging and testing.

b. (U) Conduct Baseline 5 Phase II Systems Qualification Test (SQT) at the CSED Site.

c. (U) Conduct Baseline 5 Phase III CDR.

d. (U) Commence computer program coding, debugging and testing at the CSED Site to integrate Baseline 5 Phase III into the AEGIS Combat System.

e. (U) Conduct Baseline 6 SDR and PDR; commence design specifications.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1447 PROJECT TITLE: Combat Systems Improvements

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVSURFWARCENDIV, Dahlgren, VA; NWS, Concord, CA; NWAC, Corona, CA; NAVAIRWARCENWPNDIV, Point Mugu, CA; and NRL, Washington, DC. CONTRACTORS: General Electric, Moorestown, NJ, and Syracuse, NY; Raytheon Corporation, Wayland, MA; VITRO Corporation, Silver Spring, MD; and Johns Hopkins Univ/APL, Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technical Changes: Baseline 6 (Flight IIA) as approved by the Chief of Naval Operations will introduce the following capabilities into an FY 94 ship: embarked helicopters, Evolved SEASPARROW Missile, and Fiber Optics as applied to DMS and IVCS.

2. (U) Schedule Changes: The schedule in section A reflects changes to introduce Baseline 6 (Flight IIA) into an FY 94 ship. Program Milestone III has slipped to the first quarter of FY 1993 to allow for evaluation of data from OT-IIIA.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
NDCP 1337, Rev 1, Chg 1	9/86
NTPS-30-8511A	9/87
Acq Plan AEGIS PMS 400G-91-01 Rev. 1/92	12/92
TEMP 801, Rev 6	2/92

G. (U) RELATED ACTIVITIES:
PE 0604366N, Standard Missile Improvements
PE 0603755N, Ship Self Defense
PE 0604755N, U0173, NATO Sea Sparrow

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
(U) SCN LI7/8	3,847,500	3,233,300	2,642,800	CONT.	CONT.
(U) OPN LI 174	42,546	107,786	29,589	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

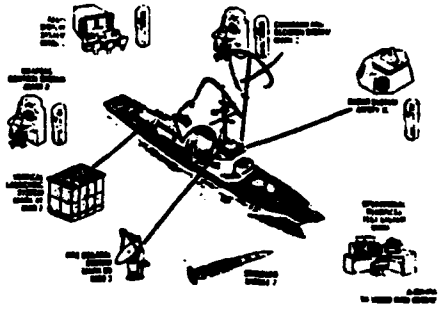
1. (U) DDG 51 DT-IIIA was conducted in October 1991, in conjunction with SPY-1D Technical Evaluation (TECHEVAL), DT-IIE.

2. (U) DDG 51 OT-IIIA was conducted in January/February 1992, in conjunction with SPY-1D Operational Evaluation (OPEVAL), OT-IIE.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1776 PROJECT TITLE: AEGIS Weapon System Mods

AEGIS WEAPON SYSTEM MARK 7 MOD 6



POPULAR NAME: AEGIS WEAPON SYSTEM MODS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	None	None	None	CONT.
ENGINEERING MILESTONES	None	None	None	CONT.
T&E MILESTONES	None	None	None	CONT.
CONTRACT MILESTONE	None	None	None	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5,916	6,673	2,483	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	845	222	200	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	6,761	6,895	2,683	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for modifications to the AEGIS Weapon System MK-7 to counter the threat (Naval Maritime Intelligence Center (NAVMIC) Threat Assessment #012-91 of September 1991). The modifications will be backfitted into CG 47 Class and DDG 51 Class ships already in the fleet.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Phase I development of the Fire Control System (FCS) Stable Master Oscillator (STAMO). Conducted STAMO Critical Design Review.

b. (U) Conducted system design reviews for Operational Readiness Test System (ORTS) upgrade. Completed the definition of the Man-Machine Interface (MMI) and prepared preliminary ORTS upgraded specifications. Completed ORTS Data Terminal Set requirements document, which specifies a full color work station and its shipboard adaptation.

c. (U) Continued with system engineering studies to define and develop Electronic Counter-Countermeasures (ECCM)/Deceptive Electronic Countermeasures (DECM) design changes relative to the eventual incorporation of these changes in the AN/SPY-1B/B(V)/D radar systems. Defined the AEGIS Weapon System requirements

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1776 PROJECT TITLE: AEGIS Weapon System Mods

to support the design effort. Continued to develop computer program algorithms to improve Anti-Air Warfare (AAW) system performance against various DECM threats.

2. (U) FY 1993 PROGRAM:

a. (U) Code, test, and debug computer program for ORTS MMI upgrade. Commence design of ORTS MMI upgrade equipment.
b. (U) Continue to develop computer program algorithms to improve AAW system performance against various DECM threats.

3. (U) FY 1994 PLANS:

a. (U) Complete Operational Readiness Test System (ORTS) Man-Machine Interface (MMI) upgrade equipment fabrication and computer program code, test, and debug.
b. (U) Conduct system testing in preparation for demonstration of ORTS MMI upgrade at the Combat System Engineering Development (CSED) Site in FY 95.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Port Hueneme, CA; and NWS, Concord, CA. CONTRACTORS: General Electric, Moorestown, NJ; Raytheon Corporation, Wayland, MA; Motorolla Corp., Scottsdale, AZ; and FMC, Minneapolis, MN.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Continued development of computer program algorithms to improve Anti-Air Warfare system performance and various DECM threats was suspended for one year.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

DCP-134	3/78	(except waiver ltr)
TLR, Rev 1, Chg 1	12/82	
ILS Plan 123-P/S	5/83	
NTP-30-7707B	2/88	
TEMP 100, Rev 3	1/89	

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

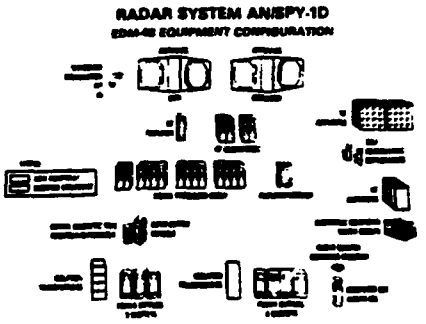
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LI #174	42,546	107,786	29,589	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1937 PROJECT TITLE: DDG Weapons Development



POPULAR NAME: SPY-1 RADAR UPGRADES

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		SPY-1D M/S III		
ENGINEERING MILESTONES	EDM SDR 12/91 EDM PDR 4/92	EDM CDR 10/92		EDM SQT 1Q/95
T&E MILESTONES	SPY-1D DT-IIE 10/91 SPY-1D OT-IIE 1-2/92			COMPLETED
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	29.235	25.041	20.910	3.779	147.225
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	1.976	2.348	3.347	2.052	15.529
GFE/ OTHER	0	0	0	0	0
TOTAL	31.211	27.389	24.257	5.831	162.754

B. (U) DESCRIPTION: This program is required to develop selected systems and subsystems for the ARLEIGH BURKE (DDG 51) class ships. This project funds development of equipment for the AEGIS Combat System, as opposed to the costs of integrating elements into the Combat System which is funded in Project K1447. Current funding provides for development of an upgrade to the current AN/SPY-1D radar (EDM-4B) to enhance its capability against seaskimming targets in increasingly more severe electronic countermeasures and in near-land clutter environments. The changes are in the transmitter, signal processor, and radar control computer program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1937 PROJECT TITLE: DDG Weapons Development

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued systems engineering to validate performance requirements analyses and definition.
b. (U) Conducted a System Design Review and a Preliminary Design Review for radar upgrades.
c. (U) Continued development of design specifications to determine equipment and firmware requirements.
d. (U) Continued detailed radar frame, module, subassembly and cabinet design and development.
e. (U) Continued equipment procurement, begin Engineering Development Model (EDM) fabrication and assembly.

2. (U) FY 1993 PROGRAM:

a. (U) Complete design specifications and conduct a Critical Design Review.
b. (U) Continue system engineering and commence generation of computer program code; debug and test computer program modifications.
c. (U) Continue equipment procurement, and EDM fabrication and assembly.
d. (U) Conduct element unit testing of the engineering development model.

3. (U) FY 1994 PLANS:

a. (U) Complete computer program code generation; complete debugging and testing.
b. (U) Complete EDM fabrication and complete element integration and testing.
c. (U) Install and perform system level integration at the Combat System Engineering Development (CSED) Site.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; and NAVSURFWARCENDIV, Port Hueneme, CA. CONTRACTORS: General Electric, Moorestown, NJ; and Johns Hopkins University, APL, Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technical Changes: Not applicable.

2. (U) Schedule Changes: SPY-1D Milestone III review slipped to first quarter of FY 1993 to permit evaluation of OT-IIE data.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
NDCP 1337, Rev 1, Chg 1	9/86
NTPS-30-8511A	9/87
PMP 88-03	10/88
PMP 89-01	10/89
Acq Plan, PMS400G-91-01, Rev. 1/92	12/92
TEMP 124-2, Rev 3	2/92

G. (U) RELATED ACTIVITIES: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1937 PROJECT TITLE: DDG Weapons Development

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands):

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) SCN LI 2122	3,947,500	3,233,300	2,642,800	2,247,893	15,293,035

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

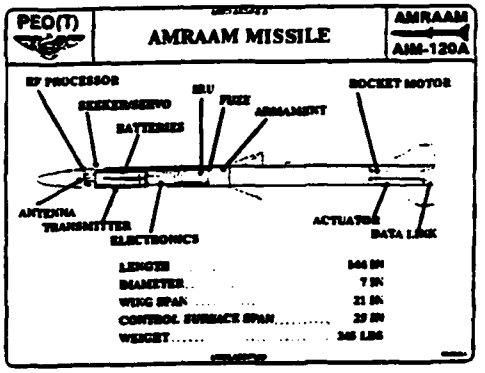
1. (U) SPY-1D Technical Evaluation (TECHEVAL), DT-IIE, was conducted in October 1991.

2. (U) SPY-1D Operational Evaluation (OPEVAL), OT-IIE, was conducted in January/February 1992.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Medium Range Air-to-Air Missiles
PROJECT NUMBER: E0981 PROJECT TITLE: AMRAAM



POPULAR NAME: AMRAAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES					
ENGINEERING MILESTONES	P³I-1 PDR 12/91	P³I-1 CDR 11/92	P³I-1 FCA/PDR 3/94		
T&E MILESTONES			P³I-1 FLT TEST		
CONTRACT MILESTONES			P³I-2 AWARD 10/93		
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	500	500	8,600	CONT.	CONT.
SUPPORT CONTRACT				CONT.	CONT.
IN-HOUSE SUPPORT	1,990	1,860	5,460	CONT.	CONT.
GFE/ OTHER	109	289	1,099	CONT.	CONT.
TOTAL	*2,599	*2,649	15,159	CONT.	CONT.

* Funded under W0981 in FY 1993 and prior.

B. (U) DESCRIPTION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile as a SPARROW follow-on with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P³I) efforts, and procurement of hardware to support Navy test and evaluation tasks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued refinement of missile/aircraft Electronic Counter-Countermeasures (ECCM) system performance.

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Medium Range Air-to-Air Missiles
PROJECT NUMBER: E0981 PROJECT TITLE: AMRAAM

b. (U) Completed operational testing (OT-IIIB).

c. (U) Continued participation in AMRAAM P³I Phase 1 (P³I-1) program with emphasis on Navy unique requirements and aircraft integration compatibilit

d. (U) Participated in P³I-1 Program Design Review (PDR).

e. (U) Participated in P³I Phase 2/3 program definition.

2. (U) FY 1993 PROGRAM:

a. (U) Continue refinement of missile/aircraft ECCM system performanc

b. (U) Continue participation in AMRAAM P³I Phase 1 (P³I-1) program including Critical Design Review (CDR) with emphasis on Navy unique requirement and aircraft integration compatibiity.

c. (U) Participate in P³I Phase 2/3 program planning and implementation.

3. (U) FY 1994 PLANS:

a. (U) Continue refinement of missile/aircraft ECCM system performanc

b. (U) Continue participation in AMRAAM P³I Phase 1 program including Functional Configuration Audit (FCA)/PDR with emphasis on Navy unique requirements and aircraft integration compatibiity.

c. (U) Commence flight testing of P³I Phase 1.

d. (U) Award the P³I Phase 2 contract which includes enhanced ECCM, improved lethality, and a propulsion system risk reduction effort to support P³I Phase 3.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV China Lake CA; NAVAIRWARCENWPNDIV Point Mugu CA. CONTRACTORS: Hughes Aircraft Company, Canoga Park, CA; Raytheon Company, Bedford, MA. OTHERS: Air Force Aeronautical Systems Division, Advanced Medium Range Air-to-Air Missile Joint System Program Office, Eglin Air Force Base, FL.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

JSOR	9/78	ILSP	2/91
MENS	11/78	DCP	3/91
SORD	1/90	TEMP	4/92
SOC	7/86	STAR	4/92

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Medium Range Air-to-Air Missiles
PROJECT NUMBER: E0981 PROJECT TITLE: AMRAAM

G. (U) RELATED ACTIVITIES:
(U) AMRAAM integration with the following programs:
PE 0207130F, F-15
PE 0207134F, F-15E
PE 0207133F, F-16
PE 0603230F, 0604239F, F-22
PE 0205667N, F-14 Upgrade
PE 0204136N, F/A-18 Squadrons
PE 0207163F, AMRAAM P^{3}I

(U) There is no unnecessary duplication of effort within the Navy, Air Force, or Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE
(U) WPN LINE 6	191,492	121,385	59,118	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the Congressional data sheets.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604354N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AAM Systems Engineering
PROJECT NUMBER: E0457 PROJECT TITLE: AIM-9X

PICTURE NOT AVAILABLE

POPULAR NAME: AIM-9X

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			MS-IV Decision (5/94)	CONT.	
ENGINEERING MILESTONES				CONT.	
T&E MILESTONES				CONT.	
CONTRACT MILESTONES			Award DEM/VAL Contr (3/94)	CONT.	
BUDGET	**FY 1992**	**FY 1993**	**FY 1994**	**TO COMPLETE**	**TOTAL PROGRAM**
MAJOR CONTRACT			3.600	CONT.	CONT.
SUPPORT CONTRACT			0	CONT.	CONT.
IN-HOUSE SUPPORT			3.498	CONT.	CONT.
GFE/ OTHER			0	CONT.	CONT.
TOTAL			7.098		

B. (U) DESCRIPTION: The AIM-9X Sidewinder program is a joint USAF/USN effort to continue the evolutionary development of the AIM-9 missile. The AIM-9X is a long term evolution of the AIM-9 that will produce a series of upgrades to the AIM-9 including seeker/guidance and kinematics that will be fielded in post-2000 timeframe. Funding for AIM-9X activities beyond FY 1993 will be provided equally by the USAF and USN. This is a new start for the Navy.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

   a. (U) Milestone IV Decision.

   b. (U) Award Demonstration and Validation Contract.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604354N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: AAM Systems Engineering
PROJECT NUMBER: E0457 PROJECT TITLE: AIM-9X

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: TBD

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Joint ORD In Coordination 09/93.
TEMP In Coordination 02/94.

G. (U) RELATED ACTIVITIES: This is jointly funded by the USAF and USN throughout the life of the program although it may not be equally funded each year.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
RDT&E,DA 0603715D	3,000	15,000	0	0	18,000
RDT&,AF 0207161F			35,445	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: A test and evaluation master plan will be written during FY 1993 to support DT that is planned for in FY 1995.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0439	Standard Missile Improvements	36,166	33,054	54,142	CONT.	CONT.
S1632	AEGIS ER	*34,147	*17,052	8,880	1,018	382,954
	TOTAL	*70,313	*50,106	63,022	CONT.	CONT.

* NOTE: These totals include former PE 0603318N funding in FY 1992 and FY 1993 for Project S1632.

B. (U) DESCRIPTION: STANDARD MISSILE IMPROVEMENT (Project S0439): STANDARD Missile fuze and guidance performance degrades when the target is in close proximity to the sea surface. The low altitude improvement program will improve performance against low and very low altitude targets. It will be implemented in two phases: Phase I added a fuze altimeter and trajectory shaping, enabling improved target detection and reducing the effect of multipath on radar returns on guidance performance. Phase II will add a

The directional warhead will improve lethality throughout the SM-2 Block III/IIIA/IIIB engagement envelope and will also improve the lethality of the SM-2 Block IV. Additionally, the SM-2 BLKIIIB (MHIP) will add a dual mode (RF/IR) capability to engage existing threats in a severe RF countermeasures environment. This capability is currently being developed for AEGIS ships and will be expanded to TARTAR ships with development commencing in FY 1994.

(U) AEGIS ER (SM-2 BLOCK IV) (Project S1632): This project was moved from PE 0603318N. The AEGIS ER missile is the latest member of the STANDARD Missile family of area defense missiles, specifically designed to take maximum advantage of AEGIS and the vertical launching system (VLS). This missile, also known as SM-2 Block IV, builds upon the SM-2 Block IIIA baseline with its improved performance and Adding significant propulsion, guidance and control enhancements, AEGIS ER extends STANDARD Missile engagement capability increases maneuverability and cross range capability and improves guidance homing accuracy in stringent environments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S0439 PROJECT TITLE: Standard Missile Improvements

POPULAR NAME: SM-2 BLOCK IIIA/IIIB

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	BLK IIIA MS III 2/92	BLK IIIA BLK IIIB MS IIA 12/93		CONT.
ENGINEERING MILESTONES	BLK IIIA PRDR 10/91 PRR 11/91 BLK IIIB CDR 3/92			CONT.
T&E MILESTONES		BLK IIIB WSMP	BLK IIIB TECHEVAL OPEVAL	CONT.
CONTRACT MILESTONES	BLK IIIA PROD 4/92		BLK IIIB O/A KIT LRIP 1/94	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	24,665	27,765	14,681	CONT.	CONT.
SUPPORT CONTRACT	0	0	0		
IN-HOUSE SUPPORT	11,501	5,289	10,739	CONT.	CONT.
GFE/ OTHER	0	0	28,722	CONT.	CONT.
TOTAL	36,166	33,054	54,142	CONT.	CONT.

B. (U) DESCRIPTION: STANDARD Missile fuze and guidance performance degrades when the target is in close proximity to the sea surface. The low altitude improvement program will improve performance against low and very low altitude targets. It will be implemented in two phases: Phase I added a fuze altimeter and trajectory shaping, enabling improved target detection, and reducing the effect of multipath on radar returns on guidance performance. Phase II

will improve lethality throughout the SM-2 Block III/IIIA/IIIB engagement envelope and will also improve the lethality of the SM-2 Block IV. SM-2 will receive Phase I (Block III) and be upgraded by Phase II (Block IIIA). The importance of these improvements derives from the fact they address threats known to exist today. Additionally, the Missile Homing Improvement Program (MHIP) SM-2 BLK IIIB will expand this effort

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S0439 PROJECT TITLE: Standard Missile Improvements

by incorporating a dual mode RF/IR seeker to improve the missile's capability to resolve seeker ambiguities and engage targets in severe RF countermeasure environments. These improvements are being developed in such a way that current systems in the fleet can be backfitted with this capability. Specific threats for SM-2 Block III/IIIA/IIIB are identified in the Navy Decision Coordinating Paper (NDCP) and approved MNS and ORD BLKIIIB. The current minimum target altitude capability of SM-2 Block II is 50 ft. Future improvements may include additional very low altitude performance enhancements, two missiles per VLS canister (Dual Pack), insensitive munition enhancements, and a common MR/ER missile.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted Pre-Production Reliability Design Review (PRDR) in 10/91 (Block IIIA).

b. (U) Completed Production Readiness Review (PRR) in 11/91 (Block IIIA).

c. (U) Completed MS III review (Block IIIA).

d. (U) Released to production (Block IIIA).

e. (U) Continued EMD (Block IIIB).

f. (U) Completed CDR, 3/92 (Block IIIB).

2. (U) FY 1993 PROGRAM:

a. (U) Continue EMD (Block IIIB).

b. (U) Achieve (Block IIIA).

c. (U) Initiate further enhancements of very low altitude performance enhancements versus Low Radar Cross Section (RCS) targets, 10/92 (Block IIIA).

d. (U) Commence flight test at WSMR, (Block IIIB).

e. (U) Complete COMOPTEVFOR (COTF) operational assessment (Block IIIB).

3. (U) FY 1994 PLANS:

a. (U) Complete MS IIA, 12/93 (Block IIIB).

b. (U) Award contract for LRIP, (Block IIIB).

c. (U) Conduct At-Sea TECHEVAL, (Block IIIB).

d. (U) Conduct At-Sea OPEVAL, (Block IIIB)

e. (U) Continue further enhancements of very low altitude performance enhancements versus Low RCS targets, 9/94 (Block IIIA).

f. (U) Initiate MHIP modifications for the TARTAR missile.

g. (U) Initiate MHIP Pre-planned Product Improvement (P3I) Program

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S0439 PROJECT TITLE: Standard Missile Improvements

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Hughes Missile Systems Company (HMSC), Pomona, CA; Raytheon Company, Bedford, MA; Motorola GEG, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; GE, Moorestown, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Program delays due to IR common seeker technical issues impacting flight test program.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

AP 408-85 Amendment 2 TAB approved	6/86
PEM signed	10/85
J&A approved	3/86
PMP 85-02 approved	5/86
PMP IIIB (MHIP) 89-1 approved	7/89
III/IIIA TEMP 623-1 REV 1, Change 2 approved	10/91
NDCP approved	5/88
IIIB (MHIP) NDCP submitted to OPNAV	9/91
IIIB (MHIP) AP SEA 89-02/AIR 88-28 (Rev 1) approved	7/91
IIIB TEMP 623-3 submitted to ASN(RD&A)	11/92
Updated IIIB documentation (IPS, ORD, MNS, ASR, COEA, and Baseline) approved by ASN (RD&A) for approval	12/92

G. (U) RELATED ACTIVITIES: Ordnance sectior developed as GFE to RAYTHEON for Project S1632 SM-2 Block IV Missile.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

WEAPONS PROCUREMENT, NAVY:

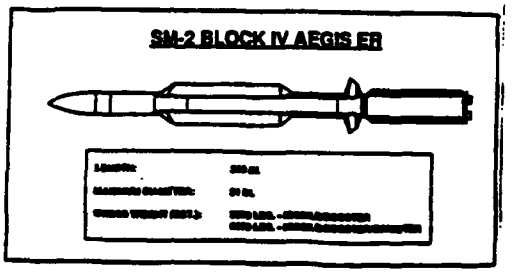
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
BLK IIIA					
(U) FUNDS #9	256,500	247,000	209,000	CONT.	CONT.
(U) QUANTITY	330	330	220	CONT.	CONT.
BLK IIIB					
(U) FUNDS #9	0	6,985	6,419	CONT.	CONT.
(U) KIT QUANTITY	0	100	100	CONT.	CONT.
(U) MISSILE QUANTITY	0	0	0	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:
Block IIIB WSMR
Block IIIB TECHEVAL
Block IIIB OPEVAL

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)



POPULAR NAME: SM-2 BLOCK IV AEGIS ER

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MSIII 5/94	CONT.
ENGINEERING MILESTONES		1st GUID FLT 3/93		
			PRR 3/94	CONT.
T&E MILESTONES	WSMR 10/91-5/93	DT/OT 11/93-1/94		CONT.
CONTRACT MILESTONES			PROD 6/94	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	26.286	12.789	3.552	611	326.686
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	7.861	4.263	5.328	407	56.268
GFE/ OTHER	0	0	0	0	0
TOTAL	34.147	17.052	8.880	1.018	382.954

B. (U) DESCRIPTION: This project was moved from PE 0603318N. The AEGIS ER missile is the latest member of the STANDARD Missile family of area defense missiles, specifically designed to take maximum advantage of AEGIS and the vertical launching system (VLS). This missile, also known as SM-2 Block IV, builds upon the SM-2 Block IIIA baseline with its improved performance and Adding significant propulsion, guidance and control enhancements, AEGIS ER extends STANDARD Missile engagement capability increases maneuverability and cross range capability and improves guidance homing accuracy in stringent environments. The resulting extension of the STANDARD Missile engagement envelope will permit utilization of the full SPY-1 B/D radar range capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued flight tests at WSMR, P/CTV and GTVs.

b. (U) Completed AEGIS Tactical Computer Program PDR and CDR.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)

c. (U) Completion of safety hazards and E-cubed testing.

d. (U) Completion of AEGIS integration, Phase 2 at CSEDS.

2. (U) FY 1993 PROGRAM:

a. (U) Continue flight tests at WSMR.

b. (U) Complete assessment of Block IV performance based on Flight test results and simulator work, 4th QTR.

c. (U) Conduct Production Readiness Review, 3rd QTR.

d. (U) Support production transition engineering tasks for BLK IV.

3. (U) FY 1994 PLANS:

a. (U) Conduct DT/OT, 1st QTR FY-94.

b. (U) Support preparation for and conduct MS III for BLK IV, 1st QTR 94

c. (U) Finalize resolution of production transition design issues.

d. (U) Finalize reformation of performance estimates based on DT and OT testing.

e. (U) Define needed changes to facilitate fleet introduction.

4. (U) PROGRAM TO COMPLETION: Program completes in FY 1995.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Indian Head, MD. CONTRACTORS: Johns Hopkins University/APL, Laurel, MD; Raytheon Company, Bedford, MA; Hughes Missile Systems Company (HMSC), Pomona, CA; Motorola, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; G.E. GSD, Moorestown, NJ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Guided Test Vehicle flight test programs at WSMR delayed; MS III changed from 6/93 to 5/94. Other schedule changes due to delays in resolving guidance section issues including seeker dynamics stability.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

AP 541-86 approved	3/87
PRM signed	6/87
J&A approved	4/87
PMP 87-01 approved	4/87
TEMP 623-2, forwarded to COTF	5/92
IPS/Baseline approved by ASN(RD&A)	7/92

G. (U) RELATED ACTIVITIES: PE 0604366N, S0439 STANDARD Missile Improvement Program supports development of SM-2 Block IIIA Ordnance section to be provided as GFE.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Standard Missile Improvements
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER (SM-2 BLOCK IV)

H. (U) OTHER APPROPRIATION FUNDS: Procurement funding planned in FY 1995.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

WSMR	10/91-5/93
DT/OT	11/93-1/94
DT/FOT&E	6/96-9/96

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604372N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Threat Upgrade

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0188	New Threat Upgrade	4,816	1,892	4,662	CONT.	CONT.
S0964	TARTAR SM-2/NTU	4,993	3,951	*0	0	121,293
TOTAL		9,809	5,843	4,662	CONT.	CONT.

* Commencing in FY 94 Project S0964 funding has been combined into S0188.

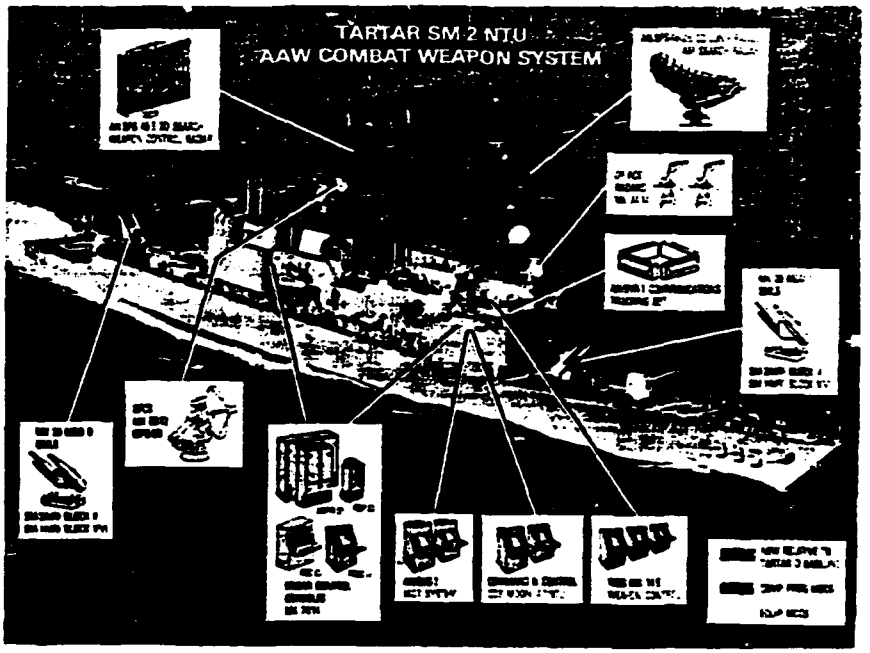
B. (U) DESCRIPTION: This program element develops shipboard weapon engagement system

The New Threat Upgrade (NTU) program supports development of modifications to counter these threats. Systems affected include Weapon Direction Systems, Guided Missile Fire Control Systems, Guided Missile Launching Systems, and Communications Tracking Sets in NTU cruisers and destroyers. In addition the program supports

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604372N
PROGRAM ELEMENT TITLE: New Threat Upgrade
PROJECT NUMBER: S0188

BUDGET ACTIVITY: 4
PROJECT TITLE: New Threat Upgrade



POPULAR NAME: NTU

A.(U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES			DT/OT CORRECTIONS WDS PDR CTS PDR	CONT.
T&E MILESTONES	LAND-BASED TEST	AT-SEA TEST		
CONTRACT MILESTONES	PDI (LARIP)	PDI (LARIP)	INITIATE SM-2 BLK III IMP. TESTS	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4.150	1.455	1.500	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	666	437	483	CONT.	CONT.
GFE/ OTHER	0	0	2.679	CONT.	CONT.
TOTAL	4.816	1.892	4.662	CONT.	CONT.

Note: Commencing in FY 94, S0964 funding has been combined into S0188.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604372N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: New Threat Upgrade
PROJECT NUMBER: S0188 PROJECT TITLE: New Threat Upgr

B. (U) DESCRIPTION: This project develops modifications to the NTU Engagement Systems to These modifications are responsiv to Combat System compatibility requirements, fleet operations, NTU Developm and Operational Test (DT/OT) lessons learned and emergent threats. The NTU Improvements are scheduled for guided missile cruisers and destroyers. Thi project supports

The NTU engagement system improvements consist of MK 74 MFCS C-Band and X-Band transmitter

Weapon Direction System a Communication Tracking Set improvements consist of and compatibilit changes driven by MK 74 MFCS modifications. These improvements are required consistent with Navy doctrine, to

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Installed Fire Control System (FCS) MK 76 pulse doppler integration (PDI) (Low Altitude/Readiness Improvement Program (LARIP)) prototype in land based test site (LBTS) for test and evaluation.

b. (U) Continued design/development of modifications to fully exploit SM-2(ER) Blk III round capabilities, and correct deficiencies from testing a lessons learned during fleet operations.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct redesign of FCS MK 76 PDI computer programs to incorporate lessons learned from LBTS test and evaluation.

b. (U) Conduct at-sea test and evaluation of FCS MK 76 PDI.

c. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned during Fleet operations.

3. (U) FY 1994 PLANS:

a. (U)

b. (U) Conduct TARTAR Weapon Direction System/Communication Tracking Set (WDS/CTS) Preliminary Design Review (PDR) for the SM-2 Block IIIB integration.

c. (U) Complete design/development/testing of modifications correcti deficiencies from testing and lessons learned during Fleet operations.

d. (U) Initiate design/development of MFCS MK 74 X-Band

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604372N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: New Threat Upgrade
PROJECT NUMBER: S0188 PROJECT TITLE: New Threat Upgra

e. (U) Initiate design/development of

f. (U) Initiate design/development of MFCS MK 74

g. (U) Initiate design/development of WDS MK 14

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN FLTCOMBATDIRSSACT, Dam Neck, VA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Port Hueneme, CA NAVSURFWARCEN INTCOMBATSYSTESTFAC, San Diego, CA; NAVAIRWARCENWPNDIV, Pt Mug CA. CONTRACTORS: Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; VITRO Corporation, Silver Spring, MD; PARAMAX Corporation, Great Neck, NY; General Dynamics, Pomona, CA; FMC Naval Systems Division, Minneapolis, MN; E-Systmes/ECI Division, St. Petersburg, FL; Raytheon Compan Wayland, MA; Republic Electronics, Hauppauge, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TARTAR NTU		TERRIER NTU	
TEMP 731	FEB 88	Navy Training Plan S-30-7626E	FEB
Navy Training Plan (Engagement System)	FEB 92	(Engagement System) Navy Training Plan S-30-8520B (MK 10 Guided Missile Launching System)	JAN
Integrated Logistic Support Plan (306-P/D)	MAR 88		
MDCP	FEB 81	Integrated Logistic Support Plan (084-4/5)	AUG

G. (U) RELATED ACTIVITIES: PE 0604366N (STANDARD Missile Improvements) supports development of improvements to SM-2 Block II/III/IIIA/IIIB missiles

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures

BUDGET ACTIVITY:

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0528[1]	Advanced Airborne Mine Countermeasures Equipment	1,422	1,180	5,516	22,126	58,600
Q0529[1]	Airborne Mine Hunt Systems	13,514	16,472	17,028	41,233	144,400
Q2047	Magic Lantern	13,867	12,746	10,611	16,720	73,100
	TOTAL	28,803	30,398	33,155	80,079	276,100

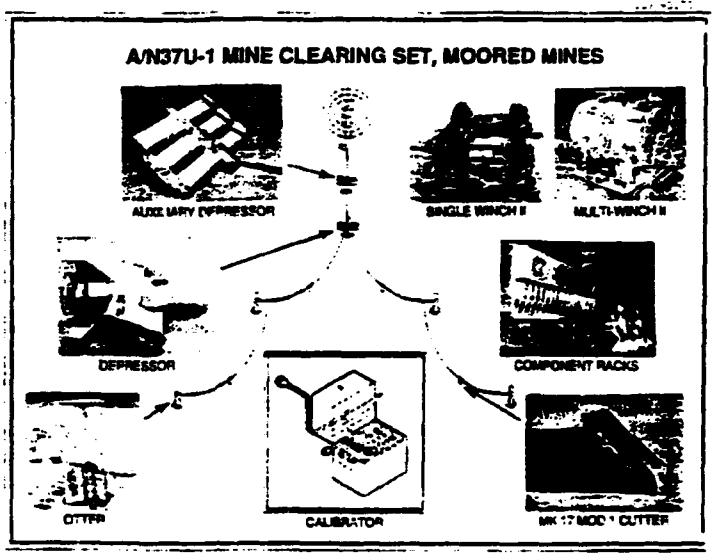
[1]Previously funded under PE 0603260N

B. (U) DESCRIPTION: This program develops airborne mine countermeasures system that are required to counter known and projected mine threats. Provides a

using Light Detection and Ranging (LIDAR) techniques.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q0528 PROJECT TITLE: Advanced Airborne Mi
Countermeasures Equipm



POPULAR NAME: AIRBORNE MINE SWEEPING EQUIPMENT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM			37U-III(8/94) CP-II(3/94)	CP-III(4QTR/98) MAG CABLE-III
MILESTONES			MAG CABLE-II(3/94)	(4QTR/98)
ENGINEERING MILESTONES			MAG CABLE-PDR(9/94)	CONT.
T&E			37U(DT-IIC(11/93))	CP(DT-IIB(4QTR/97)) CP(OT-IIB(2QTR/98))
MILESTONES			37U(OT-IIB(5/94))	MAG CABLE(DT-IIB (2QTR/97)
CONTRACT MILESTONES		37U-E&MD(6/92)	CP-E&MD(3/94) MAG CABLE-E&MD(3/94)	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	845	371	2,990	9,157	32,880
SUPPORT CONTRACT	0	0	0	0	225
IN-HOUSE SUPPORT	577	709	1,776	6,356	17,235
GFE/ OTHER	0	100	750	6,613	8,260
TOTAL	1,422	1,180	5,516	22,126	58,600

B. ( ) DESCRIPTION: There is a requirement to expand helicopter mine countermeasures by developing a more effective capability to sweep mines. The A/N37U-1 Controlled Depth Moored Sweep is being developed to
In addition there are two new sta
in FY 1994. The first is a sweep against the Cluster Pretzel mine. The seco
is a new magnetic sweep array (higher current capacity, smaller diameter, and lower weight).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q0528 PROJECT TITLE: Advanced Airborne Mine Countermeasures Equipment

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Awarded contract for additional A/N37U-1 engineering and manufacturing development (EMD) models to complete development and operational testing.
b. (U) Initiated fabrication of A/N37U-1 EMD models.
2. (U) FY 1993 PROGRAM: Complete fabrication of A/N37U-1 EMD models. Beg technical evaluation (TECHEVAL) of A/N37U-1.
3. (U) FY 1994 PLANS:
a. (U) A/N37U-1 - Initiate TECHEVAL, conduct operational evaluation (OPEVAL), obtain Milestone III (Approval for Full Rate Production (AFRP)).
b. (U) Cluster Pretzel Sweep - Obtain Milestone II. Award EMD contract Initiate design of EMD models.
c. (U) Magnetic Cable Improvement - Obtain Milestone II. Award EMD contract and conduct Preliminary Design Review (PDR). Initiate fabrication of EMD models.
4. (U) PROGRAM TO COMPLETION:
a. (U) Cluster Pretzel Sweep - Conduct PDR and Critical Design Review (CDR). Continue fabrication of EMD models. Complete fabrication and test EMD models. Conduct TECHEVAL and OPEVAL. Obtain Milestone III (AFRP).
b. (U) Magnetic Cable Improvements - Conduct CDR and continue fabricati of EMD models. Complete fabrication and test of EMD models. Conduct TECHEVAL. Obtain Milestone III (AFRP).
c. (U) Program funding planned to complete in FY-98.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: General Systems Solutions, Groton, CT; others TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3.(U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: A/N37U-1 TEMP: 7/91. Other documentation in process.

G. (U) RELATED ACTIVITIES:
- o PE 0602315N, MCM, Mining and Special Warfare Technology: Cable fairi and towed body technologies.
- o PE 0603502N, Undersea Warfare and MCM Development Single Ship Deep Sweep.
- o PE 0603555N, Undersea Superiority and Technology Demonstration.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

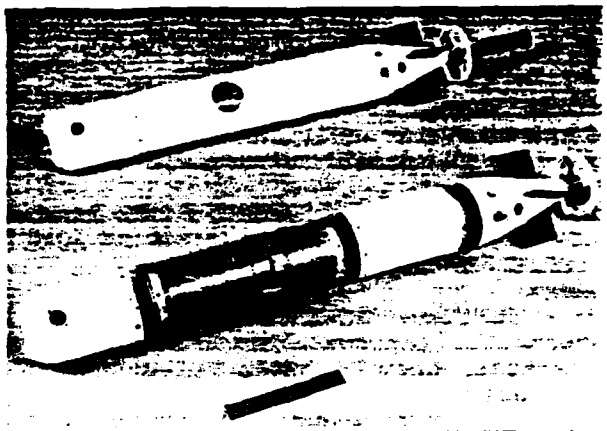
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN LINE 161	0	0	6,347	8,840	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:
1. (U) A/N37U-1:
TECHEVAL - NOV/93
OPEVAL - MAY/94
2. (U) CLUSTER PRETZEL SWEEP:
TECHEVAL - SEP/97
OPEVAL - JAN/98
3. (U) MAGNETIC CABLE IMPROVEMENTS:
TECHEVAL - JAN/97

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q0529 PROJECT TITLE: Airborne Mine Hunt Sys



POPULAR NAME: AIRBORNE MINE HUNT SYSTEM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	Q20-II(6/92)			AMNS-III (3QTR/97) Q20-III (4QTR/97)
ENGINEERING MILESTONES		Q20-PDR(7/93)	AMNS-PDR(2/94) CDR(8/94) CDR(11/93)	
T&E MILESTONES				AMNS(DT-IIB(6/96)) AMNS(OT-IIB(1QTR/97)) Q-20(DT-IIB(1QTR/97)) Q-20(OT-IIB(3QTR/97))
CONTRACT MILESTONES	Q20-EMD(7/92)	AMNS-E&MD(8/93)		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5,270	13,120	14,323	22,521	96,300
SUPPORT CONTRACT	0	0	0	0	159
IN-HOUSE SUPPORT	8,244	3,352	2,705	13,712	42,941
GFE/ OTHER	0	0	0	5,000	5,000
TOTAL	13,514	16,472	17,028	41,233	144,400

B. (U) DESCRIPTION: This project includes a sonar for mine detection and classification, and a system for mine neutralization by explosive charge, with equipment designed to provide

Systems bei

developed: A/A25E-24 Airborne Mine Neutralization Set to

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q0529 PROJECT TITLE: Airborne Mine Hunt System

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Airborne Mine Neutralization System - Performed software evaluation and subsystem demonstrations.
b. (U) AN/AQS-20 - Obtained Milestone II. Awarded EMD contract. Tested highest risk subsystems.
2. (U) FY 1993 PROGRAM:
a. (U) Airborne Mine Neutralization System - Award EMD contract. Initiate design.
b. (U) AN/AQS-20 - Conduct Preliminary Design Review (PDR); initiate fabrication of EMD models; Continue test program.
3. (U) FY 1994 PLANS:
a. (U) Airborne Mine Neutralization System - Conduct PDR and Critical Design Review (CDR) and order long lead items; initiate fabrication of EMD models.
b. (U) AN/AQS-20 - Conduct CDR; continue fabrication of EMD models.
4. (U) PROGRAM TO COMPLETION:
a. (U) Airborne Mine Neutralization System - Continue fabrication and test of EMD models. Initiate Contractor Demonstration. Conduct TECHEVAL. Conduct OPEVAL. Obtain Milestone III Approval for Full Rate Production (AFRP).
b. (U) AN/AQS-20 - Continue fabrication of EMD models. Begin contractor in-plant testing. Complete fabrication and test of EMD models. Conduct TECHEVA and OPEVAL. Obtain Milestone III (AFRP).
c. (U) Program funding planned to complete in FY-97.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD. CONTRACTORS: Raytheon Submarine Signal Division, Portsmouth, RI; others to be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Not applicable.
3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
1. (U) Airborne Mine Neutralization System -
Operational Requirements Document (Document in Review).
Test & Evaluation Master Plan #053-2 (Document in Review).
Integrated Program Summary (Document being drafted).
2. (U) AN/AQS-20 -
Operational Requirements Document: 6/92.
Integrated Program Summary: 6/92.
Cost and Operational Effectiveness Analysis: 6/92.
Test & Evaluation Master Plan #053-3: 7/92.

G. (U) RELATED ACTIVITIES:
- PE 0602315N, MCM, Mine and Special Warfare Technology: Computer-aided detection/classification, cable fairing, and towed body technologies.
- PE 0603502N, Undersea Warfare and MCM Development: Advanced Minehunting System, Project S0260, Project S1404.
- PE 0603555N Undersea Superiority Technology Demonstration.

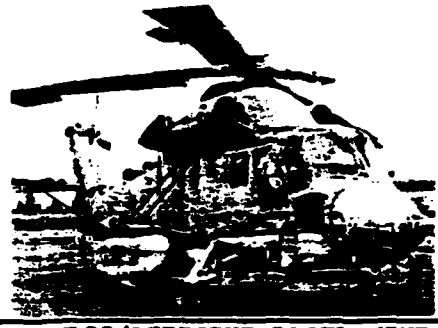
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:
1. (U) Airborne Mine Neutralization System:
TECHEVAL - JUN/96
OPEVAL - DEC/96
2. (U) AN/AQS-20:
TECHEVAL - NOV/96
OPEVAL - APR/97

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q2047 PROJECT TITLE: Magic Lantern



POPULAR NAME: MAGIC LANTERN ML90/AIRBORNE LASER MINE DETECTION SYSTEM (ALMDS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			ML/ALMDS-II (3/94)	ALMDS-III (12/96)
ENGINEERING MILESTONES	ML CDR 2/92			
T&E MILESTONES			DT-IA 10/93	DT-IIA(1/96) OT-IIA(8/96)
CONTRACT MILESTONES	ML ADM 11/91	ALMDS E&MD (6/94 - 1/97) (SH-2F / 1 EDM)		ALMDS PROD FY99

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	10.843	7.300	9.450	12.190	53.360
SUPPORT CONTRACT	2.768	1.189	861	2.170	9.500
IN-HOUSE SUPPORT	256	450	300	690	2.900
GFE/ OTHER		3.807		1.670	7.340
TOTAL	13.867	12.746	10.611	16.720	73.100

B. (U) DESCRIPTION: The Non-Acoustic Mine Detection program, which is developi the Magic Lantern Airborne Mine Countermeasures system is designed to accelerat development of a light detection and ranging (LIDAR) system for rapid detectior and localization of floating and tethered mines.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Signed contract with Kaman Aerospace on 24 Nov 91, for procureme of two (2) advanced development models (ADM).

b. (U) Completed critical design reviews for hardware software.

c. (U) Initiated alternate platform, common pod design, common navigati system studies.

d. (U) Initiated integrated logistics support planning.

2. (U) FY 1993 PROGRAM:

a. (U) Complete fabrication and delivery of ADM's.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604373N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures
PROJECT NUMBER: Q2047 PROJECT TITLE: Magic Lantern

b. (U) Initiate DT-I testing.

c. (U) Initiate documentation for MS-II.

d. (U) Provide for Contingency Deployment capability.

3. (U) FY 1994 PLANS

a. (U) Complete DT-I testing

b. (U) Obtain MS-II approval

c. (U) Procure one (1) engineering and manufacturing development model (EMD) for developmental and operational testing. The EMD will be delivered 1st QTR FY 96 to support planned Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL) in FY 96. Successful EMD testing will provide data to support Milestone III now planned for 1QFY97.

d. (U) Procure ILS items including Interim Publications, Peculiar Support Equipment, and ILS support.

e. (U) Procure long lead ILS spares items and continue EMD development.

f. (U) Continue Image Algorithm and Model refinement development.

4. (U) PROGRAM TO COMPLETION: Complete fabrication of EMD.

D. (U) WORK PERFORMED BY: *IN-HOUSE: NAVAIRWARECENACENACDIV*, Patuxent River, MD; NAVAIRWARCENACDIV, Indianapolis IN; NAVAIRWARCENACDIV, Warminster PA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; CONTRACTORS: METRON, Reston, VA; KAMAN Aerospace Corp., Bloomfield, CT and Tucson AZ.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
ORD - IN N85 REVIEW
TEMP - DRAFT IN REVIEW

G. (U) RELATED ACTIVITIES: PE 0603555N, Sea Control and Littoral Warfare Technology Demonstration.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

DTI	10/93	
DTII	01/96	
OT	Readiness Review	07/96
OTII	08/96	

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F0219	SUB SONAR IMPROVEMENT (ENG)	38,289	35,200	32,487	CONT.	CONT.
F0775	SSEP	4,463	21,739	7,204	CONT.	CONT.
X0742	SUB INTEGRATED ANTENNA SYSTEMS	11,674	13,336	15,287	CONT.	CONT.
X1411	SUB TACTICAL COMMUNICATIONS	2,198	1,876	1,571	CONT.	CONT.
	TOTAL	56,624	72,151	56,549	CONT.	CONT.

B. (U) DESCRIPTION: This program delivers block updates to Submarine Sonar Systems installed on SSN 688, 688I and TRIDENT Class Submarines. The goal is to ensure submarine stealth by maintaining clear acoustical, tactical and operational superiority over the entire spectrum of submarine and surface combatant threats to a variety of missions. The AN/BQQ-5E with TB-29 Array will provide quantum improvements in long-range detection and localization for all platforms and significantly enhance the defensive capability of SSBN 726 class submarines. The AN/BQQ-5 688I Block will provide Low Frequency Active (LFA) Interference Rejection, Dual Towed Array Processing and Full Spectrum Processing to SSN 688, 688I, and SSBN 726 Platforms as well as TB-29 capability to 688I platforms. Future improvements for the AN/BQQ-5 688I sonars may include Full Spatial Vernier Processing for TB-29 Arrays and Active Improvements. Onboard Trainers will provide dockside and at-sea operational team training to improve operator efficiency in search, detection, classification, localization and weapons launch. Towed Array development focus is on tow cable and Vibration Isolation Module (VIM) improvements to reduce self-noise. Towed Array hydrophone and telemetry development will focus on hardware affordability.

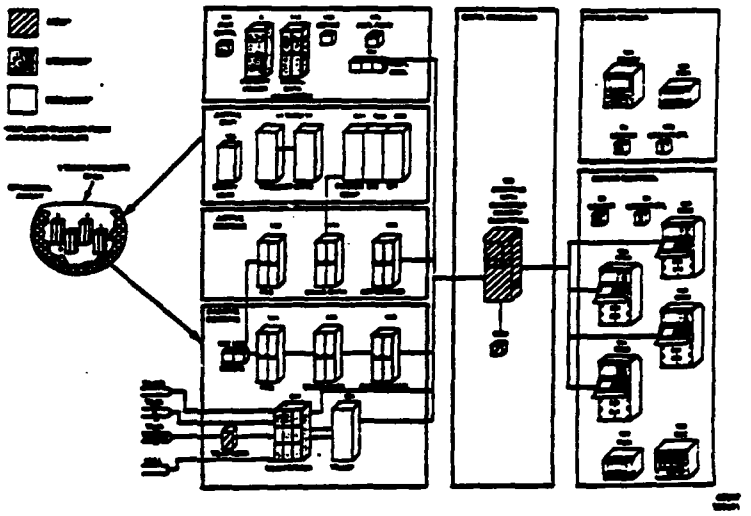
(U) The Submarine Support Equipment Program (SSEP) develops and improves submarine Electronic Support Measures (ESM) techniques and components, equipment, and systems that will increase submarine operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine ESM to be effective in conducting the following mission areas: Littoral Warfare Joint Surveillance, Space and Electronic Warfare, Intelligence gathering, MariTime protection, and Joint Strike. The major effort in this area is engineering and manufacturing development of the Integrated ESM Mast (IEM) and the Advanced Submarine Tactical ESM Combat System (ASTECS).

(U) The Submarine Integrated Antenna Systems project develops the antennas needed to communicate in networks such as Ultra High Frequency Satellite Communications, Extremely Low Frequency (ELF), Extremely High Frequency (EHF), and Global Positioning System. Hardware developments include (a) mast-mounted systems; (b) buoyant cable systems; (c) expendable buoy systems, and (d) towed buoy systems. The Submarine Tactical Communications Systems project provides attack submarines with an exterior communications system which (a) minimizes time required at communications depth, (b) enhances operability, reducing errors and manpower requirements, and (c) provides flexibility for low impact growth and change throughout the life of the submarine. Design efforts will provide increased time and frequency distribution, antenna signal distribution and interconnection subsystems to accommodate ELF, EHF, and Mini-Demand Assigned Multiple Access and a message storage and processing subsystem.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0219 PROJECT TITLE: Submarine Sonar Improvement (ENG)

AN/BQQ-5E(V)3, SSN



POPULAR NAME: Submarine Sonar System (Engineering)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
Q-5E	MSIIA 8/92			MS III 11/94
TB-29 Array		MSIIA 10/92		MS III 11/94
ENGINEERING MILESTONES				
Q-5E	SDCT 2/92			
TB-29 Array	CDR 11/91	SDCT 1/93		
T&E MILESTONES				
Q-5E		TECHEVAL 8/93	OPEVAL 3/94	
TB-29 Array		TECHEVAL 8/93	OPEVAL 3/94	
CONTRACT MILESTONE				
Q-5E	LRIP Award 8/92			
TB-29 ARRAY		LRIP Award 10/92		

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	31,629	24,330	24,951	CONT.	CONT.
SUPPORT CONTRACT	896	577	1,217	CONT.	CONT.
IN-HOUSE SUPPORT	5,764	9,843	6,319	CONT.	CONT.
GFE/ OTHER	0	450	0	CONT.	CONT.
TOTAL	38,289	35,200	32,487	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0219 PROJECT TITLE: Submarine Sonar Improvement (ENG)

B. (U) DESCRIPTION: This program delivers block updates to Submarine Sonar Systems installed on SSN 688, 688I and TRIDENT Class Submarines. The goal is to ensure submarine stealth by maintaining clear acoustical, tactical and operational superiority over the entire spectrum of submarine and surface combatant threats to a variety of missions including Peacetime Engagement, Surveillance, Deterrence, Regional Sea Denial, Precision Strike, Task Group Support, and Ground Warfare Support. Each hardware and software update is embodied in a block change package, such that the Combat System as a whole can capitalize on synergism of the individual improvements. The AN/BQQ-5E with TB-29 Array will provide quantum improvements in long-range detection and localization for all platforms and significantly enhance the defensive capability of SSBN 726 class submarines. The AN/BQQ-5/688I Block will provide Low Frequency Active (LFA) Interference Rejection, Dual Towed Array Processing and Full Spectrum Processing to SSN 688, 688I and SSBN 726 Platforms as well as TB-29 capability to 688I platforms. Future improvements for the AN/BQQ-5/688I sonars may include Full Spatial Vernier Processing for TB-29 Arrays and Active Improvements. Onboard Trainers will provide dockside and at-sea operational/team training to improve operator efficiency in search, detection, classification, localization and weapons launch. Towed Array development focus is on tow cable and Vibration Isolation Module (VIM) improvements to reduce self-noise. Towed Array hydrophone and telemetry development will focus on hardware affordability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed AN/BQQ-5E System Design Certification Test (SDCT). Milestone (MS) MSIIA approval.

b. (U) Completed TB-29 Array Critical Design Review (CDR).

c. (U) Completed System Specification for AN/BQQ-5/688I Block.

2. (U) FY 1993 PROGRAM:

a. (U) Start Technical Evaluation (TECHEVAL) for AN/BQQ-5E and TB-29 Array.

b. (U) Obtain Milestone MSIIA approval for TB-29 Array. Complete Engineering Development Model (EDM) and SDCT for TB-29 Array.

c. (U) Award development contract for Onboard Trainer.

d. (U) Start development of AN/BQQ-5/688I Block.

3. (U) FY 1994 PLANS:

a. (U) Complete TECHEVAL/Operational Evaluation (OPEVAL) for AN/BQQ-5E and TB-29 Array.

b. (U) Complete CDR for Onboard Trainers.

c. (U) Begin Towed Array Improvement studies at Technical Design Agent (TDA).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0219 PROJECT TITLE: Submarine Sonar Improvement (ENG)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET, New London, CT; NRL, Washington, D.C.; NAVSURFWARCENDIV, Crane IN; NAVSURWARCEN CARDEROCKDIV, Bethesda, MD; COMOPTEVFOR, Norfolk, VA. CONTRACTORS: International Business Machines Corp., Federal Systems Company, Manassas, VA; Martin Marietta, Aero and Naval Systems, Glen Burnie, MD; EG&G, Washington Analytical Services Center Inc., Rockville, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: AN/BQQ-5( )/688I technical content reduced.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement (OR) 167-02-89 (Rev 1)	08/91	(Onboard Trainer)
Navy Decision Coordination Paper (NDCP) S0219 - as approved	02/86	(AN/BQQ-5)
Test and Evaluation Master Plan (TEMP) 137-8 (Rev 2)	01/91	(AN/BQQ-5 & TB-29)
Acquisition Plan (AP) 424-87 (Change 3)	05/92	(AN/BQQ-5 & Towed Systems)
IPS	08/92	(AN/BQQ-5 & TB-29)
APBA	08/92	(AN/BQQ-5 & TB-29)

G. (U) RELATED ACTIVITIES: P.E. 0604562N, Submarine Tactical Warfare System; P.E. 0604524N, Submarine Combat System; and P.E. 0604561N, SSN-21 Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line51/53	125,741	127,882	50,735	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

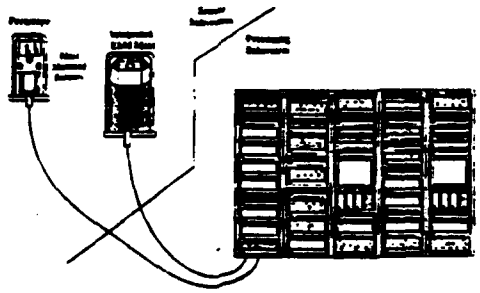
J. (U) TEST AND EVALUATION DATA:

Q5E TECHEVAL 8/93; OPEVAL 3/94
TB-29 TECHEVAL 8/93; OPEVAL 3/94

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0775 PROJECT TITLE: Submarine Support Equipment Program

Advanced Submarine Tactical
ESM Combat System



POPULAR NAME: SSEP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
IEM Program	8/92-MSII			3Q00-MSIII 2Q02-IOC
ASTECS Program	1/92-MS0		11/93 -MSI	3Q/96-MSII 2Q/01-MSIII 2Q/02-IOC
ENGINEERING MILESTONES				
IEM Program			12/93-PDR 3/94-CDR	
ASTECS Program			9/94-DEM/VAL PDR	3Q/95-DEM/VAL CDR
ASTECS Program				2Q/97-EMD PDR 1Q/98-EMD CDR
T&E MILESTONES				
IEM Program	6/92-TEMP			3Q/99-DT/OTIIA(LAND) 1Q/00-DT/OTIIC(SEA)
ASTECS Program			12/93-TEMP	3Q/98-DT/OTIIA(LAND) 1Q/00-DT/OTIIB(LAND) 1Q/01-DT/OTIIC(SEA)
CONTRACT MILESTONES				
IEM EMD Contract		3/93-Award		
ASTECS Dem/Val Contract			4/94-Award	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3.137	16.156	5.452	CONT.	CONT.
SUPPORT CONTRACT	758	1.184	852	CONT.	CONT.
IN-HOUSE SUPPORT	125	1.624	600	CONT.	CONT.
GFE/ OTHER	443	2.775	300	CONT.	CONT.
TOTAL	*4.463	*21.739	7.204	CONT.	CONT.

* Budget submitted under PE 0604515N

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0775 PROJECT TITLE: Submarine Support Equipment Program

B. (U) DESCRIPTION: This program develops and improves Electronic Support Measures (ESM) techniques and components, equipment, and systems that will increase submarine operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for Submarine ESM to be effective in conducting the following mission areas: Littoral, Joint Surveillance, Space and Electronic Warfare, Intelligence gathering, Maritime protection, and Joint Strike. Specific efforts now include development of the: (1) Integrated ESM Mast (IEM) that would potentially replace the AN/BRD-7 and AN/BLD-1 Direction Finding (DF) Systems on SSN-688 Class Submarines, SSN-21 Class Submarines and is required for the new attack submarine, (2) the Improved Early Warning Receiver, (3) periscope and antenna radar cross section reduction (RCSR) efforts to reduce vulnerability to detection by radar, and (5) the Advanced Submarine Tactical ESM Combat System (ASTECS) that will provide the next generation ESM system for the new attack submarine and possibly backfit on the SSN-21 and on the SSN-688I. The ASTECS program is being developed to meet both today's and tomorrow's threat signal environment and to meet the space and manning limitations expected on the new attack submarine. Existing submarine tactical ESM systems are not capable of processing all of today's threat signal environment and are obsolete.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Obtained Milestone (MS) II approval to begin the Engineering and Manufacturing Development (EMD) Phase of the IEM Program.

b. (U) Successfully completed development of the Improved RCSR Radome for the AN/BRD-7 DF System.

c. (U) Continued development of the Improved Early Warning (EW) Receiver Field Change Kit (FCK) for Type 18 Periscopes on the SSN-688 Class and SSN-21.

2. (U) FY 1993 PROGRAM:

a. (U) Award the IEM EMD Phase I contract.

b. (U) Complete development of the Improved EW Receiver.

3. (U) FY 1994 PLANS:

a. (U) Continue Phase I of the IEM EMD project.

b. (U) Obtain ASTECS MSI approval and begin the Demonstration/Validation (DEM/VAL) phase.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVUNSEAWARCEN DET, New London, CT; NESEC, San Diego, CA. CONTRACTORS: LOCKHEED SANDERS, Nashua, NH; RAYTHEON, Goleta, CA; RADANT, Stow, MA; GEC-MARCONI, San Diego, CA; ASTECS - TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Schedule changes are a result of the reassessment of milestone documentation and approval process.

3. (U) Cost Changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: F0775 PROJECT TITLE: Submarine Support Equipment Program

F. (U) PROGRAM DOCUMENTATION:
IEM Operational Requirement 07/91
IEM Test and Evaluation Master Plan 06/92
ASTECS Operational Requirements Document 10/91

G. (U) RELATED ACTIVITIES: PE 0603562N/F0770, Advanced Submarine Support Equipment Program (ASSEP).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN LINE 80	0	3,179	608	1,972	6,775

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: ASTECS land-based DT/OT IIA is planned for FY 98. ASTECS land-based DT/OT IIA is planned for FY 00. ASTECS at-sea DT/OT IIB is planned for FY 01.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: X0742 PROJECT TITLE: Submarine Integrated Antenna Systems

PICTURE NOT AVAILABLE

POPULAR NAME: SUBMARINE INTEGRATED ANTENNA SYSTEMS (SIAS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS II 5/94 MS III 3/94	CONT.
ENGINEERING MILESTONES	CDR 2/92 CDR 9/92 PDR 3/92 CDR 2/92 CDR 9/92			
T&E MILESTONES	DT-IIA 1/92	DT-IIB 3/93 OT-II 8/93 DT-IIA 3/93	DT-IIA 3/94 DT-IIB 3/94 DT-II 8/94	CONT.
CONTRACT MILESTONES		E&MD 4/93		

BUDGET	*FY 1992	*FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4.950	3.880	7.342	CONT.	CONT.
SUPPORT CONTRACT	270	300	525	CONT.	CONT.
IN-HOUSE SUPPORT	6.454	9.156	7.420	CONT.	CONT.
GFE/ OTHER					
TOTAL	11.674	13.336	15.287	CONT.	CONT.

*Previously funded in PE 0604502N, N0742

B. (U) DESCRIPTION: This project provides submarines with antenna systems designed to (a) permit greater operational flexibility through improved speed/depth performance; (b) improve reliability and availability; and (c) be compatible with existing and emerging communications systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Conducted Critical Design Review (CDR) for High Speed Buoyant Cable Antenna (HSBCA).
   b. (U) Conducted Developmental Testing (DT) IIA for HSBCA.
   c. (U) Conducted CDR for the Arctic Buoy.
   d. (U) Conducted CDR for the improved AN/BRA-34.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: X0742 PROJECT TITLE: Submarine Integrated Antenna Systems

e. (U) Conducted Preliminary Design Review (PDR) and CDR for the AN/BST-1 upgrade.
f. (U) Initiated preliminary efforts to design and repackage current Towed Buoy technology for application on SSN submarine.
g. (U) Terminated Arctic Buoy program.

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of the AN/BST-1 upgrade.
b. (U) Complete required documentation to support Milestone II Decision for Extremely High Frequency (EHF) antenna in FY 94.
c. (U) Conduct DT-IIB and start OT-II testing for HSBCA.
d. (U) Complete UHF DAMA Antenna Designs.
e. (U) Start Technical Evaluation (TECHEVAL) DT-IIA of the Improved AN/BRA-34.
f. (U) Conduct a risk assessment and Cost and Operational Effectiveness Analysis (COEA) and continue design and engineering efforts for the SSN Towed Buoy Antenna.

3. (U) FY 1994 PLANS:

a. (U) Complete Milestone III for HSBCA.
b. (U) Conduct DT-II for the AN/BST-1 upgrade.
c. (U) Prepare for Milestone III for the AN/BST-1 upgrade to support FY 95 decision.
d. (U) Conduct DT-IIB AND Operational Evaluation (OPEVAL) for the Improved AN/BRA-34.
e. (U) Complete Milestone II for the SSN Towed Buoy.
f. (U) Complete Milestone II for EHF Antenna.
g. (U) Issue Engineering and Manufacturing Development (E&MD) contract for the EHF non-penetrating mast antenna.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN, DET, New London, CT; NAVUNSEAWARCENDIV, Keyport, WA; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; CONTRACTORS: TRW, Redondo Beach, CA; AMERIND, Alexandria, VA; Spears Associates, Norwood, MA; and others to be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

SIAS NDCP03/80
Improved AN/BRA-34 Antenna PCAD03/89
AN/BST-1 TEMP09/90
SSN Towed Buoy CNO LTR04/91

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: X0742 PROJECT TITLE: Submarine Integrated Antenna Systems

G. (U) RELATED ACTIVITIES: PE 0602232N, Command, Control and Communications Technology block NU2A Submarines Communications Technology provides input to this program. PE 0303109N, Satellite Communications provides for the EHF transmitter and receiver that utilize the antenna developed under this program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 117	3,071	3,584	255	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

HSBCA	DT-IIA 1/92, DT-IIB 3/93 OT-II 8/93
EHF NPM	DT-II 11/97, OT 5/98
IMPR. BRA-34	DT-IIA 3/93, DT-IIB 3/94, OT-II 2/95
AN/BST-1	DT-II 8/94
SSN TOWED BUOY	DT 9/98, OT 7/99

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: X1411 PROJECT TITLE: Submarine Tactical Communications

PICTURE NOT AVAILABLE

POPULAR NAME: SSN INTEGRATED COMMUNICATIONS (SSN-ICS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES		MSIII 4/93		CONT.	
ENGINEERING MILESTONES					
T&E MILESTONES		DT-IIB 3/93		CONT.	
CONTRACT MILESTONES					
BUDGET	*FY 1992	*FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT					
SUPPORT CONTRACT	175	180	185	CONT.	CONT.
IN-HOUSE SUPPORT	2,023	1,696	1,386	CONT.	CONT.
GFE/ OTHER					
TOTAL	2,198	1,876	1,571	CONT.	CONT.

* Previously reflected in PE 0604502N, N1411.

B. (U) DESCRIPTION: The Submarine Tactical Communications System project provides attack submarines with communications systems designed to (a) enhance data throughput; (b) copy tactical data networks such as Tactical Data Information Exchange System (TADIXS); (c) be inter-operable with other U.S. and allied Military networks; and (d) improve reliability, maintainability and availability. This can be accomplished by providing the attack submarine with a properly integrated mix of Navy standard communications equipment covering a wide range of frequencies and modes. A major part of this effort is the Submarine Communications Systems Engineering Program (SCSEP) which provides a systems engineering approach for the design and evaluation of submarine radio rooms, and support for the Land-Based Submarine Radio Room (LBSRR) for new systems evaluation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine System Equipment Development
PROJECT NUMBER: X1411 PROJECT TITLE: Submarine Tactical Communications

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Continued development of Submarine Message Buffer (SMB).
   b. (U) Developed Time-Frequency Distribution Subsystem (TFDS) Test and Evaluation Master Plan (TEMP).
   c. (U) Continued SCSEP efforts.
   d. (U) Continued LBSRR evaluations.

2. (U) FY 1993 PROGRAM:
   a. (U) Evaluate radio room miniaturization, integration and automation systems and candidate equipments.
   b. (U) Conduct Development Testing (DT) IIB for SMB.
   c. (U) Complete Milestone III for SMB.
   d. (U) Continue SCSEP efforts for RDT&E evaluations.
   e. (U) Continue LBSRR evaluation.

3. (U) FY 1994 PLANS:
   a. (U) Continue evaluation of radio room miniaturization, integration and automation systems and candidate equipments.
   b. (U) Continue SCSEP engineering development efforts.
   c. (U) Continue technical support for the LBSRR.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN, DET, New London, CT; NCCOSC RDTE DIV, San Diego, CA; NAVELEXCEN, Charleston, SC. CONTRACTORS: None.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

SUB. MSG. BUFFER	TEMP	12/91
TFDS	Proposed Military Imp. (PMI)	07/88
BASEBAND SWITCH	NAPDD #184-02	07/88
ADS	NAPDD #184-02	07/88

G. (U) RELATED ACTIVITIES: PE 0602232N, Command, Control and Communications Technology block NU2A Submarines Communications Technology provides input to this program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 123	0	3,843	5,711	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

SUB. MSG. BUFFER	DT IIB	3/93
TFDS	DT II	6/95
BASEBAND SWITCH	DT/OT II	5/95
ADS	DT/OT II	5/97

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Control

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0993	Carrier Air Traffic Control	863	944	2,760	CONT.	CONT.
W1657	ATC Improvements	2,983	9,683	6,360	CONT.	CONT.
W1680	Multi Mode Receiver	1,112	0	0	0	36,800
X0718	MATCALS	2,342	2,732	873	CONT.	CONT.
	TOTAL	7,300	13,359	9,993	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides for the development, integration, and testing of automated Air Traffic Control (ATC) hardware and software required to provide improved flight safety, support more reliable all-weather ATC and landing capabilities ashore and afloat, and decrease through the development of a Low Probability of Intercept capability radiated electromagnetic energy from ATC radars. The new systems are required to replace obsolete ATC and approach/landing equipment on aircraft, aircraft carriers, amphibious ships, Naval Air Stations, and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Control
PROJECT NUMBER: W0993 PROJECT TITLE: Carrier Air Traffic Control

C. (U) DESCRIPTION: Shipboard Air Traffic Control Centers identify, marshal and direct aircraft within 50 Nautical Miles (NM) to a ship's Automatic Carrier Landing System and Independent Landing Monitor (ILM). The Precision Approach Radar and ILM then provide precise automatic control and verification of aircraft during their final approach and landing sequence. Low Probability of Intercept is required to enable aviation ships to conduct operations while preventing opposing forces from exploiting the unique radar signature of the ship.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued AN/SPN-46(V) software recompile and environmental qualification testing.

2. (U) FY 1993 PROGRAM: Complete AN/SPN-46(V) software recompile and environmental qualification testing.

3. (U) FY 1994 PLANS:

a. (U) Improve AN/SPN-46(V) performance in rain by incorporating Moving Target Detection (MTD) into radar.

b. (U) Begin initial preparation for Signature Managed Air Traffic Control and Landing System (SMATCALS) transition from concept demonstration approval to Milestone II development approval.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXACT, St. Inigoes, MD; NAVAIRWARCENACDIV, Patuxent River, MD and Indianapolis, IN; NAVSURFWARCENDIV, Crane, IN; NRL, Washington, DC. CONTRACTOR: Textron Defense Systems, Wilmington, MA and TBD.

F. (U) RELATED ACTIVITIES: SMATCALS early development effort is under PE 0603512N, Carrier Systems Development, Project W1723, CV Launch and Recovery Systems.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) APPN OPN LINE 96	28,376	19,002	10,810	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Control
PROJECT NUMBER: W1657 PROJECT TITLE: ATC Improvements

C. (U) DESCRIPTION: This program provides for engineering development, integration, adaptation, and testing of new and/or modernized real-time Air Traffic Control (ATC) systems, air navigational aids and landing systems, ATC communications systems i.e., Fleet Area Control and Surveillance Facility (FACSFAC) and Ranges must be modified to ensure continued interoperability with the National Airspace System.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Updated initial functionality studies as force structure changes occurred.

b. (U) Began development of FACSFAC capability upgrades to ensure interoperability with the Military Airspace Management System (MAMS).

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of FACSFAC various software and hardware upgrades, to ensure interoperability with MAMS.

b. (U) Evaluate Department of Defense (DoD) Common Console and develop Navy unique software for its use.

3. (U) FY 1994 PLANS:

a. (U) Complete various software and hardware for FACSFAC upgrades.

b. (U) Continue DoD Common Console testing.

c. (U) Continue Navy unique range/ATC interface.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Charleston, SC and Vallejo, CA; NAVELEXACT, St. Inigoes, MD; NAVAIRWARCENACDIV, Patuxent River, MD, Warminster, PA, and Indianpolis, IN; NCCOSC RDTE DIV, San Diego, CA; SOUTHNAVFACENGCOM, Charleston, SC; CONTRACTOR: TBD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air Control
PROJECT NUMBER: X0718 PROJECT TITLE: MATCALS

C. (U) DESCRIPTION: Provides for continued development, integration, and testing of hardware and software to meet requirements for all-weather operation and improved flight safety of Air Traffic Control and Automated Landing Systems (ALS) at Navy/Marine Corps expeditionary airfields.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Fielded certified software for Mode II (Pilot-assisted) ALS capability.

b. (U) Successfully completed studies which analyzed causes of mutual interference of Managed Air Traffic Control and Landing System (MATCALS) radar sites, and developed solutions.

c. (U) Fielded Version J software for required Tactical Digital Information Link (TADIL)-B capability for TSQ-107 Radar configuration.

2. (U) FY 1993 PROGRAM:

a. (U) Test and certify software and procedures for MODE I (fully ALS) capability to assure reliability and safety of flight.

b. (U) Certify and field Version K software for TADIL-B with AN/TPS-73 radar configuration.

c. (U) Study effectiveness of model-following algorithms to ensure more accurate landing system performance.

3. (U) FY 1994 PLANS:

a. (U) Field certified software for Mode I ALS capability.

b. (U) Test and certify TADIL-B/C updates.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: IN-HOUSE: COMSPAWARSYSCOM, Washington, DC; NAVELEXCEN, Vallejo, CA; NAVELEXACT, St. Inigoes, MD; NAVAIRWARCENACDIV, Patuxent River, MD; CONTRACTOR: PARAMAX, St. Paul, MN; GTRI, Atlanta, GA.

F. (U) RELATED ACTIVITIES: Not applicable.

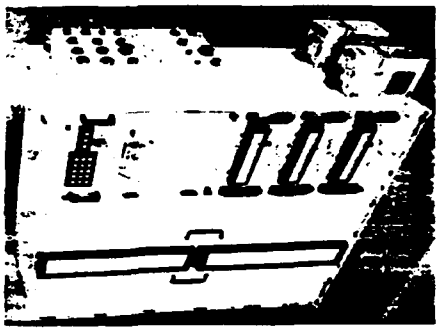
G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) APPN	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN LINE 94	4,121	3,533	4,010	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604507N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Enhanced Modular Signal Processor
PROJECT NUMBER: V1440 PROJECT TITLE: EMSP



POPULAR NAME: AN/UYS-2

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	12/91 M/S III DEFACTO	6/93 PROG REV		CONT.
ENGINEERING MILESTONES	3/92 SW CDR 4/92 ENCL PDR	6/93 S/W Acceptance	9/94 ASIP NTDS-B Dev Units	CONT.
T&E MILESTONES	DT-IID	SEM E, S/W ENCL	9/94 NTDS-B Accept. Tests	CONT.
CONTRACT MILESTONES	3/92 MYP			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	14,165	8,704	8,416	CONT.	CONT.
SUPPORT CONTRACT	0	0	0		
IN-HOUSE SUPPORT	5,676	5,643	4,839	CONT.	CONT.
GFE/ OTHER	173	180	188	CONT.	CONT.
TOTAL	20,014	14,527	13,443	CONT.	CONT.

B. (U) DESCRIPTION: The Enhanced Modular Signal Processor (EMSP) is a modular, distributed parallel state-of-the-art signal processor to provide increased performance capability for multi platform ASW weapon systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Resumed DT-IID Standard Electronic Module (SEM E) Testing. Completed Maintainability-Demo.

b. (U) Continued Acoustic Systems Implementation Program (ASIP) development, for AN/UYS-2A customer systems interfaces.

2. (U) FY 1993 PROGRAM:

a. (U) Complete DT-IID Testing and operational assessment.

b. (U) Conduct Beta Level Application Testing.

PROGRAM ELEMENT: 0604507N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Enhanced Modular Signal Processor
PROJECT NUMBER: V1440 PROJECT TITLE: EMSP

c. (U) Conduct risk mitigation IV&V testing.

d. (U) Continue ASIP development, testing, and responding to customer program interface requirements.

3. (U) FY 1994 PLANS:

a. (U) Continue DT-III Testing ASIP developed interfaces.

b. (U) Critical engineering design support for integration of the AN/UYS-2A into user systems.

c. (U) Continue Beta Level Application Testing.

d. (U) Support software development, integration and testing for user systems.

e. (U) Support Development and Operational Testing (DT/OT) for user systems (SEM E).

f. (U) Continue ASIP including acceptance testing.

g. (U) Continue risk mitigation IV&V testing

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NRL, Washington, DC. CONTRACTORS: American Telephone & Telegraph Co, Greensboro, NC.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

DCP 3/90
TEMP 1/90 (revision FY 93)
AP 12/91

G. (U) RELATED ACTIVITIES:

1. (U) PE 0204311N, Integrated Surveillance System - Provides funding for SURTASS unique interfaces and requirements for the Acoustic Systems Implementation Program (ASIP).

2. (U) Program Element 0205620N, Surface ASW Combat System Integration - Provides funding for AN/SQQ-89 unique interfaces and requirements for the Acoustic Systems Implementation Program (ASIP).

3. (U) Program Element 0604212N (SH-60B) & (SH-60F), Anti-Submarine Warfare and Other Helicopter Development - Provides funding for ALFS unique interfaces and requirements for the Acoustic Systems Implementation Program (ASIP).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604507N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Enhanced Modular Signal Processor
PROJECT NUMBER: V1440 PROJECT TITLE: EMSP

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 112	3,244	4,377	2,778	CONT.	CONT.
OPN Line 87	91,200	64,604	45,700	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Conduct Beta Level Application and risk mitigation IV&V testing. Complete DT-IID testing and continue ASIP development testing.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Shipboard Aviation Systems
PROJECT NUMBER: W1723 PROJECT TITLE: CV Launch and Recovery Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL -PROGRAM
W1723	CV Launch and Recovery Systems	0	0	1,404	CONT.	CONT.

B. (U) DESCRIPTION: This Navy unique program addresses the Engineering and Manufacturing Development (E&MD) of systems required to recover and launch Navy/Marine Corps aircraft (fixed wing, rotary wing and VSTOL) operating aboard aircraft carriers (CV/CVN), amphibious assault ships (LHD/LHA/LPH) and aviation facility ships. This program includes E&MD of: (1) the Improved Carrier Optical Landing System (ICOLS) to provide longer range, higher accuracy visual landing aids for pilots landing on aircraft carriers, (2) the Advanced Launch and Recovery Control Systems to introduce modern, modularized computer control systems to the catapults and arresting gear on aircraft carriers, and (3) the Mod 4 version of the Mark 7 arresting gear on carriers to increase the aircraft landing weight capability.,

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Award contract for design and fabrication of the ICOLS Long Range Lineup System, Engineering Development Model (EDM).

b. (U) Complete planning for the award of a contract for design and fabrication of the ICOLS Long Range Glideslope System EDM.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN, Lakehurst, NJ, and Patuxent River, MD. CONTRACTORS: Humbug Mountain Research Laboratories, Duarte, CA.

E. (U) RELATED ACTIVITIES: 0603512N, Carrier Systems Development.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N
PROGRAM ELEMENT TITLE: Ship Survivability

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0410	BR/CW COUNTERMEASURES	*5,601	*5,667	4,924	- CONT.	CONT.
S1828	SHIP SURVIVABILITY (ENGINEERING)	1,357	1,491	1,244	CONT.	CONT.
S2054	SHIP DAMAGE CONTROL (ENGINEERING)	3,625	3,742	4,124	CONT.	CONT.
	TOTAL	10,583	10,900	10,292	CONT.	CONT.

* Previously funded in PE 0604506N/S0410

B. (U) DESCRIPTION: This program supports the full scale development of equipment/systems to enable continued, effective combat missions through protection from weapons effects due to hostile actions and peace time accidents. This program also supports the engineering development of improved Damage Control/Fire Protection and Firefighting equipment, devices, and systems for rapid control/suppression of damage/fire with retention of ship mission.

(U) This program also develops chemical, biological, and radiological (CBR) defensive systems and concepts for surface ships, required to counter CBR threats in the near term (1990s) as identified in Defense Planning Guidance. Development addresses individual and collective protection, detection and monitoring, and decontamination equipment.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability
PROJECT NUMBER: S0410 PROJECT TITLE: BR/CW Countermeasures

C. (U) DESCRIPTION: Develops chemical, biological and radiological (CBR) defensive systems for surface ships to support the requirement to sustain operations in a CBR threat environment (Defense Planning Guidance (FY92-2007)). Systems developed will counter threats in the near term and predicted emerging threats as validated by NAVMIC CBR Threat Assessment (TA# 004-092).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Achieved MS III decision for Selected Area Collective Protection System (SACPS).
b. (U) Initiated feasibility study for Collective Protection design alternatives.
c. (U) Developed pre-production prototype specifications for CPS advanced high pressure fans.
d. (U) Initiated design options study for Shipboard Chemical Agent Monitor, Portable (SCAMP).
e. (U) Commenced TECHEVAL of Improved Chemical Agent Point Detector (IPD).

2. (U) FY 1993 PROGRAM:

a. (U) Conduct OT II and MS III for CPS.
b. (U) Initiate TECHEVAL of CPS advanced high pressure fans.
c. (U) Complete design options study for SCAMP.
d. (U) Continue TECHEVAL for IPD.
e. (U) Transition Interim Biological Agent Detection System (IBADS) from Advanced Development; design, build, and test hardware.
f. (U) Complete MS II of Shipboard Automatic Liquid Agent Detector (SALAD) system and initiate Engineering Development.

3. (U) FY 1994 PLANS:

a. (U) Initiate CPS FOT&E.
b. (U) Complete TECHEVAL of CPS advanced high pressure fan.
c. (U) Complete TECHEVAL of SCAMP.
d. (U) Commence OPEVAL of IPD and operational assessment of IBADS.
e. (U) Continue Engineering Development of SALAD.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCENDIV, Crane, IN. CONTRACTORS: Battelle, Columbus, OH; Science and Technology, Corp., Hampton, VA; Brunswick Corp, Clearwater, FL; Environmental Technologies Group, Inc., Baltimore, MD; Integrated System Analysts, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: Program Elements 0603514N Ship Combat Survivability; 0602233N Mission Support Technology.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN #30	2,875	0	0	CONT.	CONT.
(U) OPN #25	741	0	0	CONT.	CONT.
(U) OPN #239	6,699	5,018	10,770	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability
PROJECT NUMBER: S1828 PROJECT TITLE: Ship Survivability (Engineering)

C. (U) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed camouflage (visual) paint manual for surface ships; established performance requirements for IR paints.

b. (U) Completed final Smoke Ejection System (SES) documentation; completed engineering development of SES.

c. (U) Initiated operational improvements to the Ship Vulnerability Model (SVM).

d. (U) Initiated engineering development of Navy Standard Electronic Power System (NSEPS); procured three units for environmental testing.

2. (U) FY 1993 PROGRAM:

a. (U) Develop construction drawings for the LX Live Fire Test and Evaluation (LFT&E) scaled whipping model. (Transitions to PE 0604567N, S2198, LFT&E in FY-94.)

b. (U) Conduct environmental testing of NSEPS.

c. (U) Complete operational improvements to SVM.

d. (U) Procure prototype shock hardened combat system circuit breakers.

3. (U) FY 1994 PLANS:

a. (U) Initiate development of blast tolerant missile and torpedo magazine boundaries designed to prevent impact of the boundary with stowed munitions. Construct full scale blast chamber and begin testing.

b. (U) Conduct shipboard demonstration of NSEPS and prepare specification.

c. (U) Conduct T&E for prototype shock hardened combat system circuit breakers.

d. (U) Conduct final Low-Intensity-Conflict (LIC)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCENDIV, Dahlgren, VA; NRL, Washington, D.C. CONTRACTORS: Gibbs & Cox, Arlington, VA

F. (U) RELATED ACTIVITIES: PE 0603514N, Project S0384, Ship Survivability (Adv)

G. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Survivability
PROJECT NUMBER: S2054 PROJECT TITLE: Ship Damage Control (Engineering)

C. (U) DESCRIPTION: This project supports the engineering development of improved damage control (DC), fire protection, and firefighting systems for rapid damage control and recovery during peacetime operations and for mission retention in a post-hit situation. In addition, this project provides the full scale development necessary to transition acquisition programs to the fleet.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed TECHEVAL and initiated OPEVAL of large ship Damage Control Wirefree Communications (DC WIFCOM).
b. (U) Conducted design and initiated construction of a portable, two-hose firefighting pump engine that operates on both diesel fuel and JP-5.
c. (U) Initiated development of quick-acting watertight (QAWT) doors.
d. (U) Initiated development of fiber optic DC sensors.
e. (U) Completed evaluation of firefighting doctrine, tactics and equipment, in a CBR-Defense scenario, at the full scale fire test facility.

2. (U) FY 1993 PROGRAM:

a. (U) Request Milestone III approval for DC WIFCOM.
b. (U) Complete fabrication of prototype QAWT door; conduct tests.
c. (U) Conduct integrated fire tests at full scale test facilities to develop improved tactics and doctrine.
d. (U) Initiate installation of Integrated Survivability Management System (ISMS) on selected amphibious ships.

3. (U) FY 1994 PLANS:

a. (U) Modify QAWT door as required and complete standard drawings.
b. (U) Complete design and initiate construction of multi-station, Integrated Survivability Management System (ISMS).
c. (U) Integrate DC sensors with ISMS.
d. (U) Initiate land-based testing of multi-station ISMS, local area network, and DC sensors.
e. (U) Continue integrated fire tests at full scale test facilities.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NSCSES, Norfolk, VA. CONTRACTORS: Westinghouse MTD, Pittsburgh, PA; Reliability Services Group, Arlington, VA; Advanced Engines Development, Colgate, Wisconsin.

F. (U) RELATED ACTIVITIES: PE 0603514N - Project S1565 (Ship Damage Control Advanced)

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
COSAL Outfitting	2,943	7,803	5,561	CONT.	CONT.
OPN Line 16	11,900	16,400	14,700	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
Program Element Title: Combat Information Center Conversion
Project Number: U1604 Project Title: NTDS Software Improvements

PICTURE NOT AVAILABLE

POPULAR NAME: Advanced Combat Direction System (ACDS) Block 1

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES			FQR(CV) TRR(SAT)	CONT.
T&E MILESTONES			SAT(CV)	CONT.
CONTRACT MILESTONES		FQR(CV) AWARD FEE		CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACTS	6.188	9.854	4.459	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	898	4.300	3.478	CONT.	CONT.
GFE/ OTHER	1.797	3.586	3.597	CONT.	CONT.
TOTAL	8.883	17.740	11.534	CONT.	CONT.

B. (U) DESCRIPTION: This program element supports the development of the Advanced Combat Direction System (ACDS) Block 1 and the follow on efforts for advanced display systems, multiple sensor coordination and distributed computer architecture for the 21st Century destroyer (DD 21).

(U) The ACDS Block 1 program replaces 1960's vintage Naval Tactical Data System (NTDS) operating systems and applications algorithms and implements advanced concepts for Tactical Data System upgrades for surface ships in response to future threats, operational deficiencies, and new and existing operational requirements. The program's objective is to develop integrated, coherent ship's command and control systems that will increase operational capabilities; promote standardization and introduce new shipboard tactical displays and support equipment; and provide integration between sensor/weapons systems which are organic to and outside the battle force. This program provides for significant Combat Direction System (CDS) improvements including implementation of the Joint Tactical Information Data System (JTIDS)/ Tactical Data Information Link (TADIL) J (LINK 16) message standard to support interoperability/joint operations with U.S. Navy/Army/Air Force/Marine and NATO forces; implementation of the Aegis Tactical Executive System (ATES); and integration and interface with the Command and Control Processor (C^2P).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
Program Element Title: Combat Information Center Conversion
Project Number: U1604 Project Title: NTDS Software Improvements

(U) Developments in advanced display systems, multiple sensor coordination and distributed computer architecture make them candidates for advanced development for introduction into the combat direction systems aboard the 21st century destroyer and other combatants. Some of these include solid state active array technology, wide band radar operation, new radar wave forms, advances in signal processing, commercial display enhancements, and the distributed processing computing initiative. This program will integrate these developments such as these using a disciplined systems engineering approach into the DD21 combat system and into upgrade schedules of other ship class combat systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted government reliability/performance confidence tests on core elements.

b. (U) Continued contractor test on the core elements of ACDS Block 1 computer program.

c. (U) Continued coding of the lead ship elements of ACDS Block 1 computer program.

2. (U) FY 1993 PROGRAM:

a. (U) Complete contractor test on the core elements of ACDS Block 1 computer program.

b. (U) Continue coding of the lead ship elements of ACDS Block 1 computer program.

c. (U) Begin contractor test on the remaining lead ship elements of ACDS Block 1 program.

d. (U) Write test procedures for System Acceptance Tests (SAT).

e. (U) Conduct Formal Qualification Review (FQR) of core elements.

3. (U) FY 1994 PLANS:

a. (U) Complete contractor test on the remaining lead ship elements of the ACDS Block 1 program.

b. (U) Begin SAT on lead ship program (7/94).

c. (U) Conduct Test Readiness Review (TRR) for SAT.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NCCOSC RDTE DIV San Diego, CA; NAVSURFWARCEN INTCOMBATSYSTESTFAC San Diego, CA; Puget Sound Naval Shipyard, Bremerton, WA; NAVSURWARCENDIV, Dahlgren, VA. CONTRACTORS: Hughes Aircraft Co., San Diego, CA; QuesTech Inc., San Diego, CA; Paramax, St Paul, MN; General Electric, Moorestown, NJ; John Hopkins Univ/Applied Physics Lab, Laurel, MD.

E. (U) COMPARISON WITH FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Integration of the development of advanced display systems, multiple sensor coordination methods and a distributed computer architecture into the combat systems design for DD21 and other ship classes begins in FY 1995.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
Program Element Title: Combat Information Center Conversion
Project Number: U1604 Project Title: NTDS Software Improvements

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

(U) DCP - 22 Aug 89 (ACDS Block 1)
(U) TEMP #935 - Approved 15 Dec 88 (ACDS Block 1)

G. (U) RELATED ACTIVITIES:

(U) PE 0603512N, Carrier Systems Development (CV ASW Module)
(U) PE 0603582N, Combat System Integration
(U) PE 0205604N, Tactical Data Links
(U) PE 0603513N, Shipboard Systems Component Development
(U) PE 0603573N, Advanced Surface Machinery Systems
(U) PE 0603382N, Advanced Combat System Technology
(U) PE 0603564N, Ship Preliminary Design and Feasibility Studies

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: The ACDS schedule is as follows:

(U) System Acceptance Test (SAT)	7/94 - 12/94
(U) Combat System Integration (CSIT)	1/95 - 12/95
(U) Technical Evaluation (TECHEVAL)	3rd QTR FY96
(U) Operational Evaluation (OPEVAL)	2nd QTR FY97

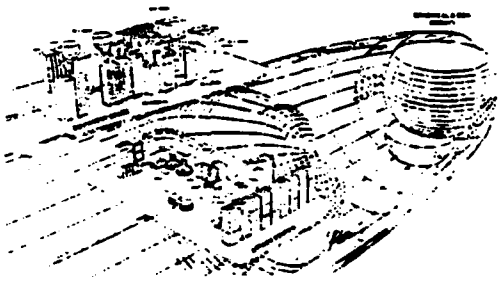
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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N
PROGRAM ELEMENT TITLE: Submarine Combat System
PROJECT NUMBER: F1941

BUDGET ACTIVITY: 4
PROJECT TITLE: AN/BSY-2

AN/BSY-2 SUBMARINE COMBAT SYSTEM



POPULAR NAME: AN/BSY-2 Submarine Combat System

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				Milestone III TBD
ENGINEERING MILESTONES	Completed Thread 2 Testing 6/92 Delivered AN/BQG-5 fairings and arrays to SSN 710 8/92	Complete Thread 3 (BQG-5) Integration Testing 8/93	Complete Thread 4 Testing 7/94 and Thread 5 Testing 8/94	Complete Thread 6 Testing 4Q/95 Post Shakedown Availability (PSA) 2Q/98
T&E MILESTONES		Begin Thread 3 (BQG-5) System Design Certification Test (SDCT) 9/93		AN/BSY-2 System Design Certification Test (SDCT 1) 1Q/95 Complete AN/BSY-2 SDCT 2 1Q/96 Combat System Installation Certification (CSIC) 3Q/96 Weapon System Accuracy Trials (WSAT) 1Q/97 Development Testing DT-II 2Q/99 Operational Testing OT-II 4Q/99
CONTRACT MILESTONES			Deliver AN/BQG-5 8901 to SSN 710 10/93	Deliver 9103 System 2Q/96 AN/BSY-2 8903 Delivery 2Q/95

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	185.368	24.505	55.118	37.781	1,238.043
SUPPORT CONTRACT	8.585	308	6.000	15.000	75.030
IN-HOUSE SUPPORT	67.097	26.854	26.363	47.738	366.6[illegible]
GFE/ OTHER	0	807	0	12.761	61.8[illegible]
TOTAL	261.050	52.474	87.481	113.280	1,741.5[illegible]

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Combat System
PROJECT NUMBER: F1941 PROJECT TITLE: AN/BSY-2

B. (U) DESCRIPTION: The Chief of Naval Operations established the SSN 21 SEAWOLF and the AN/BSY-2 Combat System Top Level Requirements. The development objectives for AN/BSY-2 are: Meet the SEAWOLF combat system related Top Level Requirements; develop an architecture which facilitates tactical improvements and future growth; and provide computer processes that improve response time from initial threat detection to weapon launch. AN/BSY-2 will provide new acoustic arrays which have improved self-noise characteristics and improved detection performance. It will provide computer aids to assist the operator in sensor, contact and weapon management, and will support employment of the most advanced submarine weapons from eight torpedo tubes. Software development is being conducted by dividing the total software into six Threads to be built and tested in phases throughout the development. The system architecture will be partitioned to facilitate tactical improvements, future growth, and high availability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. Completed Thread 2 software integration and test.
b. Delivered AN/BQG-5 arrays and fairings to SSN 710.

2. (U) FY 1993 PROGRAM:

a. (U) Complete AN/BQG-5 software development (Thread 3 integration and test).
b. (U) Begin AN/BQG-5 System Design Certification Test (SDCT).

3. (U) FY 1994 PLANS:

a. (U) Complete Thread 4 integration and test.
b. (U) Complete Thread 5 integration and test.
c. (U) Complete AN/BQG-5 SDCT.
d. (U) Deliver the BQG-5 8901 to SSN 710.

4. (U) PROGRAM TO COMPLETION:

a. (U) Complete SDCT 2.
b. (U) 9103 AN/BSY-2 System Delivery
c. (U) Initial Operational Capability at Ship Delivery.
d. (U) Conduct WSAT.
e. (U) Conduct PSA.
f. (U) Conduct Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL).

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCEN DET, New London, CT; NAVSURFWARCENDIV, Crane, IN; Navy Training Systems Center (NTSC), Orlando, FL; NAVUNSEAWARCEN DET, Norfolk, VA. CONTRACTORS: General Electric Company, Syracuse, NY, Moorestown, NJ, and Pittsfield, MA; IBM Corporation, Manassas, VA; Librascope, Glendale, CA; Martin Marietta, Baltimore, MD; Computer Sciences Corporation, Moorestown, NJ; AT&T, Greensboro, NC; EG&G Washington Analytical Services Center, Rockville, MD; MITRE Corporation, Arlington, VA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Combat System
PROJECT NUMBER: F1941 PROJECT TITLE: AN/BSY-2

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: The SEAWOLF program was terminated in the Amended FY 1993 President's Budget resulting in the termination of the AN/BSY-2 program. This termination resulted in the issuance of stop work orders and halted work processes. DoD/Navy action authorized FY-94 and out funding but left a several month lag in restoring FY-93 funding. This lag, along with the original stop work orders, caused significant schedule changes and program restructuring to complete program requirements.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
APB 2/91
TEMP 8/90
DCP 4/89

G. (U) RELATED ACTIVITIES: PE 0603691N, MK 48 ADCAP; PE 0204229N, TOMAHAWK and Theatre Mission Planning Center; and PE 0604601N, Mine Development, are weapons development programs providing combat system and weapon launch interface information to the AN/BSY-2 Combat system. PE 0604503N, Submarine System Equipment Development, provides submarine sonar improvements (engineering) for development of submarine towed arrays and towed array interfaces, submarine surveillance equipment for Electronic Support Measures (ESM) for combat system targeting, and submarine communications for enhanced antenna suite for navigation and improvements in tactical data processing which supports combat system targeting and command and control. PE 0604507N, Enhanced Modular Signal Processor, provides signal processing for the AN/BSY-2 Combat system. PE 0604707N, Space Electronic Warfare Architect/Engineering Support, provides improved algorithms for third party targeting.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

BQG-5 SDCT	4Q/93
AN/BSY-2 SDCT TEST	1Q/95
AN/BSY-2 SDCT2 COMPLETE	1Q/96
DT-II	2Q/99
OT-II	4Q/99

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F1947	NEW DESIGN SSN HM&E	0	0	104,258	CONT.	CONT.
F1950	NEW DESIGN SSN COMBAT SYS DEV	0	0	135,964	CONT.	CONT.
	TOTAL	0	0	240,222	CONT.	CONT.

B. (U) DESCRIPTION: All funding for CENTURION was previously budgeted in PE 0603561N. Funding in this budget differentiates between 6.3B and 6.4 efforts. A principal challenge to the U.S. Navy is to maintain a submarine fleet essential to defend American interests. The new attack submarine (CENTURION) is being designed to meet the potential threats of the next century in a multi-mission capable submarine that has the ability to provide covert, sustained presence in denied waters. The goal of the program is to create an affordable yet capable submarine by exploring a broad range of system and technology alternatives, (thoroughly examining) intense pursuit of all and any cost reducing measures, working closely with industry to inject effective producibility improvement, all with extreme care in identifying and mitigating any potential risks. This Program Element (PE) provides the advanced technology, prototype systems to design and construct the CENTURION Class attack submarine and its combat system. This PE directly supports the following CENTURION missions: (1) covert strike warfare; (2) anti-submarine warfare (ASW); (3) covert intelligence collection/ surveillance, indication and warning, and electronic warfare; (4) anti-surface ship warfare (ASUW); (5) special warfare; (6) mine warfare; and (7) battle group support.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1947 PROJECT TITLE: New Design SSN HM&E

PICTURE NOT AVAILABLE UNTIL MILESTONE I

POPULAR NAME: CENTURION

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS O 8/92	MS I 08/93		
ENGINEERING MILESTONES	TBD - MILESTONE SCHEDULE WILL BE ESTABLISHED AT MILESTONE I			
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	63,490	CONT.	CONT.
SUPPORT CONTRACT	0	0	3,685	CONT.	CONT.
IN-HOUSE SUPPORT	0	0	37,083	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	*0	*0	104,258	CONT.	CONT.

* FY-92 and FY-93 funded in PE 0603561N, project F2033.

B. (U) DESCRIPTION: This project encompasses the Hull, Mechanical and Electrical (HM&E) development efforts for CENTURION. The thrust of these efforts will be to develop and apply HM&E system technologies which enable design of an attack submarine system. This approach to technology innovation will carefully balance military capability, development and acquisition cost, impact on ship weight and volume, and technical risk. Leveraging and capitalizing on existing technologies and vendor bases for existing components from SSN-688I, TRIDENT, and SEAWOLF will minimize both cost and risk. Varying degrees of re-engineering of existing systems may be required to adapt them to the new submarine's requirements and minimize vendor risks of constructing a new ship with concurrent technology development. Newly developing technologies will be transitioned from ongoing industry and government R&D programs where doing so will offer substantial affordability payoffs, without sacrificing military capability. H&ME development will support a FY-98 lead ship construction contract award.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1947 PROJECT TITLE: New Design SSN HM&E

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable. This PE is initiated in FY 1994. Funding for CENTURION in FY 1992 is located in PE 0603561N (Advanced Submarine System Development), Project F2033.

2. (U) FY 1993 PROGRAM: Not applicable. This PE is initiated in FY 1994. Funding for CENTURION in FY 1993 is located in PE 0603561N (Advanced Submarine System Development), Project F2033.

3. (U) FY 1994 PLANS:

a. (U) HM&E System Development

(1) (U) Begin HM&E systems designs based on concept design tradeoff studies and producibility inputs from vendors and shipbuilders, risk mitigation concepts, and allocation of specific ship requirements approved at Milestone I.

(2) (U) Augment, transition, and support vendor and shipbuilder technology development initiatives which enhance producibility, reduce risk, or result in lower ship acquisition costs including modular structures, advanced materials, and improved fabrication techniques.

(3) (U) Conduct system design verification testing to support ship preliminary design including pressure hull structure confirmation tests, hydrodynamic modeling appendages configuration performance tests, and acoustic signature modeling and predictions.

(4) (U) Transition from advanced development, projects which improve ship and system design capabilities. Efforts include verification testing of enhanced performance simulations and models such as static structural integrity, shock dynamics, acoustic noise transmission paths, and electrical distribution system loads and stability.

(5) (U) Transition from advanced development to system engineering development technology projects which potentially reduce production costs including: Main Propulsion Unit (MPU), deck and foundation mounting, composite control surfaces, reduced cost auxiliary systems, electrical power generation and distribution systems.

(6) (U) Assess requirements and initiate updates to submarine system test facilities to support out year system test requirements. Use of existing test assets will be maximized.

(7) (U) Continue system performance evaluations of promising research and development improvements and identify high priority, cost effective improvements necessary to maintain SSN performance against threats in the 2000-2010 time frame.

(8) (U) Issue design and development contracts for the MPU and Ship Service Turbine Generators (SSTG).

5. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCEN DET, New London, CT; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; Oak Ridge National Laboratory, Oak Ridge, TN; NSSES/CD, Philadelphia, PA; additional in-house performing activities TBD. CONTRACTORS: General Dynamics/Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; TBD subsystem vendors, integration contractors and management and engineering support contractors.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1947 PROJECT TITLE: New Design SSN HM&E

F. (U) PROGRAM DOCUMENTATION:

Mission Needs Statement	10/91
Milestone 0 Acquisition Memorandum	8/92

G. (U) RELATED ACTIVITIES: HM&E systems concepts related to CENTURION completing advanced development in PE 0603561N (Advanced Submarine System Development) will be transitioned to full scale engineering development as will acoustic systems concepts in PE 0603504N (Advanced Submarine Combat Systems Development). Development of the CENTURION propulsion plant is continuing in PE 0603570N (Advanced Nuclear Power Sytems). Preliminary Design efforts will begin in PE 0603564N (Ship Preliminary Design and Feasibility Studies).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1950 PROJECT TITLE: New Design SSN Combat Systems Dev

PICTURE NOT AVAILABLE UNTIL MILESTONE I.

POPULAR NAME: CENTURION

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO	COMPLETE
PROGRAM MILESTONES	MS O 8/92	MS I 8/93			
ENGINEERING MILESTONES	TBD - MILESTONE SCHEDULE WILL BE ESTABLISHED AT MILESTONE I				
T&E MILESTONES					
CONTRACT MILESTONES					

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	116.875	CONT.	CONT.
SUPPORT CONTRACT	0	0	5.724	CONT.	CONT.
IN-HOUSE SUPPORT	0	0	13.365	CONT.	CONT.
GFE/ OTHER	0	0	TBD	CONT.	CONT.
TOTAL	*0	*0	135.964	CONT.	CONT.

* FY-92 and FY-93 funded in PE 0603561N, project F2033.

B. (U) DESCRIPTION: This project encompasses the development of the CENTURION Combat System. This combat system will utilize technologies developed for AN/BSY-1 and AN/BSY-2 and provide capabilities for passive and active detection, classification, tracking, target motion analysis, weapons launch, acoustic intercept, navigation, monitoring, external and internal communications, countermeasures, radar, and special operations.

(U) To meet the future threat, the submarine force must continue to operate as effectively in shallow water regions as we traditionally have in deep water. Close coordination with the surface battle group and air forces is essential to mission accomplishment. In order to support the CENTURION mission, the following functional capabilities will be investigated for incorporation into the CENTURION Combat System in the Cost and Operational Effectiveness Analysis currently ongoing: (1) Passive/Active detection of multiple contacts, including early warning threat determination through processing and analysis of sensor data; (2) classification of sensor data for the purpose of identifying contacts; (3) localization (tracking) of contacts through target motion analysis; (4) preset, launch, and control of weapons and countermeasures; (5) improved communication/connectivity with other battle group elements, air forces, and special operations forces; (6) incorporation of Vertical Launch System to enhance strike warfare.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1950 PROJECT TITLE: New Design SSN Combat System Dev

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable. This PE is initiated in FY 1994. Funding for CENTURION in FY 1992 is located in PE 0603561N, Project F2033.

2. (U) FY 1993 PROGRAM: Not applicable. This PE is initiated in FY 1994. Funding for CENTURION in FY 1993 is located in PE 0603561N, Project F2033.

3. (U) FY 1994 PLANS:
a. (U) Select hardware baseline of Centurion System Suite.
b. (U) Evaluate technology initiatives for hardware packaging to reduce CENTURION Combat System space and weight.
c. (U) Develop CENTURION Combat System Concept of Operations.
d. (U) Develop CENTURION Combat System technical performance goals and thresholds.
e. (U) Prepare detailed system diagram and system description.
f. (U) Begin development of System level specification and interface control documents to technically describe the total CENTURION Combat/Warfare System.
g. (U) Begin Subsystem level detailed functional performance specification development to support subsystem acquisition program requirements.
h. (U) Prepare Subsystem competitive Request for Proposal (RFP) packages as required to meet subsystem milestones.
i. (U) Complete landbased integration plan and begin procurement of required test assets.
j. (U) Continue system level studies required to support subsystem level acquisition milestones.
k. (U) Interface with ship design architects regarding shipboard arrangements, electrical and coding requirements, sensor performance, and cost reduction studies.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCEN DET, New London, CT; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: TBD Subsystem vendors; TBD Integration contractor and management and engineering support contractors.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Mission Needs Statement	10/91
Milestone 0 Acquisition Memorandum	8/92

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604558N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: New Design SSN Development
PROJECT NUMBER: F1950 PROJECT TITLE: New Design SSN Combat System Dev

G. (U) RELATED ACTIVITIES: HM&E systems concepts related to CENTURION completing advanced development in PE 0603561N (Advanced Submarine System Development) will be transitioned to full scale engineering development, as will acoustic systems concepts in PE 0603504N (Advanced Submarine Combat Systems Development). Development of the CENTURION propulsion plant is continuing in PE 0603570N (Advanced Nuclear Power Systems). Development of the Submarine Defensive Warfare System (SDWS) is continuing in PE 0101226N (Submarine Acoustic Warfare Development). Development of TB-29 and TB-16 towed arrays are continuing under PE 0604503N (Submarine System Equipment Development). The CENTURION Submarine Combat System also interfaces with: (1) PE 0603691N (MK 48 ADCAP); (2) PE 0204229N (Tomahawk & Theatre Mission Planning Center); (3) 0603562N (Submarine Tactical Warfare Systems); (4) PE 0604707N/X0798 (Space Electronic Warfare/Architect/Engineering Support). Preliminary design efforts will begin in PE 0603564N (Ship Preliminary Design Project and Feasibility Studies).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: F1946 PROJECT TITLE: SSN 21 Development

PICTURE NOT AVAILABLE

Popular Name: SEAWOLF R&D Program

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	MPU Testing Complete 9/92		Propulsion Completion 2/94	Install AN/BSY 2 3Q/95
T&E MILESTONES				DT-II 3Q/96 DT-IIIA 3Q/96 DT-IIIB 1Q/98 OT-II 2Q/99 OT-III 2Q/99
CONTRACT MILESTONES	SHOCK ANALYSIS CONTRACT 5/92		AWARD CONFORM CONTRACTS 11/93	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	32,889	21,875	18,069	42,176	486,404
SUPPORT CONTRACT	2,530	0	0	0	27,726
IN-HOUSE SUPPORT	73,024	48,986	32,177	86,087	816,993
GFE/ OTHER	45,584	20,239	25,883	172,769	298,325
TOTAL	154,027	91,100	76,129	301,032	1,629,448

B. (U) DESCRIPTION: The SSN 21 Class multi-mission submarine will be quiet, fast, heavily armed, survivable, and capable of contending with the projected enemy threat well into the 21st century. The program provides the advanced technology, prototype components and systems to design and construct the lead ship of the SSN 21 Class and SSN 22, using cost effective modular construction techniques. This program includes cost reduction efforts, producibility initiatives and technical risk reduction initiatives. Significant technical advances in areas such as silencing, survivability, depth, speed and combat system integration are also included.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: F1946 PROJECT TITLE: SSN 21 Development

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: The following information is intended to highlight major R&D efforts and does not include all SEAWOLF R&D efforts.

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Commenced at-sea testing of partial arc propulsion shaft bearing.
b. (U) Continued prototype full scale propulsor fabrication.
c. (U) Continued testing with Large Scale Vehicle (LSV).
d. (U) Commenced at-sea test of high pressure air compressor.
e. (U) Commenced qualification testing of 155V DC power supply and supported integration of 155V DC power supply with SEAWOLF Combat System at the combat system vendor's test facility (mate testing).
f. (U) Continued at-sea testing of Impressed Current Cathodic Protection (ICCP) system.
g. (U) Continued construction of Underwater Explosive Test facility (UTF).
h. (U) Continued shock qualification tests of SSN 21 components.
i. (U) Continued development of Noise Vibration Monitoring System.
j. (U) Commenced hardware/software integration testing of Ship Control System (SCS).
k. (U) Commenced fracture mechanics and corrosion study of ferralium 255.
l. (U) Continued Advanced Special Hull Treatment (ASHT) at-sea patch tests.
m. (U) Continued development of ASHT Mold-in-Place (MIP) installation technology.
n. (U) Continued development of fire retardant paint specification.
o. (U) Continued performance testing of prototype Air Turbine Pump (ATP).
p. (U) Commenced electromagnetic silencing testing.
q. (U) Continued evaluation of sanitary overboard pump.
r. (U) Completed land based testing on Main Propulsion Unit (MPU).
s. (U) Completed development of _material.
t. (U) Completed ASHT material certification tests.
u. (U) Completed fabrication of prototype battery cells and completed Advanced Submarine Battery (ASB-III) qualification testing.
v. (U) Fabricated qualification battery cells.
w. (U) Completed qualification tests of trim and drain pumps.
x. (U) Completed seawater system development.
y. (U) Completed qualification testing of prototype R-114 air conditioning unit.
z. (U) Completed prototype ATP acoustic tests.
aa. (U) Completed foundation acoustic design validation.
bb. (U) Completed SCS prototype fabrication.
cc. (U) Completed resolution of High Yield (HY-100) weld issues.
dd. (U) Completed qualification of Emergency Main Ballast Tank (EMBT) Blow Valve.

2. (U) FY 1993 PROGRAM:
a. (U) Complete at-sea testing of partial arc propulsion shaft bearing.
b. (U) Continue prototype full scale propulsor fabrication.
c. (U) Continue testing with LSV.
d. (U) Complete at-sea test of high pressure air compressor.
e. (U) Continue qualification testing of 155V DC power supply and support integration of 155V DC power supply with SEAWOLF Combat System at the combat system vendor's test facility (mate testing).
f. (U) Continue at-sea testing of ICCP system.
g. (U) Complete construction of UTF.
h. (U) Continue shock qualification tests of SSN 21 components.
i. (U) Complete development of Noise Vibration Monitoring System.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: F1946 PROJECT TITLE: SSN 21 Development

j. (U) Continue hardware/software integration testing of SCS.
k. (U) Complete fracture mechanics and corrosion study of ferralium 255.
l. (U) Continue ASHT at-sea patch tests.
m. (U) Continue development of ASHT MIP installation technology.
n. (U) Complete development of fire retardant paint specification.
o. (U) Continue performance testing of prototype ATP.
p. (U) Continue electromagnetic silencing testing.
q. (U) Complete evaluation of sanitary overboard pump.
r. (U) Commence qualification testing of quiet air reducing manifolds.
s. (U) Commence integration of Data Distribution System.
t. (U) Commence system and component integration support during ship construction.
u. (U) Commence planning for Live Fire Test.
v. (U) Commence qualification of battery cells.

3. (U) FY 1994 PLANS:
a. (U) Complete prototype full scale propulsor fabrication.
b. (U) Complete testing with LSV.
c. (U) Complete qualification testing of 155V DC power supply and support integration of 155V DC power supply with SEAWOLF Combat System at the combat system vendor's test facility (mate testing).
d. (U) Complete at-sea testing of ICCP.
e. (U) Continue shock qualification tests of SSN 21 components.
f. (U) Continue hardware/software integration testing of SCS.
g. (U) Continue ASHT at-sea patch tests.
h. (U) Continue development of ASHT MIP installation technology.
i. (U) Complete performance testing of prototype ATP.
j. (U) Continue electromagnetic silencing testing.
k. (U) Complete qualification testing of quiet air reducing manifolds.
l. (U) Continue integration of the Data Distribution System.
m. (U) Continue system and component integration support during ship construction.
n. (U) Continue planning for Live Fire Test.
o. (U) Continue qualification of battery cells.
p. (U) Commence ASHT (low volume) installation.
q. (U) Commence Performance Trials preparations.
r. (U) Commence technical assessment of 155V DC power supply equipment in preparation for refurbishment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program. Program scheduled to complete in FY 99. All components are scheduled to have completed the testing and evaluation phase.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCEN DET, Annapolis, MD; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAVUNSEAWARCENDIV, Newport, RI; NAVUNSEAWARCEN DET, New London, CT; MINAVSHPYD, Vallejo, CA; PORTSNAVSHPYD, Portsmouth, NH; ONR, Arlington, VA; DOE, Oak Ridge, TN; USACSTA, Aberdeen Proving Ground, MD; SUBMEPP Portsmouth, NH; TRICCSMA, Newport, RI. CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; Westinghouse Electric Corporation, Pittsburgh, PA; American Systems Corporation, Chantilly, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Due to reduction of Class, several areas have been restructured: certification of HY-130 steel canceled, support for system integration during ship construction reduced, shock test program descoped, and ASHT multi-yard capability and optimized installation process for ASHT canceled.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: F1946 PROJECT TITLE: SSN 21 Development

2. (U) Schedule changes: Program was terminated in Amended FY 93 President's Budget. This action caused stop work orders to be issued and slow down of work being done. This caused significant schedule changes and restructuring to complete testing and other requirements.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TLR (OPNAVINST C9010.332)	12/85
DCP	5/88
TEMP REV 2	8/90
TLR (OPNAVINST C9010.332A)	9/91

G. (U) RELATED ACTIVITIES: 0604567N (Ship Contract Design/Live Fire T&E), 0603570N (Advanced Nuclear Power Systems), 0604524N (Submarine Combat System).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN: #3	234,677	0	0	0	3,666,177
MILCON: P-398	12,000	0	0	0	12,000

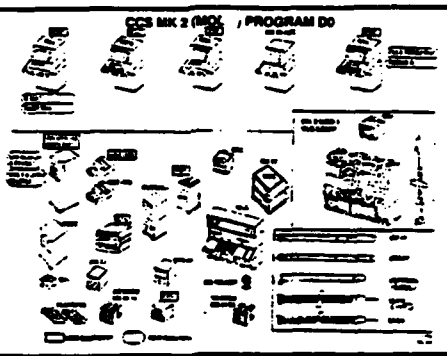
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

DT-II	3Q/96
DT-IIIA	3Q/96
Standardization Trials	3Q/96 & 1Q/98
Acoustic Trials	3Q/96 & 2Q/98
Live Fire Test	3Q/97
Launcher Trials	2Q/97
DT-IIIB	1Q/98
OT-II	2Q/99
OT-III	2Q/99

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
PROJECT NUMBER: F0236 PROJECT TITLE: SSN Combat Control System Improvement (ENG)



POPULAR NAME: CCSIP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
CCS MK1 C4.2	RTF 6/92			
CCS MK1 C4.2 Rev.1			RTF 2/94	MS III 11/94
CCS MK2 (Program DO)				
ENGINEERING MILESTONES				
CCS MK1 C4.2 Rev.1	SDCT 7/92			
AN/BSY-1 ECP 134	PDR 3/92 CDR 5/92	SDCT 3/93		
CCS MK2 (Program DO)	CDR 12/91 (Mod 0/1) SDCT 8/92 (Mod 2/3)	SDCT 6/93 (Mod 0/1)		
CCS MK2 DO (Block 1) Weapon Data Converter				PDR 6/95 CDR 9/95 PDR 9/95
T&E MILESTONES				
CCS MK1 C4.2 Rev.1		FOT&E 7/93		
AN/BSY-1 ECP 134			FOT&E 4/94	
CCS MK2 (Program DO)		TECHEVAL 8/93	OPEVAL 3/94	
CONTRACT MILESTONE				
AN/BSY-1 ECP 134	Award 12/91			
CCS MK2 DO (Block 1) Weapon Data Converter			Award 6/94	Award 10/94

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	61.705	27.528	11.246	CONT.	CONT.
SUPPORT CONTRACT	1.150	1.020	1.100	CONT.	CONT.
IN-HOUSE SUPPORT	17.111	24.400	11.301	CONT.	CONT.
GFE/ OTHER	1.406	8.790	1.780	CONT.	CONT.
TOTAL	81.372	61.738	25.427	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
PROJECT NUMBER: F0236 PROJECT TITLE: SSN Combat Control System Improvement (ENG)

B. (U) DESCRIPTION: This program develops software upgrades to integrate improved weapons capabilities within submarine Combat Control System (CCS) MK1, MK2, and AN/BSY-1 (Combat Control) and develops improvements to hardware which has become increasingly difficult and uneconomical to maintain as part of the Obsolete Equipment Replacement (OER) program. In FY94 and beyond the primary thrust of the CCS Improvement Program is the Fleet introduction of AN/BSY-1 Engineering Change Proposal (ECP) 134, Joint Operational Tactical System (JOTS) for AN/BSY-1 and CCS MK1, and CCS MK2 Program D0 system; development of the Weapon Data Converter (WDC) as part of the OER program; and development of CCS MK2 Program D0 Blocks 1 and 2 Updates. ECP 134 provides TOMAHAWK Blocks I and III capabilities to AN/BSY-1 equipped submarines. JOTS provides battlegroup interoperability and Over The Horizon (OTH) correlation algorithm update to AN/BSY-1 and CCS MK1 equipped submarines. CCS MK2 converged multiple Submarine Combat System developments into a single effort to minimize submarine life cycle costs, i.e., SSN 688, SSN 688I and SSBN 726 Classes. CCS MK2 Program D0 provides a modular software architecture; introduces TOMAHAWK Block III and Harpoon Block IC; introduces ADCAP on TRIDENT; and replaces obsolete equipment. CCS MK2 Program D0 Block 1 integrates CCS MK2 into AN/BSY-1 systems, replaces additional obsolete equipment, provides updates to the World Vector Shoreline data base as well as incorporating a direct interface to the Global Positioning System, incorporate Navy Command System (NCS) into CCS MK2 baseline and implements Tomahawk Block III Phase III (Tomahawk Strike Planning System).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Initiated system design certification test (SDCT) for CCS MK2 Mods 0/1 (SSN 688, Vertical Launch System (VLS) and Non-VLS).

b. (U) Conducted Critical Design Review (CDR) for CCS MK2 Mods 2/3 (SSN 688I and SSBN 726).

c. Awarded contract modification for software development and integration of TOMAHAWK Block III, Harpoon 1C, and operability improvements into CCS MK2 Program DO (ECP 6).

d. (U) Awarded contract modification for AN/BSY-1 ECP 134.

e. (U) Released CCS MK1 Program C4.2 to Fleet.

f. (U) Completed SDCT for CCS MK2 Mods 2/3.

g. (U) Initiated SDCT for CCS MK1 Program C4.2 Rev. 1.

h. (U) Conducted Preliminary Design Review (PDR) and CDR for AN/BSY-1 ECP 134.

i. (U) Initiated development of JOTS integration for CCS MK1 and AN/BSY-1.

2. (U) FY 1993 PROGRAM:

a. (U) Complete SDCT for CCS MK2 Mods 0/1.

b. (U) Start Technical Evaluation (TECHEVAL) for CCS MK2 Mods 0/1.

c. (U) Complete SDCT and Follow-on Test and Evaluation (FOT&E) for CCS MK1 Program C4.2 Rev. 1.

d. (U) Complete SDCT for AN/BSY-1 ECP 134.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
PROJECT NUMBER: F0236 PROJECT TITLE: SSN Combat Control System Improvement (ENG)

e. (U) Develop CCS MK2 Program DO Block 1 specifications.

f. (U) Complete SDCT for CCS MK2 Program DO (ECP 6).

g. (U) Complete development and integration of JOTS.

3. (U) FY 1994 PLANS:

a. (U) Complete TECHEVAL/Operational Evaluation (OPEVAL) for CCS MK2 Mods 0/1.

b. (U) Release CCS MK1 Program C4.2 Rev. 1 to Fleet.

c. (U) Conduct FOT&E and release AN/BSY-1 ECP 134 to Fleet.

d. (U) Develop WDC OER performance specifications.

e. (U) Award CCS MK2 Program D0 Block 1 contract.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI; NCCOSC RDTE DIV, San Diego, CA; COMOPTEVFOR, Norfolk, VA; CONTRACTORS: International Business Machines Corp., Federal Systems Company, Manassas, VA; Paramax Systems Corporation, Eagan, MN; Raytheon Company, Submarine Signal Division, Portsmouth, RI; Lockheed Missiles and Space Co., Inc., Austin, TX; EG&G Washington Analytical Services Center Inc., Rockville, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: CCS MK2 Programs D1 and D2 technical content reduced necessitating smaller block updates, i.e., Blocks 1 and 2.

2. (U) Schedule Changes: MS III for CCS MK2 slipped to November 1994 due to test ship availability requirements.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirements (S0236)	11/88 (CCS MK2)
Navy Decision Coordinating Paper (NDCP) (S0236-05)	09/88 (CCS MK2)
NDCP (S0236-AS)	12/87 (Programs C4 and C5)
Test and Evaluation Master Plan (TEMP) 234-9	09/88 (CCS MK2)
TEMP 234-8	07/90 (Program C4.2)
Acqusition Plan (AP) 11-87	09/87 (CCS MK2 Program DO)
AP 89-025 (Rev. 2 (91))	08/91 (CCS MK2 Program DO Block 1/WDC)

G. (U) RELATED ACTIVITIES:

(U) WEAPONS: P.E. 0204229N (Project A0545), TOMAHAWK; and P.E. 0603691N, MK 48 ADCAP.
(U) SENSORS: P.E. 0604503N, Submarine System Equipment Development; P.E. 0604707N (Project X0798), Over the Horizon Targeting; and P.E. 0603504N, Advanced Submarine Combat Systems Development.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
PROJECT NUMBER: F0236 PROJECT TITLE: SSN Combat Control System Improvement (ENG)

H. (U) OTHER APPROPRIATIONS FUNDS: (Dollars in Thousands)

		FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)	OPN Line 180	47,171	63,514	14,472	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA:
CCS MK1 C4.2 Rev.1 FOT&E 7/93; AN/BSY-1 ECP 134 FOT&E 4/94;
CCS MK2 (Program D0) TECHEVAL 8/93; OPEVAL 3/94
CCS MK2 (Program D0 Block 1) TECHEVAL 12/97; OPEVAL 2/98
Weapon Data Converter FOT&E 5/99

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1803	Ship Contract Design	19,308	32,514	36,702	- CONT.	CONT.
S2148	Sealift	26,764	0	0	0	26,764
S2197	Ship Specifications	4,044	3,575	3,278	CONT.	CONT.
S2198	Live Fire Test and Evaluation	0	0	7,157	CONT.	CONT.
TOTAL		50,116	36,089	47,137	CONT.	CONT.

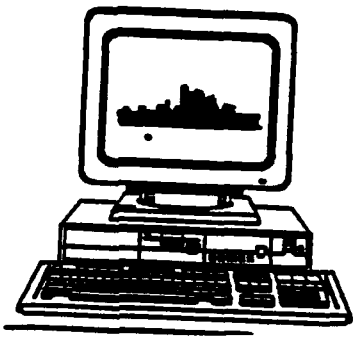
B. (U) DESCRIPTION: This program element (PE) directly supports the Navy's Shipbuilding Plan by providing for the development of all engineering and programmatic documentation, including ship specifications and contractual documents, associated with the acquisition of Navy ships. In FY 1992-93, this PE supported all work after Milestone I. In FY 1994 preliminary design funding was shifted to PE 0603564N. This PE supports development of all ship acquisition products after the preliminary design phase in the ship design and acquisition process.

(U) Contract Design is the engineering development of the technical and contractual definition of the ship design (including ship specifications and drawings) to a level of detail sufficient for prospective shipbuilders to make a sound estimate of the construction cost and schedule. Additionally, the contract design package developed under this PE provides the technical baseline from which the Navy selects the shipbuilder who then develops the detail design package required to support the construction and eventual delivery of the ship. This PE also supports the development of design methodologies which facilitate and optimize the transition from ship design documents to efficient production of new ships and ship conversions, and supports engineering planning and ship affordability studies.

(U) This PE also supports Live Fire Test and Evaluation (LFT&E) of new ship designs. Additionally, this program previously funded development and execution of the initial engineering design phase of the Strategic Sealift Acquisition Program until the creation of the National Defense Sealift Fund (NDSF).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design



POPULAR NAME: SHIP CONTRACT DESIGN

A. (U) SCHEDULE /BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE *	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	See Individual Ship Acquisition Program Documentation			
ENGINEERING MILESTONES	See Individual Ship Acquisition Program Documentation			
T&E MILESTONES	See Individual Ship Acquisition Program Documentation			
CONTRACT MILESTONES	Not applicable.			

* This project supports a number of acquisition programs. Individual acquisition milestones, are identified in the individual ship program documentation. Ship award years are identified in paragraph C.4.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4.308	9.754	12.479	CONT.	CONT.
SUPPORT CONTRACT	2.000	3.902	3.303	CONT.	CONT.
IN-HOUSE SUPPORT	13.000	18.858	20.920	CONT.	CONT.
GFE/ OTHER	0	0	0		
TOTAL	19.308	32.514	36.702	CONT.	CONT.

B. (U) DESCRIPTION: This program supports the development of all technical, programmatic, and contractual documentation required after Milestone I (FY 1992 and FY 1993), and after Preliminary Design (FY 1994 and out), for the acquisition of the ships in the Navy's Shipbuilding Program. The major effort is the engineering development of the technical and contractual definition of the ship design (e.g., ship specifications and drawings), with sufficient details for the prospective shipbuilder to make a sound estimate of construction cost and schedule. It also serves as the contractual technical definition from which the selected builder develops the shipbuilding detail design and testing package required to build and deliver the ship. For FY 1992 and FY 1993, this program also develops design methods which support the development of Contract Design and production transition; ship conversion studies, engineering and planning documents; and ship affordability studies. Also for FY 1992 and FY 1993, this project supports survivability analysis on ship designs in support of Live Fire Test and Evaluation (LFT&E) policy.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Began CVN-76 contract design.
   b. (U) Began Mine Countermeasure Support Ship, [MCS(CONV)] trade-off studies.
   c. (U) Began Flagship Conversion trade-off studies.
   d. (U) Continued CRAFT contract design.
   e. (U) Continued TAGOS-23(SW-A) contract design.
   f. (U) Continued Designing for Production Program.
   g. (U) Continued Specification Improvement Program.
   h. (U) Continued Fiber Optics (FO) Topology Program.
   i. (U) Completed AGOR-24 contract design.
   j. (U) Completed AOE-10 contract design.
   k. (U) Completed DDG-51 FLT II contract design.
   l. (U) Completed CVN-76 trade-off studies.
   m. (U) Completed DDV trade-off studies.
   n. (U) Completed MHC(V)/MCS(X) trade-off studies.
   o. (U) Completed Flagship Conversion trade-off studies.
   p. (U) Completed SEALIFT new construction and conversion Circular of Requirements (CORs).
   q. (U) Stopped work on TAGSO(ICE).
   r. (U) Limited work on TAGSO(SW) to draft specification.

2. (U) FY 1993 PROGRAM:
   a. (U) Begin L(X) preliminary design.
   b. (U) Begin MCS(CONV) conversion design.
   c. (U) Begin Flagship conversion studies.
   d. (U) Begin TAGS 60 contract design.
   e. (U) Continue CVN-76 contract design.
   f. (U) Continue TAGOS-23(SW-A) contract design.
   g. (U) Continue CRAFT contract design.
   h. (U) Continue Specification Improvement Program.
   i. (U) Continue Designing for Production Program.
   j. (U) Continue FO Topology Program.

3. (U) FY 1994 PLANS:
   a. (U) Begin L(X) contract design.
   b. (U) Continue CVN-76 contract design.
   c. (U) Continue Flagship Conversion contract design.
   d. (U) Continue TAGOS-23(SW-A) contract design.
   e. (U) Complete L(X) preliminary design.
   f. (U) Complete MCS(CONV) contract design
   g. (U) Complete TAGS 60 contract design.

4. (U) PROGRAM TO COMPLETION: This is a continuing program. Individual ship award years follow:

SHIP	FISCAL YEAR OF AWARD
AOE-10, AGOR-24, DDG-51 FLTII	FY 1992
TAGOS-23(SW-A), MCS(CONV), TAGS 60	FY 1994
CVN-76	FY 1995
L(X)	FY 1996
Flagship Conversion	FY 1996
ADC(X)	FY 1998
New Attack Submarine	FY 1998

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Systems Engineering Station, Carderock Division, Naval Surface Warfare Center, Philadelphia, PA.; Carderock Division, Naval Surface Warfare Center, Bethesda, MD.; Naval Air Engineering Center, Lakehurst, NJ; CONTRACTORS: JJMA, Inc., Arlington, VA.; Advanced Marine Enterprises, Arlington, VA.; Vitro Laboratories, Silver Spring, MD.; Bath Iron Works, Bath, ME.; Gibbs & Cox, New York, NY.; and Newport News Shipbuilding Inc., Newport News, VA..

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: See individual program documentation

G. (U) RELATED ACTIVITIES: PE 0603564N, Ship Preliminary Design and Feasibilities Study.

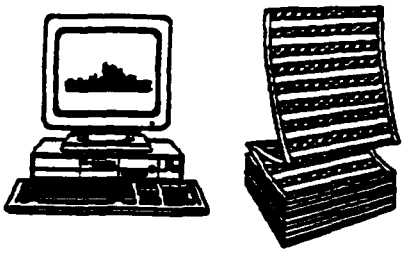
H. (U) OTHER APPROPRIATED FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: See individual ship program acquisition program documentation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S2197 PROJECT TITLE: Ship Specifications



POPULAR NAME: SHIP SPECS

A. (U) SCHEDULE /BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE *	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	See Individual Ship Acquisition Program Documentation			
ENGINEERING MILESTONES	Not applicable.			
T&E MILESTONES	Not applicable.			
CONTRACT MILESTONES	Not applicable.			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,800	1,500	1,377	CONT.	CONT.
SUPPORT CONTRACT	444	385	360	CONT.	CONT.
IN-HOUSE SUPPORT	1,800	1,700	1541	CONT.	CONT.
GFE/ OTHER	0	0	0		
TOTAL	4,044	3,575	3,278	CONT.	CONT.

* This project supports a number of acquisition programs. Individual acquisition milestones are identified in the individual program documentation. Ship award years are identified in paragraph C.4.

B. (U) DESCRIPTION: This project funds development, improvement and update of NAVSEA cognizant acquisition specifications including Federal and Military Specifications, Handbooks and General Specifications for Ships of the U.S. Navy. NAVSEA is responsible for 4600 Military Specifications and Standards, 149 Federal Specifications and Standards, 3100 Standard/Type Drawings and Design Data Sheets, 362 Ship General Specification Sections and 122 Non-Government Standards. These documents are required to reflect the latest technologies (i.e. fiber optics), manufacturing techniques, environmental requirements, hazardous material reduction, safety and legal/congressional requirements. This also funds the development and implementation of computer-aided design/computer aided-manufacturing (CAD/CAM) systems to improve the transition from the Navy's contract design package to the shipbuilders' detail design and production effort. Additionally, the project funds the integration of new fiber optic (F.O.) technology into the basic ship design process.

(U) This project was an integral part of S1803 Ship Contract Design in FY 1992 and FY 1993.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S2197 PROJECT TITLE: Ship Specifications

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Updated portions of General Specifications for Ships of the U.S. Navy.
b. (U) Updated various Federal Specifications.
c. (U) Updated various Military Specifications.
d. (U) Updated various Design Standards and Drawings.
e. (U) Continued development of Specification data base and Open Systems Architecture System.
f. (U) Commenced development of CADII system architecture.
g. (U) Commenced development of CADII ship design systems modeling techniques (Hull Form, Structure and Distributed systems)
h. (U) Continued development of Fiber Optics Topology systems.
i. (U) Completed joint coordination for Fiber, Cable, Connectors, Splices, and Interconnection box specifications. Certified F.O. component qualification facility.

2. (U) FY 1993 PROGRAM:
a. (U) Continue to update portions of General Specifications for Ships of the U.S. Navy.
b. (U) Update various outdated Federal Specifications.
c. (U) Update various outdated Military Specifications.
d. (U) Update various outdated Design Standards and Drawings.
e. (U) Continue development of Specification data base and Open Systems Architecture System.
f. (U) Complete development of CADII system architecture.
g. (U) Continue development of CADII ship design systems and modeling techniques.
h. (U) Continue development of Fiber Optics(FO) Topology systems.
i. (U) Begin development of FO High Speed Transmitter and Receiver Specification and Backplane/Switch Standards.

3. (U) FY 1994 PLANS:
a. (U) Continue to update portions of General Specifications for Ships of the U.S. Navy.
b. (U) Update various outdated Federal Specifications.
c. (U) Update various outdated Military Specifications.
d. (U) Update various outdated Design Standards and Drawings.
e. (U) Continue development of Specification data base and Open Systems Architecture System.
f. (U) Commence development of CADII analysis programs and program integration.
g. (U) Continue development of CADII ship design systems and modeling techniques.
h. (U) Continue development of Fiber Optics(FO) Topology systems.
i. (U) Continue development of optical cable and fiber connectors, required specifications and standards and optical waveguide measurements and standards development.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S2197 PROJECT TITLE: Ship Specifications

4. (U) PROGRAM TO COMPLETION: This is a continuing program. Individual ship award years follow:

SHIP	FISCAL YEAR OF AWARD
AOE-10, AGOR-24, DDG-51 FLTII	FY 1992
TAGOS-23(SW-A), MCS(CONV), TAGS 60	FY 1994
CVN-76	FY 1995
L(X)	FY 1996
Flagship Conversion	FY 1996
ADC(X)	FY 1998
New Attack Submarine	FY 1998

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Command, Control & Ocean Surveillance Center, San Diego, Ca.; Naval Ship Systems Engineering Station, Naval Surface Warfare Center, Carderock Div., Philadelphia, Pa,; Naval Institute of Standards and Technology, Electromagnetic Tech. Div., Boulder,Co.; Carderock Div., Naval Surface Warfare Center, Bethesda, Md.; Naval Research Lab, Washington, D.C.; Naval Undersea Warfare Center Det., Norfolk, Va.; CONTRACTORS: Gibbs & Cox, Alexandria, Va.; ARC, Rockville, Md.; PRC, Arlington, Va.; JJMA, Arlington, Va.; AME, Arlington, Va..

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: See documentation for individual ship programs.

G. (U) RELATED ACTIVITIES: PE 0603564N, Ship Preliminary Design and Fesibilities Study.

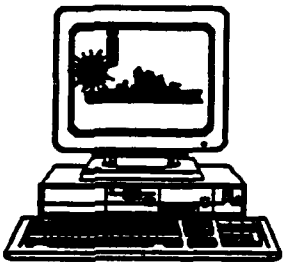
H. (U) OTHER APPROPRIATED FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable. (The specifications, standards, drawings, modeling and analysis techniques developed under this project form the basis for testing and evaluating ships and ship systems.)

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S2198 PROJECT TITLE: Live Fire Test & Evaluation



POPULAR NAME: LFT&E

A. (U) SCHEDULE /BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE *	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	See Individual Ship Acquisition Program Documentation			
ENGINEERING MILESTONES	See Individual Ship Acquisition Program Documentation			
T&E MILESTONES	See Individual Ship Acquisition Program Documentation			
CONTRACT MILESTONES	Not applicable.			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	3,221	CONT.	CONT.
SUPPORT CONTRACT	0	0	644	CONT.	CONT.
IN-HOUSE SUPPORT	0	0	3,292	CONT.	CONT.
GFE/ OTHER	0	0	0		
TOTAL	0	0	7,157	CONT.	CONT.

* This project supports a number of acquisition programs. Individual acquisition milestones are identified in the individual program documentation. Ship award years are identified in paragraph C.4.

B. (U) DESCRIPTION: This project specifically responds to the Congressionally mandated Live Fire Test and Evaluation (LFT&E) legislation which requires realistic survivability testing be conducted under all major acquisition programs before production approval is granted. Evaluations concerning the vulnerability and lethality of ships against known threat systems will be conducted using analytical prediction techniques and model testing. A less detailed analysis was an integral part of ship design funding under S1803 in previous years (FY 1992 and FY 1993) but was never separately broken out.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Contract Design/Live Fire T&E
PROJECT NUMBER: S2198 PROJECT TITLE: Live Fire Test & Evaluation

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS:
   a. (U) Completed survivability analysis for AGOR.
   b. (U) Completed survivability analysis for AOE 10.-
   c. (U) Completed survivability analysis for DDG 51 Flt II.
   d. (U) Began survivability analysis for CVN 76.
   e. (U) Began survivability analysis for MCS (Conv).

2. (U) FY 1993 PROGRAM:
   a. (U) Continue survivability analysis for CVN 76.
   b. (U) Continue survivability for MCS (Conv).

3. (U) FY 1994 PLANS:
   a. (U) Commence evaluation of L(X) design for weapon system vulnerability.
   b. (U) Commence and complete L(X) scale model development for underwater explosion testing.
   c. (U) Begin L(X) underwater explosion scale model testing and analysis.
   d. (U) Complete survivability analysis for MCS (Conv).

4. (U) PROGRAM TO COMPLETION: This is a continuing program. Individual ship award years follow:

SHIP	FISCAL YEAR OF AWARD
AOE-10, AGOR-24, DDG-51 FLTII	FY 1992
TAGOS-23(SW-A), MCS(CONV), TAGS 60	FY 1994
CVN-76	FY 1995
L(X)	FY 1996
Flagship Conversion	FY 1996
ADC(X)	FY 1998
New Attack Submarine	FY 1998

D. (U) WORK PERFORMED BY: IN-HOUSE: U.S. ARMY Aberdeen Proving Grounds, Aberdeen, Md.; Norfolk Naval Shipyard, Norfolk, Va. CONTRACTORS: JJMA, Arlington, Va.; ME, Arlington, Va..

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: See documentation for individual ship programs.

G. (U) RELATED ACTIVITIES: PE 0603564N, Ship Preliminary Design and Feasibilities Study.

H. (U) OTHER APPROPRIATED FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: See individual ship T&E documentation.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1353	Standard Hardware	8,289	7,118	4,228	CONT.	- CONT.
X1976	NGCR	19,273	22,678	11,463	CONT.	CONT.
W0845	AN/AYK-14	5,537	2,091	1,881	CONT.	CONT.
	TOTAL	33,099	31,887	17,572	CONT.	CONT.

B. (U) DESCRIPTION: Standard Embedded Computer Resources include computers, display systems, peripherals, and associated software. This equipment is not stand-alone units. Rather, they are integral building blocks of larger weapons, sensor, and combat direction systems. This program provides the technical planning and engineering support for development and evolution of the Navy's high performance embedded computer resources for transition to an open system architecture. The program includes product improvement of current generation computers AN/AYK-14, AN/UYK-43 and AN/UYK-44; development of state-of-the-art mass memory storage devices (MMSD); and development of interconnects, interfaces, protocols, and standards (hardware and software) needed for the highly flexible architectures of the Navy's next generation computer resource family.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: S1353 PROJECT TITLE: Standard Hardware



POPULAR NAME: SECR

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		II-A(MMSD)11/92	III(MMSD)12/93	
ENGINEERING MILESTONES	PRR(MMSD)04/92	PDR(43)03/93	CDR(43)11/93 PDR(DSC)12/93 CDR(DSC)04/94	
T&E MILESTONES		DTI(43)11/92 DTI(MMSD)10/92 DTI(44)12/92	DTI(43)09/94 DTI(DSC)02/94	
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5,082	4,466	2,663	CONT.	CONT.
SUPPORT CONTRACT	617	660	350	CONT.	CONT.
IN-HOUSE SUPPORT	2,534	1,918	1,115	CONT.	CONT.
GFE/ OTHER	56	74	100	CONT.	CONT.
TOTAL	8,289	7,118	4,228	CONT.	CONT.

B. (U) DESCRIPTION: Planning and support for development and modification of the Navy's high performance embedded computer resources to meet Open Systems Architecture standards via the Computer Open Systems Implementation Program (COSIP), specifically, transitional improvements to the UYK-43 and UYK-44 computers, assessment of Open Architecture display components, the Mass Memory Storage Device (MMSD),the Data Systems Console (DSC) and other standard peripherals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Productized UYK-43 High Bandwidth Memory (HBM).
b. (U) Began implementation of UYK-43/44 open architecture.
c. (U) Developed UYK-44 Variable Modular European (VME) bus bridge and demonstrated VME backplane in the UYK-44 Militarized Reconfigurable Computer (MRC).
d. (U) Developed plan for a SAFENET II Local Area Network (LAN) in UYK-43.

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: S1353 PROJECT TITLE: Standard Hardware

e. (U) Received first article delivery of the MMSD.
f. (U) Developed emulation validation software to verify AEGIS File Management Firmware Set and Native Mode Emulation Firmware.
g. (U) Began independent Government testing of the MMSD; conducted Production Readiness Review (PRR) for the MMSD.
h. (U) Initiated the COSIP; began requirements, assessment, and industry survey for appication of Open Systems Technology to combat systems; completed initial definition of COSIP evaluation plan.
i. (U) Initiated program for definition/acquisition of an Open Systems based family of DSCs, an element of the COSIP program, as replacement for common peripheral devices.

2. (U) FY 1993 PROGRAM:

a. (U) Place UYK-43 HBM into production and investigate higher performance processor and Input/Output capability via Non-Developmental Item (NDI)/VME technology.
b. (U) Productize UYK-44 VME bridge; develop UYK44 Futurebus+ bridge; demonstrate Futurebus+ backplane in UYK-44 MRC.
c. (U) Productize UYK-43/UYK-44 Open Systems architecture; hold Preliminary Design Review (PDR) for UYK-43 Open Systems Module (OSM).
d. (U) Develop UYK-43 plan for incorporation of adjunct processors.
e. (U) Complete independent Government testing of MMSD; achieve Milestone IIA for MMSD.
f. (U) Complete COSIP component evaluation plan; complete COSIP Computer Resources Information Base (CRIB).
g. (U) Acquisition of engineering model DSC components; complete DSC integration and test; DSC product acquisition program initiated.
h. (U) Initiate program for definition/assessment in COSIP of open architecture display system component elements for introduction into COSIP CRIB.

3. (U) FY 1994 PLANS:

a. (U) Finalize UYK-43 OSM and hold Critical Design Review (CDR) and SAFENET II LAN productization and place into production.
b. (U) Begin selecting High-Performance add-in items for inclusion in the OSM.
c. (U) Productize UYK-44 Futurebus+ bridge.
d. (U) Achieve Milestone III approval and certification for full rate production for MMSD.
e. (U) Populate COSIP CRIB with commercially based NDI open systems componets.
f. (U) Initial DSC systems delivered and supported; continue evolution of additional DSC systems and capabilities; hold PDR/CDR.
g. (U) Assess display system component elements and introduce to COSIP CRIB.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Indianapolis, IN; NSCSEA, Norfolk, VA; NAVSURWARCENDIV, Crane, IN; NCCOSC RDTE DIV, San Diego, CA; NAVUNSEAWARCENDIV, Newport, RI; NAVSURWARCENDIV, Dahlgren, VA; NAVSURWARCEN, White Oak DET, Silver Spring, MD. CONTRACTORS: Paramax, St. Paul, MN; Control Data Corporation, Minneapolis, MN; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Microlithics, Golden, CO; ELS, Arlington, VA; SYSCOM, Arlington, VA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: S1353 PROJECT TITLE: Standard Hardware

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: All Navy non-avionic programs using SECR, including:
PE 0604366N STANDARD MISSILE IMPROVEMENTS
PE 0603502N UNDERSEA WARFARE AND MCM DEVELOPMENT
PE 0603270N ADVANCED ELECTRONIC WARFARE TECHNOLOGY
PE 0604301N MK-92 FCS UPGRADE
PE 0604755N SHIP SELF DEFENSE
PE 0604372N NEW THREAT UPGRADE
PE 0604507N ENHANCED MODULAR SIGNAL PROCESSOR

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Developmental Test (DT) I for the following:

MMSD	- 10/92
UYK-43 HBM	- 11/92
UYK-44 VME	- 12/92
DSC	- 02/94
UYK-43 OSM	- 09/94

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources

PICTURE NOT AVAILABLE

POPULAR NAME: NGCR

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS/II 03/93		MS/III 01/96
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES	OS 09/92	OS (OPT) 05/93	OS (OPT) 06/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	5.968	3.860	2.781	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	11.451	13.639	6.155	CONT.	CONT.
GFE/ OTHER	1.854	5.179	2.527	CONT.	CONT.
TOTAL	19.273	22.678	11.463	CONT.	CONT.

B. (U) DESCRIPTION: The Next Generation Computer Resources (NGCR) program will establish a set of jointly defined Navy and industry computer hardware and software interface standards that take maximum advantage of ongoing commercial open system architecture and standardization trends in these three major areas:

MultiProcessor Interconnect	Multisystem Interconnects	Software
Backplane	Local Area Net - SAFENET	Operating System (OS)
High Speed Data Transfer Network	High Performance Local Area Network (LAN)	Database Mgmt. Sys.

(U) The NGCR program encompasses or is affiliated with all future tactical computer resources for the full range of Navy Mission Critical Computer Resources (MCCR) shipboard, airborne and shore-based systems. NGCR standards will provide an open systems architecture environment for all Navy MCCR to facilitate interoperability and commonality of products as well as encourage competition and permit applications of state-of-the-practice technologies.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Published Backplane and SAFENET MIL-STD.
b. (U) Completed baseline conformance test procedures for Backplane and SAFENET LAN test capability.
c. (U) Awarded OS evaluation model contract.
d. (U) Began conformance test capability and certification for Backplane and Survivable Adaptable Fiber Optic Embedded Network (SAFENET) Local Area Network (LAN).
e. (U) Started Backplane and SAFENET LAN certifications.
f. (U) Established industry/Navy working groups to define interface standards for Data Base Management Systems (DBMS), Graphics, and High Performance LAN (HP LAN).
g. (U) Started Architectural Test Bed requirements analysis.
h. (U) Began Operating Systems (OS) conformance test methodology investigation.
i. (U) Established System Security Task Group.
j. (U) Established User Task Group.
k. (U) Established Fault Tolerance Task Group.
l. (U) Continued Backplane and SAFENET LAN systems integration support with user programs.
m. (U) Continued joint industry/Navy working groups to define and publish interface standards: Backplane, SAFENET LAN, OS, High Speed Data Transfer Network (HSDTN), and Project Support Environment (PSE).
n. (U) Continued developing certification methodology and procedures.
o. (U) Continued Backplane, SAFENET LAN standards laboratory test model contract.
2. (U) FY 1993 PROGRAM:
a. (U) Complete Backplane, SAFENET LAN standards laboratory test model contract.
b. (U) Complete the Navy technical inputs for inclusion in the definition and approval of the following Institute of Electrical and Electronic Engineers (IEEE) OS documents to be referenced in the final NGC OS MIL-STD: 1) IEEE P1003.0 - POSIX Guide, 2) P1003.1 -Language Independent Specification, 3) P1003.4a/b- Portable Operating System Interface Standard (POSIX) Real Time, 4) P1003.5 - Ada Bindings, 5) P1003.7 - System Administration, 6) P1003.12 - Protocol Independent Specification, 7) P1003.17 - Directory Services/Name Space, 8) P1238 - File Transfer and Access Mechanism (FTAM) Interface.
c. (U) Complete the Navy technical inputs for inclusion in the definition and approval of the following American National Standards Institute (ANSI), ISO and IEEE documents to be referenced in the addendum to the Next Generation Computer Resources (NGCR) SAFENET MIL-STD: 1) ANSI X3T9.5 - Fiber Distributed Data Interface - Station Management, 2) ISO X3S.3 - IEEE Project 802 - Network Management, 3) IEEE 802.1 - IEEE Project 802 - Network Management, 4) IEEE 802.2 - Logical Link Control, 5) IEEE 802.5 - Fiber Optics. Additional standards groups participation include the Xpress Transport Protocol Technical Advisory Board (XTP TAB) and the National Institute of Standards and Technology (NIST) OIW for Network Management and Operating Systems.
d. (U) Milestone II decision.
e. (U) Award OS evaluation model contracts.
f. (U) Continue conformance test capability and certification for Backplane and SAFENET LAN.
g. (U) Continue Backplane and SAFENET LAN certifications.
h. (U) Continue joint industry/Navy working groups to define and publish Backplane, SAFENET LAN, OS, HSDTN, PSE, DBMS, Graphics, and HP LAN interface standards to satisfy Next Generation Computer user requirements.
i. (U) Continue OS conformance test procedure methodology investigation.
j. (U) Continue Security Task Group, User Task Group, and Fault Tolerance Task Group.
k. (U) Continue Backplane and SAFENET LAN systems integration support with users programs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer Resources

l. (U) Continue OS evaluation model contract.
m. (U) Continue development of certification methodology and procedures.

3. (U) FY 1994 PLANS:
a. (U) Continue joint industry/Navy working groups to define and publish OS, HSDTN, DBMS, and HP LAN interface standards to satisfy Next Generation Computer user requirements.
b. (U) Continue Security Task Group, User Task Group, and Fault Tolerance Task Group.
c. (U) Continue conformance test capability and certification for Backplane and SAFENET LAN.
d. (U) Continue Backplane and SAFENET LAN certifications.
e. (U) Continue Backplane and SAFENET LAN systems integration support with users programs.
f. (U) Continue OS evaluation model contracts.
g. (U) Continue development of certification methodology and procedures.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVAIRWARCENACDIV, Warminster; PA, NAVAIRWARCENACDIV, Indianapolis, IN; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, Chine Lake, CA; NAVUNSEAWARCENDIV, Newport, RI; NAVSURFWARCENDIV, Crane,IN; NIST, Gathersburg, MD. CONTRACTORS: Numerous companies (100+) participating in the the working groups (at their expense). Competitive contracts awarded with Cable & Computer Technology, Anaheim, CA; Litton Systems, Pascagoula, MS; Raytheon, Sudbury, MA, Booz-Allen and Hamilton, Bethesda, MD, Raytheon, Portsmouth, RI.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: 1) Termination of working groups associated with three planned standards (High Performance Backplane, Project Support Environment, and Graphics) 2) Termination of OS Conformance Testing 3) Delays in the Architectual Test Bed implementation to FY-95 4) Decreasing the number of tasks to be exercised under the Operating System Evaluation Model contracts.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement	08/88
Acquisition Plan	05/89
Program Master Plan	06/89
Revised Acquisition Plan	04/92

G. (U) RELATED ACTIVITIES: The following Program Elements fund the development of broadbase computer systems technology and products providing the basis for transition to the NGCR program under project X1976.
PE 0601101E, Defense Research Sciences
PE 0602301E, Strategic Technologies
PE 0602708E, Integrated Command and Control Technology
PE 0603223C, Systems Concepts and Battle Management
PE 0204163N, Fleet Communications

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: W0845 PROJECT TITLE: AN/AYK-14

C. (U) DESCRIPTION: The AN/AYK-14 project provides for airborne digital computer requirements with a standard design that has permitted state-of-the-art technology infusion through pre-planned product improvements. The focus of the Advanced AYK-14 (AAYK-14) development is to provide the bridge necessary to evolve new platforms to an Open Systems Architecture (OSA). The AAYK-14 program includes: (1) the development of a commercially based Reduced Instruction Set Computer (RISC) Processor Module (RPM) that will permit communications between existing AYK-14 16-bit Compiler Monitor System (CMS-2) modules and AAYK-14 32-bit Ada modules, (2) development of a backplane based on the commercial IEEE/NGCR OSA standard Futurebus+ interface, (3) support of the additional design, test and qualification necessary to meet multi-user requirements and bring other program's Futurebus+ OSA modules into the AAYK-14 family.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed preliminary specifications for the future development of AAYK-14 modules including a High Speed Data Bus (HSDB) module, Global Positioning System (GPS) module, and Display Processor Modules.

b. (U) Continued the development of the AAYK-14 Core Processor Set (CPS) which includes the RISC Processor Module (RPM), Futurebus+ backplane/chassis and their four associated Computer Software Configuration Items (CSCI's). The AAYK-14 CPS was selected as the primary processing subsection for the LAMPS MK III Block 2 Integrated Mission Processor (IMP) development and teamed with the SH-60B for continued development of the CPS.

2. (U) FY 1993 PROGRAM:

a. (U) Continue the development of the AAYK-14 CPS.

b. (U) Evaluate design, test and qualification requirements to bring other Futurebus+ OSA module developments into the AAYK-14 family.

3. (U) FY 1994 PLANS: Complete design and build of a full-up SH-60 AAYK-14/IMP. Begin IMP testing, including interoperability testing between existing AYK-14 16-bit CMS-2 modules and new design 32-bit ADA modules. Evaluate the integration requirements of AAYK-14/IMP module into V-22 and AAYK-14/parallel processor into the E-2C aircraft.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORKED PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIVIND, Indianapolis, IN; NAVAIRWARCENACDIV, Patuxent River, MD; NADEP, Norfolk, VA. CONTRACTORS: Computing Devices International Incorporated, Bloomington, MN, International Business Machines (IBM) Federal Section, Owego, NY.

F. (U) RELATED ACTIVITIES: PE 0604212N ASW and Other Helo Development.

G. (U) OTHER APPROPRIATIONS FUNDS: Applicable airframe appropriations include V-22, F/A-18, E-2C, AV-8B, EA-6B, EP-3, ES-3, F-14D, P-3 AEW, ALQ-149, MK 50 torpedo, Automatic Carrier Landing System (ACLS), CV-FTAS, VP-FTAS, Air Force Tactical Operations Center (TAOC) and the Army JSTARS. Procurement appropriation information is not available at this level of detail.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0267	Mine Improvements	2,724	1,810	2,722	CONT.	CONT.
Q0272	QUICKSTRIKE	5,949	6,234	2,944	0	116,754
	TOTAL	8,673	8,044	5,666	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for engineering, development, support systems, test models, tests, and other Mine Warfare related research and development to counter current and future enemy submarines, surface ships, and Mine Warfare tactics. The Mine Improvements project (Q0267) modifies or improves existing mine subsystems, components, and support systems to maintain their effectiveness, quality, and reliability against evolving threat targets, tactics, and scenarios. Typical items include mine power supplies, flight gear, threat data collection and analysis, system effectiveness evaluation, mine algorithm development, and minefield planning models and tactics. The QUICKSTRIKE project (Q0272) is for the development of major subsystems of mines. Current development effort is the QUICKSTRIKE Mod 3 system utilizing the Target Detecting Device (TDD) MK71 and Safety-Arming (S/A) device MK75.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development
PROJECT NUMBER: Q0267 PROJECT TITLE: Mine Improvements

C. (U) DESCRIPTION: This continuing, non-acquisition project updates mine components and support systems to accommodate evolving mine targets and mining scenarios. Data on threat targets, minefield locations, and enemy tactics are collected; the performance of current mines in those scenarios are determined; needed changes to sensors, power supplies, flight gear, mine algorithms, counter-countermeasures, and minefield planning models are identified; and prototypes are built, tested, and evaluated.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed developmental testing of the MK164 Flight Gear Kit, which permits high-speed, low-altitude delivery of 500 pound Destructor and QUICKSTRIKE mines.

b. (U) Began development of an advanced power supply for the MK71 TDD.

c. (U) Continued the installation of additional computer models in the Total Mine System Simulator (TMSS).

d. (U) Continued the development of algorithms for the MK71 TDD, which improve its capability against evolving targets.

e. (U) Continued the upgrade of threat models and minefield planning models.

f. (U) Continued support for the Insensitive Munitions (IM) program, which improves the safety of ordnance.

2. (U) FY 1993 PROGRAM:

a. (U) Complete operational testing of the MK164 Flight Gear Kit and obtain approval for Fleet use.

b. (U) Continue development of advanced power supplies, TDD algorithms, and models of threat targets and minefield performance.

c. (U) Continue improvements to the TMSS.

d. (U) Complete the IM program requirement for all in-service mines.

3. (U) FY 1994 PLANS:

a. (U) Continue to characterize and develop models of threat targets as they are identified in the evolving world.

b. (U) Continue to develop and improve TDD algorithms to accommodate threat targets and changing mine warfare tactics.

c. (U) Continue to develop and improve minefield effectiveness and planning models to respond to evolving targets, tactics, and scenarios.

d. (U) Continue to develop and install additional target, environmental, and mine system models in the TMSS, which is used to expedite mine system effectiveness evaluation and to develop and assess minefield planning models and techniques.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN WHITE OAK DET Silver Spring MD; NAVSURFWARCEN MINEWARENGACT Yorktown VA. CONTRACTORS: Vredenburg Reston, VA.

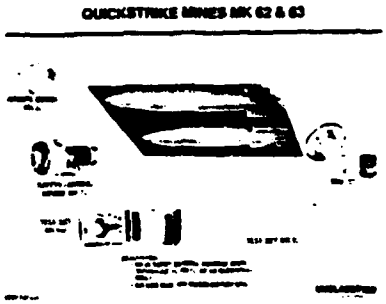
F. (U) RELATED ACTIVITIES: The Mine Improvements project is closely monitoring and working with the Joint Direct Attack Munitions program, PE 0604618F and 0604618N.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development
PROJECT NUMBER: Q0272 PROJECT TITLE: QUICKSTRIKE



POPULAR NAME: QUICKSTRIKE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			III 4/94		
ENGINEERING MILESTONES	CDR 2/92				
T&E MILESTONES	DT-II 7/92		OT-II 10/93		
CONTRACT MILESTONES			PRODUCTION AWARD 6/94		
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	PROGRAM TOTAL
MAJOR CONTRACT	1.755	1.620	2.490	0	30.000
SUPPORT CONTRACT	218	218	200	0	5.182
IN-HOUSE SUPPORT	3.976	4.396	254	0	81.572
GFE/ OTHER	0	0	0	0	0
TOTAL	5.949	6.234	2.944	0	116.754

B. (U) DESCRIPTION: QUICKSTRIKE series mines are a family of modern bottom mines adapted from 500/1,000 pound general-purpose bombs and a 2,000 pound MK65 mine, coupled with associated S/A Devices, Flight Gear, and TDD. QUICKSTRIKE Mod 0 and Mod 1 system developments are complete and service equipments are being procured. This program develops the QUICKSTRIKE Mod 3 system whose principal component is the TDD MK71, a three sensor (magnetic/seismic/pressure), programmable mine firing device. The flexibility inherent in this TDD will allow for continued adaptation of the mine logic and firing criteria in response to changes in mining scenarios, and enemy threat and tactics.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed contractor development of the QUICKSTRIKE Mod 3 Target Detection System.

b. (U) Began Technical Evaluation (DT-II) of the QUICKSTRIKE Mod 3 System.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Mine Development
PROJECT NUMBER: Q0272 PROJECT TITLE: QUICKSTRIKE

2. (U) FY 1993 PROGRAM:

a. (U) Complete TECHEVAL (DT-II) of the QUICKSTRIKE Mod 3 System.

3. (U) FY 1994 PLANS:

a. (U) Conduct Operational Evaluation (OT-II) of the QUICKSTRIKE Mod 3 System.

b. (U) Obtain Approval for Full Rate Production (AFRP) of the QUICKSTRIKE Mod 3 unique equipments.

4. (U) PROGRAM TO COMPLETION: Not applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN WHITE OAK DET Silver Spring MD; NAVSURFWARCEN MINEWARENGACT Yorktown VA. CONTRACTORS: Sparton Defense Electronics, Jackson, MI; Vredenburg, Reston, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TEMP 221-1 Rev 3 2/93

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN Line 36	8,525	0	3,543	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

DT-II 4Q/92 through 3Q/93
OT-II 1Q/94

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E1341	ADVANCED ROCKET SYSTEMS (ARS)	12,228	10,162	10,810	CONT.	CONT.
E2183	IMPROVED SLAM	0	0	19,162	CONT.	CONT.
	TOTAL	12,228	10,162	29,972		

B. (U) DESCRIPTION: This program funds the development of air-to-surface munitions and improvements designed to attack a variety of targets during day, night and adverse weather conditions. This is a continuing program to improve Navy and Marine Corps air launched weapons. Major items in this program are the 2.75 inch rocket motor and warhead improvements which will become part of the Advanced Rocket System (ARS) and the 25MM Advanced Multipurpose Projectile (AMP) which will become the universal projectile for use in all Department of the Navy (DON) 25MM gun systems. TOW 2A (AIR) improvements in FY-92 to enhance shipboard compatibility include incorporation of an ignition safety device (ISD) for the rocket motors and case upgrades to enhance Hazards of Electromagnetic Radiation to Ordnance (HERO) capabilities of the missile system.

(U) The Improved SLAM provides upgrades to the hardware and software in response to Desert Storm lessons learned. Upgrades include increased hardened target penetration, improved mission planning and overall aerodynamic performance improvements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions
PROJECT NUMBER: E1341 PROJECT TITLE: Advanced Rocket Systems (ARS)





POPULAR NAME: ARS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MS-II 10/92		MS-III 3Q/97
ENGINEERING MILESTONES			PDR 10/93	FCA/PRR 3Q/96 PCA/FQR 3Q/96
T&E MILESTONES			DT-IIA 11/93	DT-IIB 3Q/95 OT-IIA 4Q/96 OT-IIB 4Q/97 OT-IIIA 4Q/98
P3I				OT-IIIB 4Q/99
				LFT&E 1Q/96 ARS OT-IIC 4Q/98
CONTRACT MILESTONES		E&MD 10/92		LRIP OPTION 2Q/97

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	7.200	9.296	9.000	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	4.828	638	1.410	CONT.	CONT.
GFE/OTHER	200	228	400	CONT.	CONT.
TOTAL	12.228	10.162	10.810	CONT.	CONT.

B. (U) DESCRIPTION: This is a continuing program improving Navy and Marine Corps air launched weapons. Major items in this program are the 2.75 inch rocket motor and warhead improvements which will become part of the projected Advanced Rocket System (ARS) and the 25MM Advanced Multipurpose Projectile (AMP) which will become the universal projectile for use in all Department of the Navy (DON) 25MM gun systems. Tow 2A (AIR) improvements in FY-92 to enhance shipboard compatibility include incorporation of an ignition safety device (ISD) for the rocket motors and case upgrades to enhance Hazards of Electromagnetic Radiation to Ordnance (HERO) capabilities of the missile system.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions
PROJECT NUMBER: E1341 PROJECT TITLE: Advanced Rocket Systems (ARS)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Conducted Source Selection.
b. (U) Completed engineering development of TOW 2A (AIR) ISD and began qualification testing.
c. (U) Completed TOW 2A case upgrade development and qualification testing.
d. (U) Completed TOW 2A Logistics Review Group Audit.

2. (U) FY 1993 PROGRAM:

a. (U) Began ARS aircraft integration.
b. (U) Obtain ARS MS-II approval.
c. (U) Award ARS Engineering and Manufacturing Development (E&MD) contract for baseline program with PrePlanned Product Improvement (P3I) and Low Rate Initial Production (LRIP) options.
d. (U) Continued oversight of the cooperative Navy/Marine Corps AMP program.

3. (U) FY 1994 PLANS:

a. (U) Conduct ARS baseline Preliminary Design Review (PDR).
b. (U) Begin ARS baseline Development Testing (DT)-IIA.
c. (U) In accordance with Navy/Marine Corps Memorandum of Agreement, NAVAIR will provide funding to participate in on-going Navy/Marine Corps AMP Ammunition Program. The program moves into Phase II of E&MD, which involves fabrication and test and evaluation of test articles.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVSURFWARCENDIV, Indian Head, MD; NAVSURFWARCENDIV, Crane IN; NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWARCENACDIV, Patuxent River, MD; CONTRACTORS: Lockheed, Austin, TX (ARS); Hughes Aircraft Company, Tuscson, AZ. (TOW); OLIN (25MM AMP) St. Petersburg, FA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: The ARS E&MD contract award slipped five months from 05/92 to 10/92. Baseline PDR was originally planned to begin 7 months after contract award. As a result of contract negotiations, baseline PDR will be 12 months after contract award. This additional time effects all baseline progam milestones.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirements Document	JUN 92 (ARS)
Acquisition Plan	JUN 92 (ARS)
Justification & Approval	JUN 91 (ARS)
TEMP	OCT 92 (ARS)
Integrated Program Summary	OCT 92
Operational Requirement	AUG 88 (TOW IIA (AIR))

G. (U) RELATED ACTIVITIES: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions
PROJECT NUMBER: E1341 PROJECT TITLE: Advanced Rocket Systems (ARS)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN-Line	0	0	0	835,800	835,800

ARS production planned to begin in FY-96

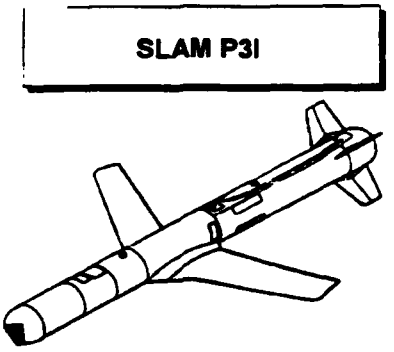
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: For ARS the following programs have been evaluated under the NATO Comparative Test Program funded with Foreign Weapon Evaluation funds. All evaluations are complete: Rocket motor - Canada - Bristol Co.; Warhead - France - Thompson Brandt Co.; Warhead - Norway - Raufoss Co. None for the TOW 2A (AIR).

J. (U) TEST AND EVALUATION:

ARS DT-IIB	3Q/95
ARS OT-IIA	4Q/96
ARS OT-IIB	4Q/97
LFT&E	1Q/95
ARS OT-IIIA	4Q/98
ARS OT-IIIB	4Q/99
ARS OT-IIC	4Q/98

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions
PROJECT NUMBER: E2183 PROJECT TITLE: Improved SLAM



POPULAR NAME: Improved SLAM

A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
Program Milestones			MS IV/II	CONT.
Engineering Milestones			PDR	
T&E Milestones			TEMP	
Contract Milestones			P3I DEV	

P3I=Pre-Planned Product Improvements

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
Major Contract	0	0	16,362	CONT.	CONT.
Support Contract	0	0	200	CONT.	CONT.
In-House Support	0	0	2,600	CONT.	CONT.
GFE/Other	0	0	0	CONT.	CONT.
Total	0	0	19,162	CONT.	CONT.

B. (U) DESCRIPTION: The Standoff Land Attack Missile (SLAM) is designed to provide an intermediate range day/night/adverse weather air-to-surface weapon for use against land and in-port surface targets. The Improved SLAM program provides upgrades to the hardware and software in response to Desert Storm lessons learned. These upgrades will provide increased stability and rain protection for the aero nose; increased hardened target penetration capability with a replacement warhead; integration of SLAM mission planning into the Tactical Aircraft Mission Planning System (TAMPS) to reduce mission planning time and eliminate SLAM unique mission planning hardware; increased memory to allow for missile software updates at O or I level maintenance sites and limit future recurring retrofit costs; enhanced software to provide a retargeting capability prior to launch for use against pop up targets; and Man-In-The-Loop improvements to provide improved anti-laser counter measures and search while tracking capability to allow aimpoint refinement while maintaining target track." This is a new start.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air-to-Surface Munitions
PROJECT NUMBER: E2183 PROJECT TITLE: Improved SLAM

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Prepare for Milestone IV/II program decision to commence engineering and manufacturing development (EMD).

b. (U) Complete system Preliminary Design Review.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWARCENWPNDIV, Pt Mugu, CA; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENACDIV, Warminister, PA; NAVSURFWARCENDIV, Indian Head, MD; NAVSURFWARCENDIV, Dahlgren, VA; NAVAIRWPNSTA, Earle, NJ; F/A-18 WSSA; A-6 WSSA. CONTRACTORS: McDonnell Douglas Missiles System Company, St. Louis, MO.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) ENGINEERING CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: In process, will be completed before the MS IV/II review in FY 94.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
QUANTITY	110	70	75	150	405
WPN-LINE 7	167,005	89,501	98,369	194,906	549,781

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures (Engineering)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0080	MINE W/F (ENG)	15	416	0	- 0	19,759
C1969	MINE NEUT EQ	1,224	2,429	1,298	332	20,014
	TOTAL	1,239	2,845	1,298	*CONT.	*CONT.

*Project C2182 Advanced Countermeasures System starts in FY 1997.

B. (U) DESCRIPTION: This program element covers a wide variety of present and emerging technologies which are projected to contribute to the Marine Corps Mine/Countermine capability. Largely focused on countermine efforts, this program element will specifically develop systems which will neutralize mines. The dynamic nature and complexity of the countermine problem and its relative urgency necessitates the advanced development of a variety of systems which will each contribute to achieving overall countermine effectiveness.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures (Engineering)
PROJECT NUMBER: C1969 PROJECT TITLE: Mine Neutralization Equipment

C. (U) DESCRIPTION: This program will test and evaluate existing mine neutralization systems for both individuals and vehicles, and will provide for the engineering development of new technology for mine neutralization applications. The Anti-Personnel Obstacle Breaching System (APOBS) is being developed and tested to replace the World War II vintage Bangalore Torpedo. An Assault Amphibious Vehicle (AAV7A1) mounted Full Width Mine Rake (FWMR) is being developed to provide minefield proofing for amphibious assaults from the high water mark inland and where tanks are not employed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed APOBS Developmental Test (DT). Continued preparation for Milestone III documentation for APOBS. APOBS certified as an Insensitive Munition. Completed concept selection between Track Width Mine Plow and Full Width Mine Plow. Completed FWMR concept test plan.

2. (U) FY 1993 PROGRAM: Complete APOBS Operational Test (OT). Obtain final Weapons System Explosive Review Board approval for APOBS. Continue preparation for Milestone III documentation for APOBS. Conduct DT II, environmental testing, and blast analysis evaluations of AAV7A1 mounted FWMR.

3. (U) FY 1994 PLANS: Conduct DT II and complete OT for FWMR. Achieve Milestone III decision in first quarter of FY 1994 for APOBS.

4. (U) PROGRAM TO COMPLETION: Complete pre-planned product improvement for FWMR. This program is planned to complete at the end of FY 1996.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVSURFWARCENDIV, Crane, IN; NAVSURFWARCENDIV, Indian Head, MD; NAVSURFWARCEN ORDSTA, Louisville, KY; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; TECOM, Aberdeen, MD; MCOTEA, Quantico VA and NAVCIVENGRLAB, Port Hueneme, CA. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC	0	0	5,000	15,900	20,900

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604618N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Direct Attack
PROJECT NUMBER: E2137 PROJECT TITLE: Joint Direct Attack Munitions

PICTURE NOT AVAILABLE

POPULAR NAME: JDAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS-0 6/92	MS-I 6/93		MS-II 2Q/95
ENGINEERING MILESTONES			PDR 9/94	CDR 2Q/95
T&E MILESTONES				DT-II 2Q/96 OT-IIA 3Q/97 OT-IIB 1Q/98
CONTRACT MILESTONES			MULTI-FUNCTION FUZE 12/93 JDAM I AWARD (2) E&MD 12/93	DOWNSELECT 2Q/95

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,598	11,556	5,908	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	5,908	8,800	3,312	CONT.	CONT.
GFE/ OTHER	800	4,341	1,132	CONT.	CONT.
TOTAL	10,306	24,697	10,352		

B. (U) DESCRIPTION: Joint Direct Attack Munition (JDAM) combines the requirements of the Air Force's Adverse Weather Precision Guided Munition Program (AWPGM) and the Navy's Advanced Bomb Family (ABF). This joint acquisition program will have the Air Force as executive service. The Navy's portion of JDAM was previously funded under the Program Element 0604609N, Bomb Fuze Improvement. The JDAM program has three objectives: 1) to develop accurate (inertial) and precision (seeker) adverse weather guidance kits for Navy and Air Force MK 80 series and BLU-109 penetrator warheads; 2) to develop improved multi-purpose fuze; and 3) the development of an advanced all-up-round blast/fragmentation bomb. The Navy's JDAM program is used both in the joint development of these JDAM components and in the support of Navy-unique requirements such as aircraft integration on the F/A-18 and A-6 aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Milestone 0 completed.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604618N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Direct Attack
PROJECT NUMBER: E2137 PROJECT TITLE: Joint Direct Attack Munitions

2. (U) FY 1993 PROGRAM: Milestone I decision.

3. (U) FY 1994 PLANS:

a. (U) Conduct Preliminary Design Reviews for Inertial/GPS Guidance Kit and Multi-Function Fuze.

b. (U) Award contracts for Engineering and Manufacturing Development (E&MD) of Inertial/Global Positioning System (GPS) Guidance Kit (JDAM 1) and Multi-Function Fuze. (Contracts will be awarded with FY 1993/1994 funds.)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Aeronautical Systems Division, Eglin AFB, FL; and NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Start of E&MD for blast/fragmentation bomb has been postponed to FY 1997 to reflect Navy plans to deplete existing inventory of MK 80 series bombs prior to initiating development of an improved replacement weapon. E&MD to adapt JDAM inertial/GPS guidance components to MK 80 series bombs has been added as an FY 1997 start.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Joint program documentation under development.

G. (U) RELATED ACTIVITIES: Air Force PE 0604618F, Joint Direct Attack Munitions.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

	Q/YR
DT-IIB	2Q/96
OT-IIA	3Q/97
OT-IIB	1Q/98

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development
PROJECT NUMBER: Q1829 PROJECT TITLE: Explosive Ordnance Disposal Procedures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q1829	Explosive Ordnance Disposal Procedures	5,665	5,737	6,266	CONT.	CONT.

B. (U) DESCRIPTION: This is a Joint Service Program. DoD assigned development responsibility for Explosive Ordnance Disposal(EOD) procedures and equipment to the Navy in support of the Joint Services. This program provides for the technical development, validation, preparation, joint service verification and approval of EOD render-safe procedures for all known domestic and foreign conventional and nuclear ordnance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Developed 130 new EOD render-safe procedures and provided 110 technical updates of existing procedures.
b. (U) Continued development of specialized tools and equipment and countermeasure procedures to access and disable
c. (U) Coordinated and participated in exercises to prove concepts and procedures.

2. (U) FY 1993 PROGRAM:

a. (U) Obtain foreign ordnance and develop render-safe procedures for new sophisticated domestic and foreign ordnance.
b. (U) Continue on-going procedures development.
c. (U) Continue procedures development.

3. (U) FY 1994 PLANS:

a. (U) Obtain foreign ordnance and develop render-safe procedures for additional domestic and foreign ordnance.
b. (U) Develop procedures.
c. (U) Continue to coordinate and participate in exercises and joint working groups.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval EODTC, Indian Head, MD. CONTRACTORS: EG&G, Las Vegas, NV; BATTELLE-PNL, Richland, WA.

E. (U) RELATED ACTIVITIES: All conventional or nuclear ordnance related developments, both domestic and foreign, manufactured or improvised.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604703N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Manpower, Personnel, Training, Simulation & Human Factors
PROGRAM NUMBER: L1882 PROJECT TITLE: Manpower, Personnel, Training, Simulation & Human Factors

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
L1822	PERS,TNG	1,775	1,087	1,069	CONT.	CONT.

B. (U) DESCRIPTION: This program applies advanced technologies to operational requirements in manpower, personnel, training, and human factors, and transitions into operation those projects demonstrated in advanced development. Enabling technologies include adaptive testing, math optimization, statistical and econometric forecasting, computer-based simulation, and decision support systems (DSS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Performed operational test and evaluation of Computer Adaptive Testing-Armed Service Vocational Aptitude Battery.

b. (U) Implemented sea/shore rotation policy analysis model in all enlisted skill communities.

c. (U) Conducted full-scale test and evaluation of Computerized Enlisted Detailing Support System.

d. (U) Transitioned personnel/training history information system to operational use.

2. (U) FY 1993 PROGRAM: Complete enlisted cost/performance trade-off model. Complete expansion of Computerized Enlisted Detailing Support System to all skill areas. Begin engineering development of a prototype Military Strategic and Tactical Relay System Operators' Requirement Aid (MORA).

3. (U) FY 1994 PLANS: Complete engineering development of an integrated enlisted skill management modeling system. Complete MORA prototype validation on USS Coronado. Begin engineering development of officer community management system, brig retraining system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSPRANDCEN, San Diego, CA; NCCOSC, RDT&E Division, San Diego, CA. CONTRACTORS: B-K Dynamics, Rockville, MD; Man Tech, Alexandria, VA; HumRRO, Alexandria, VA; Pacific Sciences and Engineering, San Diego, CA.

E. (U) RELATED ACTIVITIES: 0602722A, Personnel and Training; 0602703F, Personnel Utilization Technology; 0603731A, Manpower and Personnel; 0603707N, Manpower, Personnel and Training Advanced Technology Development; 0603632M, Marine Corps Advanced Manpower Training Systems; and 0603704F, Manpower and Personnel Systems Technology.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604707N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Architecture/Engineering Support

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2144	SEW Engineering	0	0	9,749	CONT.	CONT.
X0798	OTH Targeting	0	2,715	2,167	CONT.	CONT.
	TOTAL	0	2,715	11,916	CONT.	CONT.

B. (U) DESCRIPTION: Space Electronic Warfare Architecture/Engineering Support effort ensures the effective development and integration of naval command, control, communications, computers and intelligence (C^4I) systems under the aegis of the Copernicus Architecture with surveillance and electronic combat to support the conduct of Space and Electronic Warfare (SEW). This effort includes both Fleet Engineering and top-level SEW systems engineering. Fleet Engineering encompasses the performance of critical experiments, technology enhancements, and insertions into deploying Fleet units and emerging operational opportunities, i.e., exercises and tests. The top-level SEW systems engineering process: (a) integrates systems developers in support of these operational opportunities; (b) ensures a consistent requirement-driven focus; and (c) extracts the lessons-learned as a stimulus to the planning and programming, technology, and research, development and acquisition systems.

The Over-the-Horizon Targeting (OTH-T) program conducts important OUTLAW-series demonstration projects to transition advanced technologies and/or new capabilities to the fleet, and conducts critical tests and evaluations for Command, Control, Communications, Computers and Intelligence (C^4I) systems within the Copernicus Architecture for Space and Electronic Warfare (SEW). The program office is also responsible for developing and maintaining system level specifications and conducting Navy and joint interoperability testing to certify compliance for systems that support employment of TOMAHAWK and HARPOON cruise missiles beyond the sensor range of the launch platforms. Major at sea system tests are also conducted under OTH-T Fleet Exercises (SLAMEXs). The OTH-T Program also provides configuration control for Navy OTH-T/SEW systems.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604707N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Architecture/Engineering Support
PROJECT NUMBER: X0798 PROJECT TITLE: OTH Targeting

C. (U) DESCRIPTION: The OTH-T program conducts important OUTLAW-series demonstration projects to transition advanced technologies and/or new capabilities to the fleet, and conducts critical tests and evaluations for Command, Control, Communications, Computers and Intelligence (C4I) systems within the Copernicus Architecture for Space and Electronic Warfare (SEW). The program office is also responsible for developing and maintaining system level specifications and conducting Navy and Joint interoperability testing to certify compliance for systems that support employment of TOMAHAWK and HARPOON cruise missiles beyond the sensor range of the launch platforms. Major at sea system tests are also conducted under OTH-T SLAMEXS. The OTH-T program also provides configuration control for Navy OTH-T/SEW systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: In FY 92, the OTH-T program was executed under PE 0604231N, project X0486 (ASWOC OTH-T) as directed by Congress.

2. (U) FY 1993 PROGRAM: Deploy OTH-T Airborne Sensor Interface System (OASIS) for S-3 (OUTLAW VIKING); provide Fleet SEW system engineering support to validate specific sensor-to-shooter targeting delivery paths within the Copernicus Architecture; conduct OTH-T SLAMEXS; conduct interoperability testing and data analysis of OTH-T/SEW systems and rapid prototyping products at the Reconfigurable Land Based Test Site (RLBTS), and prepare detailed technical reports; expand the RLBTS lab; and act as a focal point for new technology introduction into the OTH-T/SEW Systems.

3. (U) FY 1994 PLANS: Provide Fleet SEW Systems Engineering support to validate specific sensor-to-shooter targeting delivery paths within the Copernicus Architecture; conduct Navy and Joint interoperability testing and data analysis of OTH-T/SEW systems and rapid prototyping products at RLBTS, and prepare detailed technical reports; develop OASIS for E2(Outlaw Hawkeye); act as a focal point for new technology introduction into the OTH-T/SEW Systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC. CONTRACTORS: JHU/APL, Laurel, MD; TIBURON Systems, San Jose, CA; DELFIN Systems, Sunnyvale, CA.

F. (U) RELATED ACTIVITIES: The OTH-T process encompasses a multitude of SEW/C4I systems from sensor to shooter and is supported by the following PEs: PE 0204229N, Tomahawk and Theatre Mission Planning Center; PE 0204163N, Fleet Communications; PE 0603735N, WWMCCS Architecture Support; PE 0604231N, Tactical Command System (TCS); PE 0205604N Tactical Data Links; PE 0604777N, Navigation/ID System; PE 0303109N, Satellite Communications; PE 0604574N, Navy Tactical Computer Resources; PE 0303152N, WWMCCS Information System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604707N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Architecture/Engineering Support
PROJECT NUMBER: X2144 PROJECT TITLE: SEW Engineering

C. (U) DESCRIPTION: This initiative ensures the effective development and integration of naval command, control, communications, computers and intelligence (C4I) systems under the aegis of the Copernicus Architecture with surveillance and electronic combat to support the conduct of Space and Electronic Warfare (SEW). This effort includes both Fleet Engineering and top-level SEW systems engineering. Fleet Engineering encompasses the performance of critical experiments, and technology demonstrations and insertions into deploying Fleet units and emerging operational opportunities, i.e., exercises and tests. The top-level systems engineering process: (a) integrates systems developers in support of these operational opportunities; (b) ensures a consistent requirement-driven focus; and (c) extracts the lessons-learned as a stimulus to the planning and programming, technology, and research, development and acquisition systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS: Support, analyze, and evaluate Fleet operational test launches and exercises to validate/provide proof of concept for the Copernicus Architecture; develop engineering level descriptions for the C4I, surveillance and electronic combat SEW subsystems; define the Copernicus Environment in accordance with applicable Federal and DoD open system standards based activities such as the Defense Information Systems Agency's (DISA) Corporate Information Management (CIM) Group and the Joint Service Common Operating Environment Working Group; develop an open systems standards based end-to-end engineering description of the Copernicus Architecture (in accordance with the National Institute of Standards and Technology's Open Systems Environment/Application Portability Profile) for use as program manager engineering guidance; conduct technical analyses of existing Navy C4I programs to maximize their compliance with the Copernicus Environment/Engineering descriptions; continue the development of automated support tools, e.g., documentation, tracking, simulation, and configuration control management system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C; Naval Command and Control Ocean Surveillance Center (NCCOSC), San Diego, CA; Naval Surface Warfare Center (NAVSURFWARCEN), Dahlgren, VA.; CONTRACTORS: JHU/APL and Booz Allen Hamilton, Arlington, VA.

F. (U) RELATED ACTIVITIES: The SEW systems engineering process is supported by the following PEs: PE 0603763N, Warfare System Architecture and Engineering; PE 0204163N, Fleet Communications; PE 0603735N, WWMCCS Architecture Support; PE 0604231N, Tactical Command System (TCS); PE 0205604N Tactical Data Links; PE 0604777N, Navigation/ID System; PE 0303109N Satellite Communications; PE 0604574N, Navy Tactical Computer Resources; PE 0303152N, WWMCCS Information System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604710N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ENG)
PROJECT NUMBER: R0371 PROJECT TITLE: Energy Conservation (ENG)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0371	ENERGY CONSERVATION (ENG)	3,351	3,857	3,137	CONT.	CONT.

B. (U) DESCRIPTION: Develop energy-efficient systems and practices for ships, facilities, and aircraft. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced operating costs. Efforts include fuel use optimization aids for aircraft; antifouling paints, air conditioning and lighting for ships; adaption of commercially available energy conservation and renewable energy technologies to Navy facility needs. Provide test and evaluation support to the companion PE 0603724N Proj R0829. As currently funded, annual savings for the combined 6.3/6.4 program are projected to be $130M by 1995 and $197M by 2000 compared to 1985 cost.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Aircraft: Flight Optimization Routines for Energy Management (FOREM) was distributed to EA-6B, KC-130R/T, E-2C; enhanced for F/A-18 and A-6E. Integrated Flight Performance Advisory System (FPAS) became operational on F/A-18C/D. Ships: Continued ship testing of advanced antifouling (AF) paint systems; documented drag increases of 5 to 15% by biofilm (slime) fouling. Facilities: Transitioned machinery diagnostic technology to users. Completed T&E of pierside power metering and conditioning technology. Designed photovoltaic (PV)/diesel large hybrid power system for field test.

2. (U) FY 1993 PROGRAM: Aircraft: Develop Pocket-sized Aircraft Performance Advisory Computer (P-S APAC) for E-2C, C-2A, K-130F; enhance for P-3B/C. Complete FOREM enhancements for F-14A and KC-130R/T; initiate for E-2C, EA-6B, TA-4J, P-3C. Modify FPAS software for F/A-18's with F404-GE-402 engine. Ships: Continue ship testing of advanced AF paint systems; develop procedures to maximize service life and effectiveness. Initiate life cycle studies of commercial silicone AF coatings. Complete fabrication of MILSPEC screw compressor for R-134a refrigerant. Initiate efficiency improvement program for gas turbine (LM-2500) powered ships. Facilities: Continue Inverse Flash Steam Purification (IFSTEP) pierside steam system testing. Assess commercial/-industrial energy conservation practices for Navy applications. T&E passive solar technologies for heating/cooling. Field test large PV/diesel hybrid power systems. Support MILCON PV power system projects.

3. (U) FY 1994 PLANS: Aircraft: T&E FOREM for E-2C, EA-6B, and KC-130R/T and distribute; DT&E for P-3C, KC-130F, UC-12, and C-2A. T&E P-S APAC for DC-9/C-9B and distribute. Transition upgraded FPAS for F/A-18 with F404-GE-402 engine. Ships: Complete SHIPEVAL of high efficiency DC lighting system with integral emergency ballasts. Initiate qualification testing of MILSPEC R-134a refrigerant screw compressor air-conditioning plant. Maximize the service life/effectiveness of advanced AF paints. Develop efficiency improvements for LM-2500 powered gas turbine ships. Facilities: Demonstrate industrial process energy saving technologies identified in 6.3. Monitor pierside power metering/power demand control techniques in field applications. T&E solar, wind, and hybrid energy source technologies.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN DET, Annapolis, MD; NAVAIRWARCENACDIV, Warminster, PA; NCEL, Port Hueneme, CA; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: IOTA Eng., Tucson, AZ; Lawrence Berkeley Lab, Berkeley, CA; McDonnell Aircraft, St. Louis, MO; York Intl., York, PA.
E. (U) RELATED ACTIVITIES: P.E. 0603724N, Navy Energy Program.
F. (U) OTHER APPROPRIATION FUNDS: Not applicable.
G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0053	JTIDS	2,000	3,723	6,096	CONT.	CONT.
C1929	ATACC	7,011	0	8,561	CONT.	CONT.
C2085	AFATDS	8,603	7,804	11,566	CONT.	CONT.
	TOTAL	17,614	11,527	26,223	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE) provides funds for the engineering development of Marine Corps Command, Control, and Communications Systems which include Marine Tactical Command and Control Systems development and improvements. The projects are aimed toward more effective command and control of tactical forces during both amphibious and expeditionary land operations. This concept envisions an integrated air/ground tactical command and control system oriented toward amphibious expeditionary environment to meet the unique command, control and interoperability requirements of the Landing Force Commanders.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C0053 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

C. (U) DESCRIPTION: JTIDS integrates the high capacity, jam resistant, secure, digital communications capability provided by the JTIDS Class 2/2H terminal into the Radio Terminal Set AN/TSC-131 (JTIDS Module). The JTIDS Module will in turn be used as part of the AN/TYQ-23 Tactical Air Operations Module (TAOM) Joint Tactical Information Distribution System/Tactical Air Data Information Link-Joint (JTIDS/TADIL-J) integration program. JTIDS also provides engineering and technical assistance to the JTIDS/TADIL-J integration programs for the AN/TYQ-51 Advanced Tactical Air Command Central (ATACC) and Air Defense Communications Platform (ADCP).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Continued engineering and manufacturing development (EMD) of the multi-plexer TD-1459/U JTIDS interface box (JIB) and JTIDS Module (JM). The JIB is a component of the JM.
b. (U) Conducted JM and JIB Critical Design Reviews.
c. (U) Began testing of the JIB software and hardware.
d. (U) Continued monitoring the development of the Class 2/2H terminals.
e. (U) Continued to monitor the TAOM Mass Memory Controller (MMC) Project under the auspices of the Air Force Modular Control Equipment Pre-Planned Product Improvements (MCE-P3I) Program for integration into the TAOM as a prerequisite for TADIL-J integration.

2. (U) FY 1993 PROGRAM:
a. (U) Complete formal testing of the JIB hardware and software.
b. (U) Begin formal testing of the JM.
c. (U) Continue to monitor the MMC Project under the USAF MCE-P3I program.
d. (U) Join the USAF MCE-P3I JTIDS/TADIL-J integration program using the JM as the key component of the JTIDS/TAOM interface.

3. (U) FY 1994 PLANS:
a. (U) Complete formal testing of the JM.
b. (U) Monitor completion and testing of the MMC Project.
c. (U) Continue participation in Joint USAF-led TAOM JTIDS/TADIL-J integration program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; NISE West, Vallejo, CA; Electronic Systems Division, Bedford, MA. CONTRACTORS: GEC MARCONI, Wayne, NJ; Litton Data Systems, Van Nuys, CA; Eldyne, Inc., San Diego, CA.

F. (U) RELATED ACTIVITIES: Project C1929, Advanced Tactical Air Command Central (ATACC) under this PE. MCE-P3I Joint Program (Air Force lead service) on development of JTAOM.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 57	0	0	1,743	33,804	35,547

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C1929 PROJECT TITLE: Advanced Tactical Air Command Central (ATACC)

C. (U) DESCRIPTION: This project will integrate hardware and software into a replacement system, capable of overcoming the current operational deficiencies of the AN/TYQ-1 Tactical Air Command Central (TACC), and the AN/TYQ-3A Tactical Data Communications Central. The ADA computer language program will automate and enhance the now manual decision support/mission planning functions of the TACC. Additionally, the ATACC will provide increased interoperability through the integration of Joint Tactical Information Distribution System/Tactical Air Data Link-Joint (JTIDS/TADIL-J), and automate Joint Interoperability of Tactical Communications Systems (JINTACCS) message receipt and origination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Formal Qualification Testing.

b. (U) Completed System Functional Qualification Testing.

c. (U) Completed Field Installation and Acceptance Testing.

2. (U) FY 1993 PROGRAM: Conduct and complete operational test.

3. (U) FY 1994 PLANS:

a. (U) Commence software upgrade of all message standards to conform with current Joint Chiefs of Staff baselines for certification testing (TADIL-A/B, NATO Link-1, JINTACCS).

b. (U) Commence JTIDS/ATACC software development.

c. (U) Start effort to integrate standard Marine Tactical Command and Control System-related common software, upgraded ATACC software and JTIDS software into ATACC.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA. CONTRACTORS: Grumman Data Systems, Springfield, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

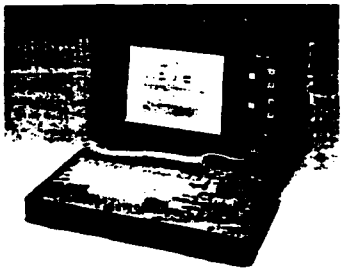
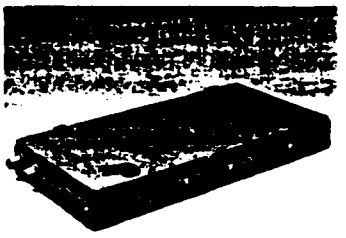
G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 67	0	6,751	9,619	17,279	33,649

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2085 PROJECT TITLE: Advanced Field Artillery Tactical Data System (AFATDS)

POPULAR NAME: AFATDS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			MS III 4th Qtr		CONT.
ENGINEERING MILESTONES					CONT.
T&E MILESTONES			IOT&E 2nd Qtr DTE-I 1st Qtr		CONT.
CONTRACT MILESTONES					CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	6,600	6,750	9,800	CONT.	CONT.
SUPPORT CONTRACT	620	173	383	CONT.	CONT.
IN-HOUSE SUPPORT	1,354	550	800	CONT.	CONT.
GFE/ OTHER	29	331	583	CONT.	CONT.
TOTAL	8,603	7,804	11,566	CONT.	CONT.

B. (U) DESCRIPTION: This program was formerly titled FIREFLEX. AFATDS will consist of the digital fire support Command and Control (C2) automated software, fielded on Marine Corps common hardware. AFATDS will automate for the Marine commander the integration and coordination of supporting arms. AFATDS development is in three versions, each adding new capabilities and refining existing capabilities. The Marine Corps plans to field version 2 baselined on the Lightweight Computer Unit.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

   a. (U) Completed software Preliminary Design Reviews.

   b. (U) Completed software Critical Design Reviews.

   c. (U) Negotiated AFATDS version of 2 contract option.

2. (U) FY 1993 PROGRAM:

   a. (U) Complete Code and Integration of version 1.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2085 PROJECT TITLE: Advanced Field Artillery Tactical Data System (AFATDS)

b. (U) Conduct version 1 Formal Qualification and System software test.

c. (U) Concurrently develop AFATDS version 2 software.

3. (U) FY 1994 PLANS:

a. (U) Conduct Developmental Test and Experimentation (DTE-I) of version 1.

b. (U) Conduct Initial Operational Test and Evaluation of version 1.

c. (U) AFATDS Army System Acquisition Review Council (ASARC) III.

d. (U) Start Preliminary Design Review of version 2.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; Army Program Manager, FATDS, Ft. Monmouth, NJ; and TSM, Fort Sill, OK. CONTRACTORS: Magnavox Systems, Incorporated, Fort Wayne, IN.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Test dates changed due to test site/test unit availability.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) The Army Program Managers' Office has complete program documentation.

2. (U) Marine Corps unique documentation is as follows:

a.	(U) Required Operational Capability	May 1989
b.	(U) Memorandum of Agreement	August 1989
c.	(U) Test and Evaluation Master Plan (Revision G, Change 4)	April 1992

G. (U) RELATED ACTIVITIES: PE 0203726A, Advanced Field Artillery Tactical Data System (AFATDS), Project D322.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC Line 69 AFATDS	0	0	9,609	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Memorandum of Understanding signed with ADLER (Germany) in 1991.

J. (U) TEST AND EVALUATION (T&E):

1. (U) DTE-I October-November 1993

2. (U) Initial Operational Testing and Evaluation February-March 1994

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System - Surface Terminal

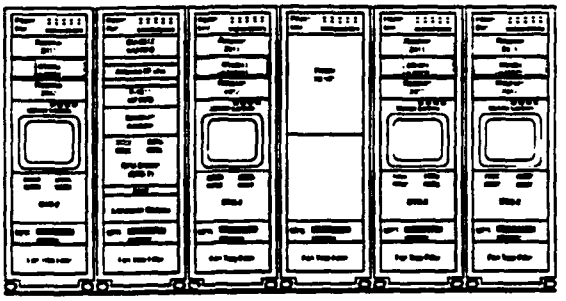
A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2134	BGPHES-ST	0	5,409	8,631	CONT.	CONT.
X2135	CHBDL-ST	0	5,372	16,104	CONT.	CONT.
	TOTAL	0	10,781	24,735	CONT.	CONT.

B. (U) DESCRIPTION: The Battle Group Passive Horizon Extension System extends the Battle Group's line-of-sight radio horizon by using remote receivers in the ES-3A's sensor payload, and sends this information via the Common High Bandwidth Data Link to the surface ships.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System - Surface Terminal
PROJECT NUMBER: X2135 PROJECT TITLE: Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST)



POPULAR NAME: CHBDL-ST

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollar in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				CONT.
ENGINEERING MILESTONES			DT/OT Equip Build 6/94	CONT.
T&E MILESTONES				CONT.
CONTRACT MILESTONES	PDR 2/92 CDR 7/92			CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	PROGRAM TOTAL
MAJOR CONTRACT		3,672	12,604	CONT.	CONT.
SUPPORT CONTRACT		800	800	CONT.	CONT.
IN-HOUSE SUPPORT		900	2,700	CONT.	CONT.
GFE/ OTHER		0	0	CONT.	CONT.
TOTAL	0	5,372	16,104	CONT.	CONT.

B. (U) DESCRIPTION: This project procures, installs and tests the Common High Bandwidth Data Link-Shipboard Terminal (CHBDL-ST). The CHBDL-ST equipment provides a common high bandwidth data link shipboard terminal for the receipt of signal and imagery intelligence data from remote airborne sensors and the transmission of link and sensor control data to airborne platforms. Signal intelligence data is received from the Battle Group Passive Horizon Extension System (BGPHES) Airborne Component (AC) and delivered to the BGPHES Shipboard Terminal. Imagery intelligence data is received from the Advanced Tactical Airborne Reconnaissance System (ATARS) and is delivered to the Joint Service Imagery Processing System - Navy (JSIPS-N).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Funded under P.E. 0604231N/Project X0709.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Developmental Test/Operational Test - II (DT/OT-II) prime item equipment fabrication.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System - Surface Terminal
PROJECT NUMBER: X2135 PROJECT TITLE: Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST)

b. (U) Continue design and preparation of Land-Based Test Site (LBTS) at NAVSURFWARCENDIV; Dahlgren, VA.

c. (U) Initiate shipboard installation design for at-sea DT/OT-II.

3. (U) FY 1994 PLANS:

a. (U) Complete prime item equipment fabrication for DT/OT-II.

b. (U) Complete factory integration and acceptance testing for DT/OT-II equipment.

c. (U) Initiate prime item equipment fabrication for factory environmental and reliability qualification testing.

d. (U) Complete preparation of LBTS at Dahlgren, VA; deliver DT/OT-II system to LRTS; initiate Navy acceptance testing.

e. (U) Complete DT/OT-II CV/CVN installation design; obtain design approval and initiate work planning.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVELEXCEN, Portsmouth, VA; ECAC, Annapolis, MD. CONTRACTORS: Paramax Systems Corp., Salt Lake City, VT (Prime); Datron, Simi Valley, CA (Major Sub); JHU/APL, Laurel, MD; MITRE Corp., Reston, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement 03/91

G. (U) RELATED ACTIVITIES: PE 0603261N Tactical Airborne Reconnaissance, project W0534, Tactical Reconnaissance Systems (ATARS) and project A2174, Joint Service Imagery Processing System, Navy JSIPS-N. ATARS is a sensor system which gathers information that is transmitted over CHBDL-ST. JSIPS-N will process imagery data collected by ATARS. The initial contract award funded the design and fabrication of one system using Defense Special Projects Office funds.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

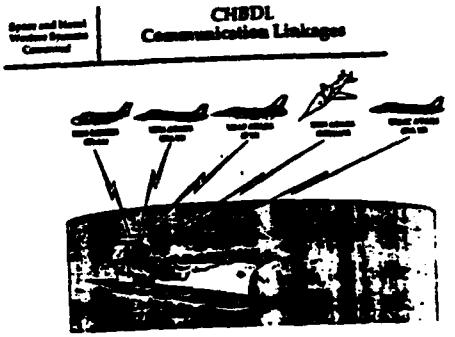
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN	0	0	0	212,600	212,600

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System - Surface Terminal
PROJECT NUMBER: X2134 PROJECT TITLE: BGPHES - ST



POPULAR NAME: BGPHES

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	CDR	Fabrication	TRR	FCA/PCA
T&E MILESTONES		DT-IID-E 5/93		DT-IIG-H 3/95
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	PROGRAM TOTAL
MAJOR CONTRACT	0	4,059	6,281	CONT.	CONT.
SUPPORT CONTRACT	0	400	900	CONT.	CONT.
IN-HOUSE SUPPORT	0	700	1,200	CONT.	CONT.
GFE/ OTHER	0	250	250	CONT.	CONT.
TOTAL	0	5,409	8,631	CONT.	CONT.

B. (U) DESCRIPTION: Battle Group Passive Horizon Extension System Surface Terminal (BGPHES-ST) extends the Battle Group's line-of-sight radio horizon by using remote receivers in the ES-3A's sensor payload, via the Common High Bandwidth Data Link Shipboard Terminal (CHBDL-ST). BGPHES-ST will be located in CV/CVN Ships Signal Exploitation Space (SSES). The BGPHES-ST 4-position, 6-rack cryptologic control, analysis and reporting center uses Navy-standard DTC/TAC-series workstations and integral local intercept receivers. The design downsizes and corrects deficiencies from the 14-rack AN/SLQ-50(XN-1) model tested on USS EISENHOWER (CVN-69) during FY87 (factory verification completed in fall 1989). Development will proceed in two stages, first reducing risk by demonstrating operation with the ship's local receivers (the AN/SLQ-50 (XN-2)), then (timed to meet CHBDL-ST development) adding control and use of the remote airborne payload (the AN/SLQ-50 (XN-3)).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

Efforts funded in P.E. 0604231N Project X0709.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System - Surface Terminal
PROJECT NUMBER: X2134 PROJECT TITLE: BGPHES - ST

2. (U) FY 1993 PROGRAM:

a. (U) Conduct functional and physical configuration audits (FCA/PCA) on initial configuration (core local receiver segment).

b. (U) Complete integration testing for core local receiver capability. Conduct inplant testing on initial configuration (DT-IID-E).

c. (U) Analyze rehost of software to TAC-3 computers.

d. (U) Initiate planning of integration and test of the (XN-3) with the BGPHES data link and aircraft sensors.

3. (U) FY 1994 PLANS:

a. (U) Develop, fabricate and integrate the hardware and software to control BGPHES' airborne payload segment via the BGPHES data link. Start formal factory test program.

b. (U) Develop and test software to be uploaded to the Navy airborne receiver segment.

c. (U) Define software interfaces to host ships' Command, Control, Communication, Computers, and Intelligence (C4I) systems.

d. (U) Initiate rehost of software to TAC-3 computer.

e. (U) Initiate software interfaces for Pre-planned Product Improvement (P^3I) and USAF interoperability.

f. (U) Complete planning for integration and test of the (XN-3) with the BGPHES data link and aircraft sensors.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NESEC, San Diego, CA; NESEC, Charleston, SC; NESEC, Portsmouth, VA. CONTRACTOR: E-Systems, Inc., Melpar Division, Falls Church, VA; SSA, Inc., Tysons Corner, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION:
OR 08/85
DCP 05/91

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) BGPHES DT-IID-E - Design Qualification Test - FY93 5/93

2. (U) BGPHES DT-IIG-H - Design Qualification Test - FY95 3/95

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Standoff Weapon Systems
PROJECT NUMBER: E2068 PROJECT TITLE: Joint Standoff Weapon System



POPULAR NAME: JSOW

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	MS-II			LRIP 1Q/97
BASELINE	JUN/92			MS-III 1Q/98
JSOW P3I			P3I/D/V(PR)	P3I/MSII 1Q/97
			JAN/94	P3I/LRIP 4Q/99
ENGINEERING MILESTONES		PDR		SYS CDR 3Q/95
BASELINE		JAN/93		PVR 3Q/96
				PRR 4Q/96
				FCA 1Q/96
JSOW P3I				P3I/SRR 2Q/95
				P3I/SDR 1Q/96
				P3I/PDR 3Q/96
				P3I/PRR 3Q/99
T&E MILESTONES			DT-IIA	DT-IIC 2Q/96
BASELINE			JAN/94	OT-IIA 2Q/96
			DT-IIB	OT-IIB 1Q/97
			AUG/94	
JSOW P3I				DT-IIB 4Q/97
				DT-IIC 4Q/98
				OT-IIA 1Q/99
				OT-IIB 4Q/99
CONTRACT MILESTONES	E&MD			ST/STE 1Q/96
BASELINE	JUN/92			LRIP(OPTION) 1Q/97
JSOW P3I		P3I OPTION/DEM/VAL		P3I/E&MD 1Q/97
			JUL/94	P3I/LRIP
				DECISION 3Q/99

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	28,919	40,755	58,900	CONT.	CONT.
SUPPORT CONTRACT	348	-0-	-0-	CONT.	CONT.
IN-HOUSE SUPPORT	11,760	14,949	11,603	CONT.	CONT.
GFE/ OTHER	6,641	7,639	10,000	CONT.	CONT.
TOTAL	47,668	63,343	80,503	CONT.	CONT.

B. (U) DESCRIPTION: The JSOW is an air-to-ground weapon designed to attack a variety of targets during day, night and adverse weather conditions. JSOW will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of most target area surface-to-air threat systems. The JSOW launch-and-leave capability will allow several target kills per aircraft sortie. JSOW will be integrated with Navy F/A-18, AV-8B, A-6 and A/FX aircraft.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Standoff Weapon Systems
PROJECT NUMBER: E2068 PROJECT TITLE: Joint Standoff Weapon System

(U) The JSOW program will first develop a baseline weapon for use against fixed area targets. This weapon will be designed upfront for pre-planned product improvements (P3I) to enable the attack of blast/frag sensitive or moving point targets. The baseline JSOW variant will include a kinematically efficient airframe, an integrated Inertial/Global Positioning System (INS/GPS) navigation capability, and a BLU-97/B submunition payload. The P3I variant will add a terminal seeker, a man-in-the-loop data link, and a unitary warhead. P3I will provide increased accuracy and lethality, and the capability for aimpoint selection, target discrimination, and bomb impact assessment.

(U) Through adherence to MIL STDs 8591 and 1760, and minimized weight and dimension considerations, JSOW will have considerable potential for compatibility with Air Force or NATO aircraft. Acquisition agreements are being definitized with the Air Force to initiate the JSOW program which will integrate the BLU-108 SKEET submunition into the baseline JSOW for use on F-16 and other Air Force aircraft. The agreements will also ensure mid-course guidance and the terminal seeker are common between JSOW and the USAF/USN Joint Direct Attack Munition (JDAM) programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Milestone (MS) II Decision, JSOW Baseline, was completed.
b. (U) Awarded Engineering & Manufacturing Development (E&MD) Contract, JSOW Baseline.
c. (U) Formalized Joint USN/USAF Requirements and Acquisition Strategy (JSOW/JDAM).

2. (U) FY 1993 PROGRAM:

a. (U) Continue E&MD efforts, Baseline.
b. (U) Conduct Preliminary Design Review (PDR) Jan/93, Baseline.
c. (U) Continue JSOW/JDAM efforts, including Cost and Operational Effectiveness Analysis (COEA).

3. (U) FY 1994 PLANS:

a. (U) JSOW BASELINE:

(1) (U) Continue E&MD efforts.
(2) (U) Continue JSOW/JDAM efforts.
(3) (U) Conduct Developmental Test and Evaluation (DT-IIA) Jan/94.
(4) (U) Conduct DT-IIB Aug/94.

b. (U) JSOW P3I:

(1) (U) JSOW P3I Demonstration and Validation (DEM/VAL) Program Review in January 1994.
(2) (U) JSOW P3I DEM/VAL Contract Award, July 1994.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWPSTA, Pt Mugu, CA; NAVAIRWARCENACDIV, Indianapolis, IN; NAVAIRWARCENACDIV, Warminister, PA.; NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTOR: Texas Instruments, Inc. Lewisville, TX; John Hopkins University/APL, Laurel, MD.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Standoff Weapon Systems
PROJECT NUMBER: E2068 PROJECT TITLE: Joint Standoff Weapon System

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Justification for Major System New Start December 1985.

2. (U) Operational Requirement Document April 1992.

3. (U) Acquisition Plan March 1991.

4. (U) Test & Evaluation Master Plan March 1992.

5. (U) Integrated Program Summary (Currently being prepared).

G. (U) RELATED ACTIVITIES:

1. (U) Under Air Force RDT&E Program Element (PE) 0604727F, the Air Force will agree to integrate the BLU-108 submunition as a payload for the JSOW baseline vehicle and integrate it on Air Force aircraft to provide a standoff delivery capability against massed armor. A Memorandum of Agreement between the Navy and Air Force was signed 15 July 1991 to address joint service Interoperability and cooperation. It details the JSOW/JDAM requirements and acquisition approach. Funding under PE 0604727F will begin in FY93 and will continue in FY94.

2. (U) The JSOW Inertial Navigation Set/Global Positioning System (INS/GPS) will be used as the guidance set for PE 0604618N, Joint Direct Attack, Project E2137 JDAM program.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

Baseline:
DT-IIA JAN/94
DT-IIB AUG/94
OT-IIA 2Q/96
DT-IIC 2Q/96
OT-IIB 1Q/97

P3I:
DT-IIB 4Q/97
DT-11C 4Q/98
OT-IIA 1Q/99
OT-IIB 4Q/99

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U0166	SPS	7,941	7,777	4,935	CONT.	CONT.
U0167	RAM	4,937	0	9,096	CONT.	CONT.
U0172	CIWS	7,741	13,308	18,428	CONT.	CONT.
U0173	NSSMS	7,532	5,964	37,996	CONT.	CONT.
U0665	IRST	0	0	12,904	CONT.	CONT.
U0954	Shp EW	36,237	31,032	29,029	CONT.	CONT.
U2178	QRCC	0	0	4,372	CONT.	CONT.
	TOTAL	64,388	58,081	116,760	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE), effective for FY 1994, consolidates currently ongoing and planned programmatic efforts related to Ship Self Defense (SSD). The consolidation facilitates effective planning and management of these efforts, exploiting the synergistic relationship inherent in each. These projects are directed by a single program manager in PEO(SD). Analysis and demonstration have established that surface SSD based on single-sensor detection, point-to-point control architecture performs marginally against current and projected anti-ship cruise missile (ASCM) threats. The supersonic seaskimming ASCM reduces the effective battle space to the horizon and the available reaction time-line to less than 30 seconds, from first opportunity to detect until the ASCM impacts its target ship. Against such a threat: multi-sensor integration is required for effective detection; parallel processing is essential to reduce reaction time to acceptable levels and to provide vital coordination/integration of hardkill and softkill assets; and improvements in terminal gun system effectiveness and in missile kinematics, control and homing accuracy are required for successful hardkill engagement. These SSD projects address and coordinate the detect, control and engage functions necessary to meet the rigorous SSD requirements within a development structure dedicated to systems engineering.

(U) DETECTION: Improved coordinated sensor performance is to be achieved through the efforts of SPS Improvements (U0166), I/R Search and Track (U0665) and Shipboard EW Improvements (U0954). These efforts address both active and passive detection capability exploiting the radar, infrared (IR) and electronic signatures of ASCM. In addition, softkill developments addressing active countermeasures, decoys and ship signature reduction technology are being pursued through project U0954.

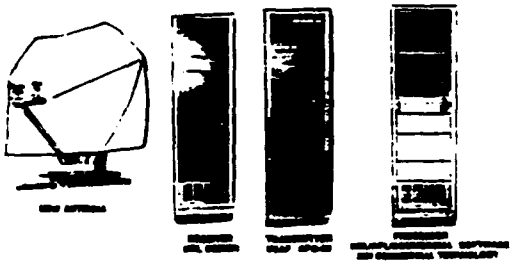
(U) CONTROL: Multi-sensor integration, parallel processing and the coordination of hardkill/softkill capabilities in an automated response to the ASCM threat are the cornerstones of Ship Self Defense Systems (SSDS) being developed through Quick Reaction Combat Capability (QRCC-U2178) efforts. In addition, that project provides for the central system engineering management of SSD developments.

(U) ENGAGEMENT: Both missile and terminal gun system requirements are being addressed via NATO SEASPARROW (NSSMS, U0173), 5IN Rolling Airframe Missile (RAM, U0167) and Close-In Weapon System (CIWS, U0172). Missile improvements are to include improved missile kinematic performance, advanced seeker and low elevation fuzing/warhead capabilities. Gun system improvements address system detection, rate-of-fire, number of rounds on target, first round accuracy and reliability and maintenance.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0166 PROJECT TITLE: SPS Improvement Program

SPQ-9(I) RADAR IMPROVEMENT PROGRAM



POPULAR NAME: SPS IMPROVEMENTS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		SPQ-9(I) MS IV 8/93		CONT.
ENGINEERING MILESTONES			SPQ-9(I) CDR 7/94	CONT.
T&E MILESTONES		LBT, ADM 4/93		CONT.
CONTRACT MILESTONES		SPQ-9(I) PRU 9/93		CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2,952	5,799	4,165	CONT.	CONT.
SUPPORT CONTRACT	340	148	150	CONT.	CONT.
IN-HOUSE SUPPORT	4,649	1,830	620	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	7,941	7,777	4,935	CONT.	CONT.

B. (U) DESCRIPTION: This program develops and tests performance and reliability upgrades for search radar equipment to meet the evolving threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Supported analysis/trade-off studies to coordinate and refine element roles within SSD strategy; supported development of system interface adaptations as necessary to provide effective SSD integration.

b. (U) Continued development/test of anti-ship missile defense (ASMD) modifications to AN/SPQ-9 Radar.

c. (U) Completed studies of SYS-2(V) Series Improvements to integrate IR/electro-optical and improve signal processor.

d. (U) Completed SPS-49 Medium Pulse Repetition Frequency Unit (MPU) transition to production.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0166 PROJECT TITLE: SPS Improvement Program

e. (U) Completed evaluation of fleet introduction of SPS-48E Low Elevation Field Change.

f. (U) Investigated options to improve Mark (MK) 23 TAS Radar ASMD capability.

2. (U) FY 1993 PROGRAM:

a. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated SSDS, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

b. (U) Complete testing of ASMD modifications to AN/SPQ-9 Radar. Complete risk reduction design efforts and tests. Finalize specifications and award contract for production representative unit (PRU) and production options. Continue SSDS integration studies.

3. (U) FY 1994 PLANS:

a. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated SSDS, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

b. (U) Monitor PRU contract for ASMD improvements to AN/SPQ-9 Radar. Conduct Critical Design Review (CDR). Continue risk reduction studies. Complete integration definition with SSDS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCENDIV, Crane, IN; NRL, Washington, DC; NAVPGSCOL, Monterey, CA. CONTRACTORS: JHU/APL, Laurel, MD; ITT Gilfillan, Van Nuys, CA; Westinghouse, Baltimore, MD; Norden Systems, Melville, NY; Hughes Aircraft Co, Fullerton, CA; Lockheed Sanders, Nashua, NH.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program planning to be integrated with SSD Master Plan which captures the following activities: PE 0603755N, Ship Self Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line 172	--	--	7,430	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: SPQ-9(I) FOT&E planned 6/95-7/95.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: UO167 PROJECT TITLE: 5" Rolling Air Frame Missile



POPULAR NAME: RAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES	GMLS MS III GMRP Block 0 MS IV 7/93 GMRP Block 0 MS III 4/93			CONT.	
ENGINEERING MILESTONES				CONT.	
T&E MILESTONES		Breadboard Demo 4/93		CONT.	
CONTRACT MILESTONES			EMD Block I	CONT.	
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	3,608	0	6,376	CONT.	CONT.
SUPPORT CONTRACT	0	0	299	CONT.	CONT.
IN-HOUSE SUPPORT	1,329	0	1,945	CONT.	CONT.
GFE/ OTHER	0	0	476	CONT.	CONT.
TOTAL	4,937	0	9,096	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of this program is to develop a surface-to-air self-defense system utilizing a dual mode, passive Radio Frequency/IR 5" RAM. The baseline system provided a self-defense capability against incoming active radar guided anti-ship missiles and was planned on an equal cost share basis with the Government of the Federal Republic of Germany. The planned effort will provide a capability against passive anti-ship missiles and very low altitude missiles through the incorporation of an IR all-the-way guidance mode and improved fuze. This system is designed to counter high density ASCM raids and provide for ship survivability with accurate terminal guidance, proven lethality and no fire control channel dependence.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed Seeker Engineering Model.

b. (U) Initiated Algorithm Development.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: UO167 PROJECT TITLE: 5" Rolling Air Frame Missile

c. (U) Performed Background Measurement Experiments.

d. (U) Supported analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; supported development of system interface adaptations as necessary to provide effective SSD-integration.

e. (U) Milestone IV of RAM Block 0 will authorize the Engineering Manufacturing Development (EMD) of the IR guidance and low altitude fuze upgrade program.

2. (U) FY 1993 PROGRAM: Funds provided under PE 0603755N, project U2191, to continue risk reduction in infrared missile upgrade (IRMU), low altitude fuze and system integration efforts.

3. (U) FY 1994 PLANS:

a. (U) Initiate engineering and manufacturing development on Block I Upgrade Program including IR electronics and software, simulation/Engineering Module testing, critical experiments, and fabrication of test rounds.

b. (U) Select single fuze design and initiate engineering and manufacturing development effort.

c. (U) Initiate design effort on MK-49 GMLS ORDALT/ECP to provide compatibility with both Block 0 and Block I missiles.

d. (U) Continue to support analysis/trade-off studies to coordinate and refine element roles within SSD strategy; support development of system interface adaptations as necessary to provide effective SSD integration.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA (Acquisition Engineering Agent and Design Agent for GMRP), Pt. Mugu, CA, and White Sands, NM; Naval Warfare Assessment Center, Corona, CA; NAVSURFWARCENDIV Dahlgren, VA and Port Hueneme, CA (AEA for GMLS, ISEA for GMWS). CONTRACTORS: Hughes Missile System Division, Pomona, CA; RAMSYS GmbH, Ottobrunn, Germany; TRANSLANT, Inc., Pomona, CA.; Johns Hopkins University, Applied Physics Laboratory, Laurel, MD.; and EG&G, Washington Ana Services Center, Rockville, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: New schedule developed to support restart of program.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

OR:	5/75	TEMP:	1/90
FSED MOU:	3/79	AP:	4/92
NDCP:	2/89	PRODUCTION MOU:	8/87
ILSP:	8/90	ASR:	7/92

G. (U) RELATED ACTIVITIES: Under the provisions of the Memorandum of Understanding (MOU) with Germany, the development costs shown will be shared by U.S. and German government. PE 0605863N, RDT&E;N Ship and Aircraft Support and PE 0603755N, Ship Self Defense.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0167 PROJECT TITLE: 5" Rolling Air Frame Missile

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

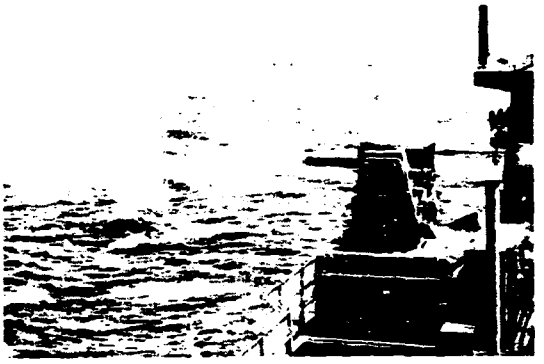
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN #10	9,137	8,229	58,500	CONT.	CONT.
(U) Procurement Quantity	0	0	240	CONT.	CONT.
(U) OPN Line 172	26,653	5,630	62,957	CONT.	CONT.
(U) Procurement Quantity	3	0	10	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: A production MOU was approved and signed by both countries on 3 August 1987. The MOU describes production of the Guided Missile Round Pack and the Guided Missile Launching System. The Block I development commenced as a follow-on development under this Production MOU.

J. (U) TEST AND EVALUATION: Milestone IV of the RAM Block 0 Upgrade in 1993 will authorize the development of an IR upgrade program that will allow RAM to counter the entire spectrum. This development will complete with a combined Navy Test and Evaluation/Operational Test and Evaluation in FY 1998 and a Milestone III decision for production of Block I Missile in FY 1998.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0172 PROJECT TITLE: Close-In Weapon System (PHALANX)



POPULAR NAME: PHALANX

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES		B/L 3 PDR 6/93	B/L 3 CDR 6/94	CONT.
T&E MILESTONES				CONT.
CONTRACT MILESTONES	B/L 3 9/92			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,694	8,378	12,845	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	4,797	3,680	3,883	CONT.	CONT.
GFE/ OTHER	1,250	1,250	1,700	CONT.	CONT.
TOTAL	7,741	13,308	18,428	CONT.	CONT.

B. (U) DESCRIPTION: The PHALANX CIWS is an automatic, fast-reaction, computer-controlled radar and gun system. It functions as the last segment in the Navy's "defense-in-depth" concept. Its mission is to detect, engage, and destroy hostile anti-ship missiles that have penetrated the ship's primary defense systems. The program requirements are contained in the CIWS Block I (MK 15 MODS 11-14) TEMP 142-1 (Rev 2). It automatically detects, evaluates, tracks, and engages threats and then returns to search mode ready for another target. The initial CIWS version, Block 0, has been approved for service use and is in the fleet. CIWS Block I, Baseline 0, provides increased performance in search elevation coverage, increased velocity coverage, a larger magazine, augmented reliability, built-in test equipment, and improvements to system operability test and fault isolation test programs. Block I received Approval for Limited Production (ALP) in FY 85 and IOC occurred 10/88. CIWS Block I, Baseline 1, adds a pneumatic gun drive system, enabling the gun to fire 4,500 spm, and increased search sensitivity. Block I received ALP in FY 88 and Approval for Full Rate Production in FY 90.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0172 PROJECT TITLE: Close-In Weapon System (PHALANX)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Baseline 3 design effort commenced with technical studies to determine the optimal development path for the PHALANX sensors. Baseline 3 will provide a detection sensor capability for RAM as well as improving the performance of the PHALANX in an Electronic Countermeasures (ECM) environment. The sensor improvements will enhance performance of the weapon system against very low altitude and low Radar Cross-Section (RCS) targets.

b. (U) Developed data and model for determining useful life of gun barrels in PHALANX, Enhanced Lethality Cartridge and optimal barrel design.

c. (U) Conducted tests related to: the effects on PHALANX of chaff launched from close-by ships; the Advanced Fire Control (AFC-1) program; and improved Operational Program software.

d. (U) Examined the feasibility of using PHALANX in an initial anti-small boat Surface Mode.

e. (U) Supported analysis/trade-off studies to coordinate and refine element roles within the total ship self defense concept, supported development of system interface adaptations to provide effective SSD integration.

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of the improved sensor capabilities (Baseline 3) which will better counter lower elevation, lower RCS targets; be more capable in an ECM environment; and provide a detection sensor for RAM.

b. (U) Continue development and testing of the High Order Language (HOL) computer and AFC programs including AFC-2 which will counter the capabilities which are expected to be fielded by anti-ship missiles in the near future.

c. (U) Continue ongoing design and engineering efforts to incorporate all 1993 PHALANX improvements into the Ship Self Defense system, an element of the total ship self defense concept.

3. (U) FY 1994 PLANS:

a. (U) Continue development of Baseline 3 to include: (1) Integrating an automatic acquisition video tracker and advanced electro-optic capabilities to improve overall system operation in both multi-path and Electromagnetic Compatibility environments and (2) Developing a Search-Through-Track capability to allow longer range detection and engagement of targets.

b. (U) Continue developmental testing of Baseline 3 HOL computer and fire control improvements at China Lake.

c. (U) Continue ongoing design and engineering efforts to incorporate all 1994 PHALANX improvements into the Ship Self Defense system, an element of the total SSD concept.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN ORDSTA, Louisville, KY; NAVSURFWARCENDIV, Port Hueneme, CA; NAVAIRWARCENWPNDIV, Pt. Mugu, CA. CONTRACTORS: Defense Technology, Inc., Arlington, VA; Technautics, Inc., Arlington, VA; Hughes Missile System Division, Pomona, CA or General Electric, Pittsfield, MA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0172 PROJECT TITLE: Close-In Weapon System (PHALANX)

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

CIWS Block I TEMP 142-1 (Rev 2) 8/89

G. (U) RELATED ACTIVITIES: PE 0603755N, Ship Self Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

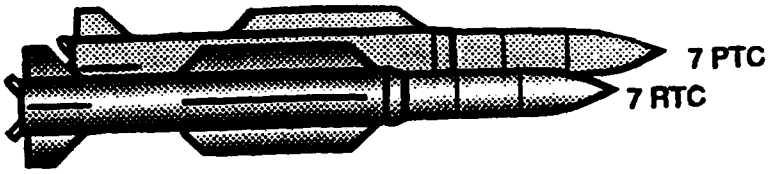
	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) WPN (#41)	2,006	0	0	CONT.	1,323,100
(U) SCN (Various)	43,896	40,350	0	CONT.	CONT.
(U) SCN ORDALTS	0	0	24,413	CONT.	CONT.
(U) WPN MODS (#45)	56,538	66,100	41,800	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Development testing for improvement concepts related to Baseline 3, is ongoing. Also, testing for product improvements developed to solve current Fleet problems continue. FOT&E for Baseline 3 will be in FY 1995.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0173 PROJECT TITLE: NATO SEASPARROW



POPULAR NAME: NATO SEASPARROW

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			IV 10/93		
ENGINEERING MILESTONES			PDR 5/94	CONT.	
T&E MILESTONES					
CONTRACT MILESTONE			EDM CA 12/93	CONT.	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4,541	4,312	29,768	CONT.	CONT.
SUPPORT CONTRACT	1,816	901	3,628	CONT.	CONT.
IN-HOUSE SUPPORT	1,175	751	4,600	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	7,532	5,964	37,996	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for self defense improvements in multiple surface ship classes, to counter maneuvering supersonic seaskimmer ASCM. The improvements are derived from:

(U) Self Defense Surface Missile System (SDSMS) computer program integration of multiple sensors (search radars, MK XII and UPX 29 Identification Friend or Foe, Combat Direction System/Advanced Combat Direction System (CDS/ACDS), AN/SLQ-32 Electronic Support Measures (ESM), MK 23 Target Acquisition System (TAS) and NSSMS fire control radars) and weapons (RIM-7 SEASPARROW and RIM-116 RAM).

(U) The SDSMS program integrates multiple weapon and sensor systems through the MK-23 TAS to improve acquisition and reaction time for AN/SWY-1 and SWY-2 SDSMS. SWY-1 consists of TAS and MK-57 NSSMS, and SWY-2 is TAS and MK-31 RAM integrated with AN/SLQ-32 ESM system. This occurs through improved sensor correlation/association and Threat Evaluation Weapon Assignment algorithms and implements approved tactical doctrine in system software. Corrects SDSMS RIM-7P OPEVAL deficiencies. Updates SDSMS software to match evolution of shipboard ACDS. Consolidates SDSMS software products into one common TAS computer program to support all ship classes and system variants. Develops and tests SDSMS computer programs to provide threat identification and roll angle data via pre-launch messages and modifies engageability logic/algorithms to account for maximum intercept range to support RIM-7R OPEVAL requirements.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0173 PROJECT TITLE: NATO SEASPARROW

(U) The Kinematic Missile:
-Studies and develops kinematic improvements and alternatives to the SEASPARROW missile as a cooperative NSSMS Consortium initiative, to concurrently include U.S. unique options.
-Studies improvements to meet probability of kill requirements against maneuvering targets, enhanced Electronic Countermeasures, mid course uplink and system integration.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued development of common TAS integration Operational Computer Program (OCP) for both SWY-1 and 2.

b. (U) Completed RIM-7P Operational Evaluation (OPEVAL) deficiency correction program.

c. (U) Completed Phase II study of kinematic improvement of ESSM and system integration.

d. (U) Conducted support analysis/trade-off studies to coordinate and refine element roles within SSD strategy; supported development of system interface adaptations as necessary to provide effective SSD integration.

2. (U) FY 1993 PROGRAM:

a. (U) Deliver TAS integration OCP for SDSMS SWY-2 to support RAM in LHA-5.

b. (U) Continue integration of TAS common OCP for SDSMS SWY-1 for CV/CVN, LHD-1, DD, AOR and AOE classes; and the Self Defense Test Ship (SDTS) in preparation for RIM-7P FOT&E and FY94 RIM-7R OPEVAL.

c. (U) Correct deficiencies identified during at-sea testing of SWY-2 TAS OCP in LHA-5.

d. (U) Design, build and test NSSMS hardware and software modifications required for the Self Defense Test Ship (SDTS) Program. This effort provides a remote control and monitoring capability to support test exercises.

e. (U) Conduct Cost and Operational Effectiveness Analysis and develop Baseline Program Plan for Kinematic Missile.

f. (U) Initiate Phase III Contract Definition Phase for EDM contract.

g. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated SSDS, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

3. (U) FY 1994 PLANS:

a. (U) Continue integration of TAS common OCP for SDSMS SWY-1 for CV/CVN, LHD-1, DD, AOR and AOE classes; and the SDTS coincident with RIM-7P FOT&E.

b. (U) Commence Integration or TAS Radar and System Control functions in the SSDS Program.

c. (U) Develop pre-launch messages for the RIM-7P and 7R missiles. Test pre-launch messages during 7R OPEVAL.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0173 PROJECT TITLE: NATO SEASPARROW

d. (U) Award Kinematic Missile EDM Contract.

e. (U) Initiate system development as determined from COEA results.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Port Hueneme, CA; NAVSURFWARCEN, Dahlgren, VA; NAVAIRWARCEN, China Lake, CA. CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; Raytheon Company, Equipment Division, Wayland, MA; Raytheon Company, Missile Systems Division, Bedford, MA; Ball Corporation, Broomfield, CO; Hughes Missile System Division, Ontario, CA; General Electric, Moorestown, NJ; FMC, Minneapolis, MN; Martin Marietta, Baltimore, MD; JHU/APL, Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: EDM activities for Kinematic Missile and system integration to satisfy near term threat requirements are being initiated in FY94.

2. (U) Schedule changes: Schedule modified to incorporate Kinematic Missile and system integration requirements starting in FY94.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

TOR: 09/86 TOR for Advanced SRAAW Combat System
TEMP: 09/92 Draft, 5/93 Approved

G. (U) RELATED ACTIVITIES: PE 0603755N, Ship Self Defense; PE 0603609N, Conventional Munitions; PE 0604307N, AEGIS Combat System Engineering; PE 0604366, Standard Missile Improvements.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable for this submission.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NSSMS Consortium MOU(s). Concept definition phase cooperatively shared with selected NSSMS Consortium nations.

1. (U) MOUs for the Cooperative Development, Production and Support of the NSSMS dated 1968 and 1977 and signed by the Governments of Australia, Belgium, Canada, Denmark, Germany, Greece, Italy, The Netherlands, Norway, Portugal, Spain, Turkey and the United States.

2. (U) The objectives of these MOUs are to increase military effectiveness of NSSMS equipments, support military readiness, obtain economic advantages, maintain standardization, evaluate and implement proposed configuration changes.

3. (U) Program in existence since 1968.

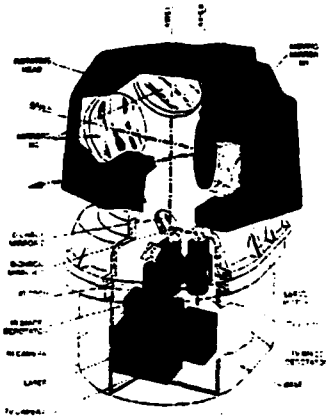
4. (U) RDT&E funding through FY91: $113,931K.

J. (U) TEST AND EVALUATION: Draft Test and Evaluation Master Plan to be completed for Milestone IV. OPEVAL for Kinematic upgrade and NSSMS integration to occur in FY97, OPEVAL with MK-41/AEGIS integration in FY97 and FY98.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0665

BUDGET ACTIVITY: 4
PROJECT TITLE: I/R Search & Track



POPULAR NAME: IRST

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES			MS II 12/93	CONT.
ENGINEERING MILESTONES				CONT.
T&E MILESTONES				CONT.
CONTRACT MILESTONES			Award E&MD	CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT			10,287	CONT.	CONT.
SUPPORT CONTRACT			300	CONT.	CONT.
IN-HOUSE SUPPORT			2,317	CONT.	CONT.
GFE/ OTHER				CONT.	CONT.
TOTAL	0	0	12,904	CONT.	CONT.

B. (U) DESCRIPTION: This is a new start. The sophistication and diversity of threats facing naval surface combatants is increasing with respect to lower radar cross-section, use of passive radiation frequency radiation homing (ARM), increased speed, and lower altitudes. This PE provides funding for development of an IR system, a passive detection device that increases SSDS detection of low, high speed, low observable targets to provide a cue to radar systems; by augmenting radars during radar frequency jamming and emission control; and by reducing vulnerability to ARM missiles.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable for this submission.

2. (U) FY 1993 PROGRAM: Cost and Operational Effectiveness Analysis (CEOA) being conducted via funding provided in P.E. 0603755N, Project Z2138 in preparation for FY94 program initiation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0665 PROJECT TITLE: I/R Search & Track

3. (U) FY 1994 PLANS:

a. (U) Develop system specification.

b. (U) Prepare acquisition plan.

c. (U) Prepare request for proposal(RFP).

d. (U) Obtain Milestone II decision to enter Engineering and Manufacturing Development (EMD) phase.

e. (U) Award EMD contract for IRST.

f. (U) Award Limited Production contract for Thermal Imaging System (TIS).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCENDIV DAHLGREN, VA, NAVSURFWARCENDIV PORT HUENEME, CA. MAJOR CONTRACT: To be determined.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:
COEA in process.

G. (U) RELATED ACTIVITIES: PE 0603755N, Ship Self Defense.

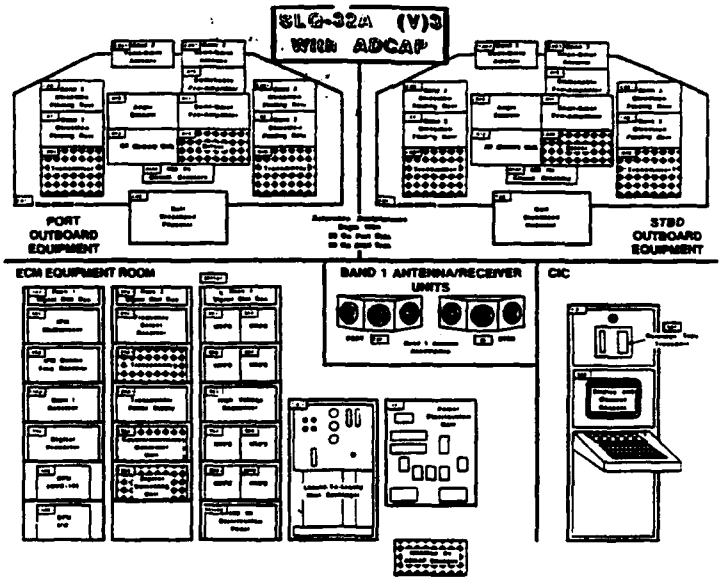
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: DT/OT for production decision for TIS scheduled FY 95, and FY 97 for IRST.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N
PROGRAM ELEMENT TITLE: Ship Self Defense
BUDGET ACTIVITY: 4
PROJECT NUMBER: U0954
PROJECT TITLE: Shipboard EW Improvements



POPULAR NAME: SHIPBOARD EW IMPROVEMENTS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES	TORCH MSIII 8/92	AIEWS/OACM RAIDS MSIII 8/92 NULKA MSIIA 6/93	ADCAP MSIII 8/94 MSI 10/93	CONT.
ENGINEERING MILESTONES	PHASE E SRR 8/92 ADCAP CDR 12/91	PHASE E PDR 6/93 CDR 1QTR	PHASE E CDR 3/94	CONT.
T&E MILESTONES	OUTLAW BANDIT MSIII 9/92 NULKA DTIIB 6/92	ADCAP DTIIA 4Q/93 RAIDS DT/OT 1/93 DDI DT III E1 7/93	ADCAP/DDI DT/OT 1Q/94 DDI DT III E2 7/94 DDI OT III B 9/94 NULKA DTIID/OTIIA 12/94	CONT.
CONTRACT MILESTONES	PHASE E AWARD 6/92		AIEWS/OACM AWARD 7/94	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	4,887	10,000	14,997	CONT.	CONT.
SUPPORT CONTRACT	3,601	3,752	2,769	CONT.	CONT.
IN HOUSE SUPPORT	27,494	17,165	11,083	CONT.	CONT.
GFE/ OTHER	255	115	180	CONT.	CONT.
TOTAL	36,237	31,032	29,029	CONT.	CONT.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0954 PROJECT TITLE: Shipboard EW Improvements

B. (U) DESCRIPTION: The Shipboard EW Improvements Program major efforts are: Advanced Capability (ADCAP) - Improves Active Countermeasure capability; AN/SLQ-32(V) Phase E - Improves threat detection capability; DECM/Decoy Integration (DDI) - Integration of MK36 Decoy Launching System with AN/SLQ-32A(V) Shipboard Electronic Countermeasures System; Rapid ASM Integrated Defense System (RAIDS)-A phased Rapid Development initiative to improve the ability of surface combatants to perform ASMD. Advanced Torch Decoys, this program develops Ship Launched Decoys capable of seduction and distraction of IR homing Anti-Ship Missiles. The MK186 MOD 2 TORCH provides improved flame characteristics.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) ADCAP EDM #1 Factory and Acceptance tests.

b. (U) Phase E Full Scale Engineering Development (FSED) contract award and System Requirement Review.

c. (U)

d. (U) NULKA DT-IIB/E completed (ship and environmental test) in Australia and DT-IIC /C/ in U.S.

e. (U) NULKA-Completed captive carry testing in Australia and U.S.

f. (U) TORCH-Completed MS III and granted full production.

g. (U) TORCH-Continued DT-I on the Infrared Distraction Decoy (IRDD).

2. (U) FY 1993 PROGRAM:

a. (U) Phase E FSED PDR.

b. (U) ADCAP-Conclude FSED; Conduct field testing.

c. (U)

d. (U) Complete NULKA DTII D/E &OT-IIA.

e. (U) DDI DT-IIIE/OT-IIIB at-sea tests.

f. (U) Complete RAIDS DT-IIA/OT-IIA

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0954 PROJECT TITLE: Shipboard EW Improvements

3. (U) FY 1994 PLANS:

a. (U) Phase E CDR and Factory tests.

b. (U) DDI follow on evaluations.

c. (U) ADCAP testing. Final DT/OT. ADCAP Production award.

d. (U) AIEWS/OACM multiple Concept Exploration and Definition studies.

e. (U) AIEWS/OACM Evaluation Concepts; develop follow on RFP.

f. (U) AIEWS/OACM Conduct Milestone (MS) I review.

g. (U) AIEWS/OACM Award Demo/Validation contracts.

h. (U) TORCH - Complete developmental testing of the FLIRT; release for Operational Test and Evaluation.

i. (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSWC, Dahlgren, VA; NSWC, Crane, IN; NOSC, Louisville, KY; NCCOSC, San Diego, CA; DTRC, Bethesda, MD; NSWC, Port Hueneme, CA; NSY, Long Beach, CA; SPCC, Mechanicsburg, PA; COMOPTEVFOR, Norfolk, VA. CONTRACTORS: Raytheon Co., Goleta, CA; Sippican, Marion, ME; AWADI, Melbourne, Australia; Rubatex Corp., Bedford, VA.; UNISYS, Corp., Great Neck, N.Y.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Phase E Test and Evaluation Master Plan (TEMP) III-IE in process.

2. (U) DDI TEMP Rev 2. approved May 92.

3. (U) ADCAP TEMP in process. Completion expected 3Q/93.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U0954 PROJECT TITLE: Shipboard EW Improvements

4. (U) AIEWS MNS approved OCT 92. AIEWS MSI documentation to be submitted for approval 1Q/94. AIEW COEA in process, report 9/93.

5. (U) SSDS MK0 (RAIDS) RFP in process. RAIDS TEMP signed 91/1Q.

6. (U) NULKA Joint TEMP signed by USN OCT 88. Rev.1 in process.

7. (U) OACM-TOR 09/90; Operations Requirement Document in preparation.

8. (U) OUTLAW BANDIT OR 05/87; TEMP Rev 1 02/93; AP 06/91.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

OPN	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE
(U) AN/SLQ-32 (68)	94,495	81,013	1,393	CONT.
(U) ASMD Systems 84VV (188)	3,536	3,087	0	0
(U) Shipboard Expend 84VP (195)	24,706	42,241	12,108	CONT.
(U) OUTLAW BANDIT (74)	13,394	7,909	19,064	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NULKA, a joint US/AUSTRALIA project to develop an anti-ship missile decoy systems capable of seduction. Memorandum of Agreement with Australia signed Aug 1986. Total program cost in U.S. dollars $94 million. U.S share of the common work is 78%, Australia 22%. The U.S is responsible for developing the electronic payload. Australia is responsible for developing the rocket motor, flight control systems, launcher and the final system integration. AIEWS investigating feasibility of joint US/UK project to develop an integrated EW system. PNP approved Jan 93. Program initiation would occur following MSI.

J. (U) TEST AND EVALUATION:

1. (U) DDI DT-IIIE FY94/3QTR.

2. (U) SLQ-32 (ADCAP) DDTIIA FY93/4Q; DDI DT/OT FY94/1Q.

3. (U) RAIDS DT/OTIIA FY93/2QTR.

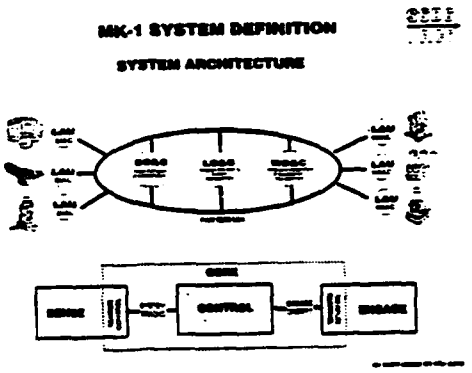
4. (U) OUTLAW BANDIT DT FY92/4QTR.

5. (U) NULKA DT-IIA FY92 1QTR/DTIIB FY92/3QTR.

6. (U) NULKA DTIID/OTIIA FY94/1Q.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2178 PROJECT TITLE: Quick Reaction Combat Capability (QRRC) - Eng



POPULAR NAME: QRCC

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES				CONT.	
ENGINEERING MILESTONES			PDR 8/94	CONT.	
T&E MILESTONES				CONT.	
CONTRACT MILESTONES			MKI E&MD 4/94	CONT.	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	0	3,710	CONT.	CONT.
SUPPORT CONTRACT	0	0	75	CONT.	CONT.
IN-HOUSE SUPPORT	0	0	462	CONT.	CONT.
GFE/ OTHER	0	0	125	CONT.	CONT.
TOTAL	0	0	4,372	CONT.	CONT.

B. (U) DESCRIPTION: The QRCC program provides the multi-sensor integration and hardkill/softkill coordination to improve current system performance with respect to short range anti-air SSD. It is intended to leverage recent critical experiments and RAIDS program efforts, to upgrade existing short range anti-air warfare defenses by providing a quick reaction capability through flexible embedded doctrine, that coordinates the detect-through-engage sequence for in-service equipment. In particular, QRCC applies multi-sensor integration to existing sensors; upgrades and integrates RAIDS for support of local command and control; integrates and coordinates weapon systems; and provides a first level of hardkill/softkill integration. QRCC architecture centers on the distributed processing concept and will be incrementally implemented via a MK 1 SSDS focusing on integration of RAM, CIWS and the electronic countermeasures system, SLQ-32, followed by a Mark 2 system which integrates NSSMS, CIWS, RAM, SLQ-32 and the MK 23 TAS across a broad ship class spectrum. It integrates existing system elements via a fiber optic local area network and uses color workstations for system operation, maintaining form, fit and function of the OJ-194 console. This project provides for the full scale EMD of SSDS leading to production and installation.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2178 PROJECT TITLE: Quick Reaction Combat Capability (QRRC) - Eng

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable for this submission.

2. (U) FY 1993 PROGRAM: Not applicable for this submission.

3. (U) FY 1994 PLANS:

a. (U) Award E&MD contract and begin full scale development of SSDS MK1 for the LSD-41 (Dock Landing Ship) class.
b. (U) Conduct PDR.
c. (U) Initiate Design and engineering of modifications to the MK 1 system for installation aboard FFG-7(CORT) (Guided Missile Frigate) and LHA (Amphibious Assault Ship) classes.
d. (U) Initiate Integrated Logistic Support and other programmatic efforts to prepare for fleet support requirements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSURFWARCENDIV DAHLGREN VA, NAVSURFWARCENDIV PORT HUENEME CA, NAVSURFWARCENDIV CRANE IN MAJOR CONTRACT: To be determined, JHU/APL LAUREL MD

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: MNS: 8/92

G. (U) RELATED ACTIVITIES: PE 0603755, Ship Self Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line 172	0	0	16,854	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. (U) DT/OT for the MK 1 system is anticipated mid FY 95.

2. (U) DT/OT for the MK 2 system is anticipated early FY 97.

3. (U) Each system to experience FOT&E as adaptations to multiple ship classes occur.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604759N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Major Test and Evaluation Investment
PROJECT NUMBER: W2195 PROJECT TITLE: T&E Investment
A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2195	T&E Investment	35,729	41,088	52,496	- CONT.	CONT.

B. (U) DESCRIPTION: This project has been established to improve visibility of Test and Evaluation (T&E) resources across the Services for major T&E investment funding. Following this direction, all improvement and modernization efforts as well as the T&E Modernization funds have been transferred from PE 0605864N, Project W2125 T&E Modernization, to PE 0604759N, Project W2195 T&E Investment. This project provides support for the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center (NAVUNSEAWARCEN DET AUTEC), Andros Island, Bahamas; the Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), Point Mugu, CA and China Lake, CA; the Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV), Patuxent River, MD and Trenton, NJ. These funds are required to correct major deficiencies in T&E and increase T&E support effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) NAVUNSEAWARCEN DET AUTEC. Completed the design/develop/fabrication of the Weapon Noise Measurement System. Completed work on the Site 1 Expansion project. Completed trade-off studies and the final specification for shipyard installation of a Torpedo Launch Tube. Continued work on the procurement/installation of the Distributed Data Processing/Communication System.

b. (U) NAVAIRWARCENWPNDIV. Completed prototype of modernized range control room. Initiated construction (cable laying) phase of the underwater fiber optics link for San Nicolas Island (supports Operational Security (OPSEC) requirements). Evaluated prototype digital ranger for FPS-16 metric radars. Continued Telemetry (TM) development laboratory modernization, TM sensor calibration improvements and automated capability for TM circuit design. Continued instrumentation upgrades; continued Integrated Target Control System (ITCS) reliability and interoperability upgrades; and initiated replacement of aging tracking mounts. Continued instrumentation and facilities improvements. Continued radar upgrades for Radar Cross Section (RCS) Measurements facility. Initiated replacement of obsolete and non-supportable interface between metric instrumentation tracking radars and range central computers. Procured two of five digital interfaces for range surveillance radars (supports Advanced Combat Direction System (ACDS) improvement program). Initiated replacement/upgrade of multilateration data link controller to support over the horizon Time Space Position Indication (TSPI) requirements.

c. (U) NAVAIRWARCENACDIV. Continued improvements of computation, control and range Electronic Warfare (EW) systems including enhancements of communications, instrumentation data system, threat emitters and computers. Continued OPSEC procurement and installations. Continued update of T&E data processing equipment. Procured and installed Maritime Multi-Mission Interoperability Center (MMIC) and Integrated Aircraft Weapon System (IAWS) test components. Continued upgrade of Electromagnetic Environmental Effects (E3) facilities. Continued System Rehabilitation and Modernization (SRAM) for existing test facilities/capabilities.

d. (U) Global Positioning System (GPS). Provided integration, test and evaluation of prototype equipment for Navy GPS tracking system at NAVAIRWARCENACDIV, NAVAIRWARCENWPNDIV and NAVUNSEAWARCEN DET AUTEC. Purchased Low Rate Initial Production (LRIP) equipment from the Tri-Service GPS Range Application Joint Program Office (RAJPO).

e. (U) Portable Tracking System (PTS). Developed Digital Signal Processor (DSP) of the analog Differential Phase Shift Keyed (DPSK) signal processor. Performed four shallow water experiments involving ping architectures. Developed a single channel DPSK signal processor using a DSP integrated circuit. Developed a prototype time division multiplexed in-line hydrophone unit.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604759N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Major Test and Evaluation Investment
PROJECT NUMBER: W2195 PROJECT TITLE: T&E Investment

f. (U) Deep Water Range (DWR). Developed technical specification and procurement package for the in-water tracking system procurement. Developed deep acoustic ambient recording unit and conducted initial in-water tests. Conducted water chemistry cruise and bathymetric survey.

2. (U) FY 1993 PROGRAM:

a. (U) NAVUNSEAWARCEN DET AUTEC. Continue the installation of the Distributed Data Processing/Communication system. Initiate work on interface with remote ranges/facilities. Initiate study for Down Range Site Reduction Project to reduce operating costs. The identified configuration modifications will be implemented based on the study. Initiate work on counter measure resistant tracking system.

b. (U) NAVAIRWARCENWPNDIV. Continue the radar upgrades and increase the throughput of the data reduction system at the RCS measurement facility. Initiate procurement of ACDS consoles. Provide compatibility with fleet ACDS equipped ships. Complete the underwater fiber optics link for San Nicolas Island. Initiate procurement of digital rangers for FPS-16 metric tracking radars. Complete improvement for TM sensor calibration capability. Complete acquisition of off-line data processing computer system, and initiate upgrade of the range timing system for the over land Aircraft/Missile Ranges. Complete configuration management and real-time mass storage upgrades and initiate improvement of data reduction/analysis and communications systems for the Electronic Combat Range (ECR). Initiate TM antenna servo drive upgrade.

c. (U) NAVAIRWARCENACDIV. Continue improvements to the Flight Test Range tracking system. Continue update of existing E3 facilities and target. Continue procurement of data computation and control systems for the Flight Test Range Operations Center and components for Range EW System. Continue procurement and installation of MMIC and IAWS test components. Continue a prudent SRAM effort for existing T&E facilities/capabilities. Initiate upgrades to the Electromagnetic Transient T&E Facility (EMTTEF) and Range Support Aircraft Instrumentation (RSAI). Continue updates to T&E data processing equipment.

d. (U) GPS. NAVAIRWARCENWPNDIV will perform LRIP equipment test and evaluation for the RAJPO in conjunction with integrating these equipments into the Sea Test Range. Evaluate the LRIP system equipment for out year full production equipment integration into the North Range facility.

e. (U) GPS. NAVAIRWARCENACDIV will attain a limited Initial Operating Capability (IOC) with equipment purchased this year.

f. (U) GPS. NAVUNSEAWARCEN DET AUTEC will procure LRIP equipment for integration, test and evaluation.

g. (U) PTS. Develop a multichannel processor using a DSP integrated circuit. Design, develop and build prototype in-line hydrophone unit. Conduct in-water prototype testing. Initiate software development (shallow track and arctic track).

h. (U) Initiate program to develop modernized version of the ITCS.

3. (U) FY 1994 PLANS:

a. (U) NAVUNSEAWARCEN DET AUTEC. Complete the computer/display system part of the Distributed Data Procession/Communication System. Continue work on interface with remote ranges/facilities. Complete Down Range Site Reduction study and initiate procurement of hardware. Continue work on counter measure resistant tracking system. Initiate system interface design work on an Advanced Weapon Noise Measurement System.

b. (U) NAVAIRWARCENWPNDIV. Complete radar upgrades for the RCS measurement facility. Initiate planning development of user required low frequency, low observable pylon for the RCS measurement facility. Complete procurement of ACDS consoles. Initiate procurement of mobile frequency surveillance systems. Complete FPS-16 metric tracking radar upgrades. Initiate refurbishment/upgrade of ARSR-1 surveillance radar. Complete TM circuit design capability. Initiate replacement of unmaintainable threat radar dedicated computer and initiate upgrade to the threat radar instrumentation. Initiate procurement of focus parallel cable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604759N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Major Test and Evaluation Investment
PROJECT NUMBER: W2195 PROJECT TITLE: T&E Investment

c. (U) NAVAIRWARCENACDIV. Continue improvements to the Flight Test Range tracking system. Procure and install fiber optic systems for overall communications for NAVAIRWARCENACDIV. Continue integration of EW threat emission simulation and flight test of Electronic Support Measure (ESM) systems. Continue upgrade of E3 facilities. Continue MMIC. Continue improvement of flight test range of operations and implement GPS capabilities. Continue improvements of IAWS. Continue a prudent SRAM effort for existing T&E facilities/capabilities. Continue upgrade of EMTTEF. Continue updates to T&E data processing equipment. Provide current technology power absorbers for propulsion system testing that have improved reliability and increased capabilities. Improve the unique small engine and support facilities through analysis and engineering study/design and procurement of controls/valves, enhanced data acquisition systems, improved control room/test area ergonomics to accommodate current and emerging test requirements.

d. (U) GPS. Continue to procure and integrate the Tri-Service RAJPO Develop GPS system equipment.

e. (U) PTS. Design, fabricate and test advanced development model transponder array. Begin request for procurement process and award contracts for the major hardware buys. Continue software development. Develop the technical specifications and the procurement packages for the major sub-systems.

f. (U) Continue ITCS modernization.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET AUTEC, Andros Island, Bahamas; NAVAIRWARCENWPNDIV, Point Mugu and China Lake, CA; NAVAIRWPNSTA, Point Mugu and China Lake, CA; NAVAIRWARCENACDIV, Patuxent River, MD; and Trenton, NJ; NAVFACCHESDIV, Washington, DC. CONTRACTORS: Computer Sciences Corporation, Los Angeles, CA; UNISYS, New York, NY; and SRS Technology, Newport Beach, CA; Grumman Technical Services, Titusville, FL; Georgia Tech Research Institute, Atlanta, GA; H-6 Corporation, Nashua, NH; Logimetric, Plainview, NY; Cober Corporation, Stanford, CT; Veda Corporation, Lexington Park, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Slip installation of torpedo launch tube on an AUTEC vessel to the outyears due to change in user requirement.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0605864N, Test and Evaluation Support; this program provides institutional Maintenance and Operations support. PE 0604940D, Central Test and Evaluation Investment Program: initiates development and implementation of a standard Radio Frequency data link; development of advanced design Anti-Radiation Missile targets; Metric Infrared Imaging System and Infrared Plume Measure Capability; development of a Common Airborne Instrumentation System; Improvement and Modernization of Air Combat Environment Test and Evaluation components laboratories; Offensive Sensor Laboratory; Closed Loop Laboratory; Air Combat Environment Test and Evaluation Facility Operations and Control Center, Communications, Navigation and Identification Laboratory; Advanced Flight Simulator; Aircrew Systems Evaluation Facility.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) MILCON P-454	16,600	-	-	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604761N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Intelligence
PROJECT NUMBER: Z0772 PROJECT TITLE: Foreign Material Exploitation/Acquisition

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Z0772	FMA/E	2,014	1,872	345	CONT.	CONT.

B. (U) DESCRIPTION: The Foreign Material Exploitation and Acquisition Project

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

2. (U) FY 1993 PROGRAM:

3. (U) FY 1994 PLANS:

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Laboratories (various)

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable. (Other appropriations are funded in the General Defense Intelligence Programs).

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604771N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Medical Developments
PROJECT NUMBER: MO933 PROJECT TITLE: Medical/Dental Equipment Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MO933	Med/Dent Equipment Development	4,129	3,915	4,030	CONT.	CONT.

B. (U) DESCRIPTION: Equipment developed in this program will improve battlefield and shipboard availability for frozen and freeze-dried blood products and substitutes, resuscitative fluids, and wash solutions for post thaw frozen blood and minimize operational injuries and medical complications.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed operational testing and evaluation of Resuscitation Fluids Production System (REFLUPS).

2. (U) FY 1993 PROGRAM:

a. (U) Complete REFLUPS prototype improvements for acquisition.

b. (U) Submit FDA Application for Clinical use of REFLUPS.

c. (U) Begin work on low cost ear protectors in high-noise areas.

d. (U) Begin development of freeze-dried blood products.

3. (U) FY 1994 PLANS:

a. (U) Continue development of ear protectors.

b. (U) Continue development of freeze-dried blood products.

c. (U) Begin work on system to wash frozen-thawed red blood cells.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHLAB, Pensacola, FL CONTRACTORS: Sterimatics Corporation, Bedford, MA, and Boston Univ Blood Lab, Boston, MA.

E. (U) RELATED ACTIVITIES: Tri service effort coordinated through the Armed Services Biomedical Research Evaluation and Management Committee.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0676*	Improved ID	21,611	15,094	17,352	CONT.	CONT.
W1253*	Combat ID	9,886	0	7,677	CONT.	CONT.
F0253**	N&E SPT	5,105	2,764	5,140	CONT.	CONT.
X0921	GPS	49,229	49,895	49,878	CONT.	CONT.
	TOTAL	85,831	67,753	80,047	CONT.	CONT.

B. (U) DESCRIPTION: Reliable and secure Navigation and positive identification (ID) systems are essential elements of battle management in the naval environment. NAVSTAR Global Positioning System (GPS) is a space-based radio positioning and navigation system that provides users with worldwide, all-weather, three dimensional position, velocity and precise time data based on a constellation of 21 or more satellites. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam-resistant Identification Friend or Foe (IFF) systems for battle group air defense management and air traffic control. The resolution of the identification problem is of special interest to Congress. Identification is multifaceted and includes information received from several sensors (both cooperative and non-cooperative systems). The Combat Identification System (CIS) project (W1253) covers the Navy development aspects of a Cooperative Aircraft Identification (CAI) system which is the next-generation replacement for the aging MK XII IFF and canceled Air Force MK XV IFF. The Improved Identification Development project (W0676) develops Non-Cooperative Target Recognition (NCTR) and integration techniques. This project was restructured to allow rapid fielding of prototypes called Shipboard Advanced Radar Target ID System (SARTIS), an NCTR system, on selected ships. AUTO-ID, a prototype sensor kinematics/doctrine display system, for aircraft carriers and selected Air-to-Air Warfare (AAW) ships is being integrated into formal full-scale development of systems beginning in FY 1992; the restructured Centralized IFF (CIFF) project will provide the vehicle to integrate both cooperative and non-cooperative ID systems. This program element also includes development of a new Photonics Mast and Doppler Sonar Velocity Log (DSVL) under Navigation & Electronic Support project (F0253). The Photonics Mast project is a non-hull penetrating replacement for existing optical periscopes. The Photonics mast exploits a wide portion of the electro-magnetic spectrum utilizing advanced electro-optical imaging and fiber optics. The DSVL is a high accuracy velocity meter which is being developed for precise measurement of own ship's relative and absolute speed.

* Previously funded under P.E. 0604211N.
** Previously funded under P.E. 0604514N.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: W0676 PROJECT TITLE: Improved ID Development

PICTURE NOT AVAILABLE

POPULAR NAME: SARTIS, SLQ-20B, CIFF

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES		MSII (SLQ-20) 4/93		CONT.
ENGINEERING MILESTONES		SDR/PDR/CDR(CIFF)	PDR & CDR (SLQ-20)	CONT.
T&E MILESTONES			DT (CIFF) DT/OT(SARTIS)	CONT.
CONTRACT MILESTONES	E&MD (CIFF) 6/92	E&MD(SLQ-20) 5/93		CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2,000	10,000	9,900	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	19,436	5,094	7,302	CONT.	CONT.
GFE/ OTHER	175	0	150	CONT.	CONT.
TOTAL	21,611*	15,094*	17,352	CONT.	CONT.

*Previously funded under Program Element 0604211N Project W0676.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: W0676 PROJECT TITLE: Improved ID Development

B. (U) DESCRIPTION: This project provides for the development and integration of NCTR techniques and multi-sensor information integration systems for improved identification (ID). A secondary effort involves deployed AUTO-ID prototypes which take IFF track, link data and kinematics/doctrine information to better ID/display targets; these features/displays are being integrated into a restructured CIFF development. Project will also develop an upgraded AN/SLQ-20 for future integration into the CIFF multi-sensor system. Participation is also maintained in Joint-Service NCTR efforts.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U)

b. (U)

c. (U) Continued crossdecking/support of 8 deployed AUTO-ID prototypes.

d. (U) Awarded Engineering and Manufacturing Development (E&MD) contract for restructured/enhanced CIFF in 6/92; prepared for milestone II and award of E&MD contracts for AN/SLQ-20 antenna and processor; coordinated SARTIS and SLQ-20 efforts with integration into CIFF via Pre-Planned Product Improvement (P3I).

e. (U) Chaired Joint-Service Working Group NCTR activities and conducted technology investigations to investigate Joint Service common approaches under the guidance of the General Office Steering Committee for Combat ID (GOSC-CID) chaired by N6X.

2. (U) FY 1993 PROGRAM:

a. (U)

b. (U) Complete CIFF SDR 12/92 to continue E&MD of CIFF system; initiate E&MD of AN/SLQ-20 antenna/processor in third quarter and prepare for contractor testing of CIFF.

c. (U) Continue Joint-Service NCTR activities. Turnover chairmanship of Joint Service Working Group to U.S. Army. Continue to investigate potential Joint Service approaches to NCTR.

3. (U) FY 1994 PLANS:

a. (U)

b. (U) Perform contractor testing and prepare for developmental/operational testing of the CIFF system; complete CDR and prepare for developmental testing of the AN/SLQ-20 upgraded processor.

c. (U) Continue Joint-Service NCTR activities.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: W0676 PROJECT TITLE: Improved ID Development

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NCCOSC RDTE Div, San Diego, CA; NAVAIRWARCENACDIV, Warminster, PA; NESEA, St. Inigoes, MD. CONTRACTORS: Allied-Signal/Bendix Communications, Towson, MD; Scope, Inc., Reston, VA; The Johns Hopkins University Applied Physics Laboratory, Laurel, MD; Others, TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: As a result of CIFF contract negotiations, DT and OT have been compressed to support a MS III decision in 4QFY95. The AN/SLQ-20 MSII and E&MD schedules were redefined to accommodate new documentation requirements in accordance with the revised DoD Instruction 5000.2 and additional program authority direction.

3. (U) Cost Change: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

1. SARTIS: O.R. (NCTR) 2/86; RDC (SARTIS) 1/90; AP and TEMP drafted.

2. CIFF/AUTO-ID integration: O.R. 2/86; program restructured 1/90; AP 4/91; TEMP 3/92; contract awarded 6/92.

3. AN/SLQ-20 Upgrade: O.R. 2/86; PCAD 5/91; AP 1/92; TEMP drafted.

G. (U) RELATED ACTIVITIES: P.E. 0603742F, Combat Id Systems; PE 0604790A, IFF Equipment.

H. (U)OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: Start T&E in FY 1994 with SARTIS OPEVAL.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: W1253 PROJECT TITLE: Combat ID System

PICTURE NOT AVAILABLE

POPULAR NAME: CAI

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM	DAB 0		DAB I	CONT.
MILESTONES	8/92		3/94	CONT.
ENGINEERING MILESTONES				
T&E MILESTONES				
CONTRACT MILESTONES				

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	1,937	0	1,900	CONT.	CONT.
SUPPORT CONTRACT	0	0	0	CONT.	CONT.
IN-HOUSE SUPPORT	5,549	0	4,277	CONT.	CONT.
GFE/ OTHER	2,400	0	1,500	CONT.	CONT.
TOTAL	9,886	0	7,677	CONT.	CONT.

B. (U) DESCRIPTION: USN has the requirement for a CAI system that would replace aging MK XII equipments. The Joint Chiefs of Staff/Joint Requirements Oversight Council Mission Need Statement (JCS/JROC MNS) for Combat Identification was validated 3/92 by the Commanders in Chief (CINCs); OSD had a Milestone/Decision Acquisition Board (DAB) 0 in 8/92 which directed "Combat ID to enter into Phase 0 for Joint Concept Exploration and Definition studies on Battlefield ID (Army lead) and cooperative Aircraft Identification (Navy) with Navy as overal lead for coordination of both Phase 0 efforts." A Cost and Operational Effectiveness Analysis (COEA) is underway to investigate options to be presented at DAB I. The Naval Research Lab (NRL) is directing COEA studies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Supported Congressional/OSD direction on this special interest program; attended OSD/NATO meetings and initiated Joint-Service discussions in preparation for Navy lead of this major program with Allied interoperability.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: W1253 PROJECT TITLE: Combat ID System

b. (U) Completed DAB 0 in 8/92; planned a Joint program office structure and initiated Service participation.

c. (U) Participated in Joint Service Working Groups.

2. (U) FY 1993 PROGRAM: (Supported by FY 1992 funds)

a. (U) Initiate Concept studies and Phase 0 COEA.

b. (U) Prepare for DAB I.

3. (U) FY 1994 PLANS:

a. (U) Complete DAB I.

b. (U) Initiate Phase I efforts.

c. (U) Prepare for possible condensed Phase I, leading to early DAB II, yet to be determined.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NAVAIRWARCENACDIV Patuxent River, MD; NCCOSC RDTE DIV, San Diego, CA; DOD ECAC, Annapolis, MD; NESEA, St. Inigoes, MD; NAVAIRWARCENACDIV,Indianapolis, IN; Air Force; Army; TBD. CONTRACTORS: TBD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: JCS MROC 20-83 and NIS STANAG 4162; DOD AIMS STANAG 4193; JCS/JROC MNS 4/92; ADM 8/92.

G. (U) RELATED ACTIVITIES: P.E. 0623772A, Battlefield Combat ID Systems (BCIS).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

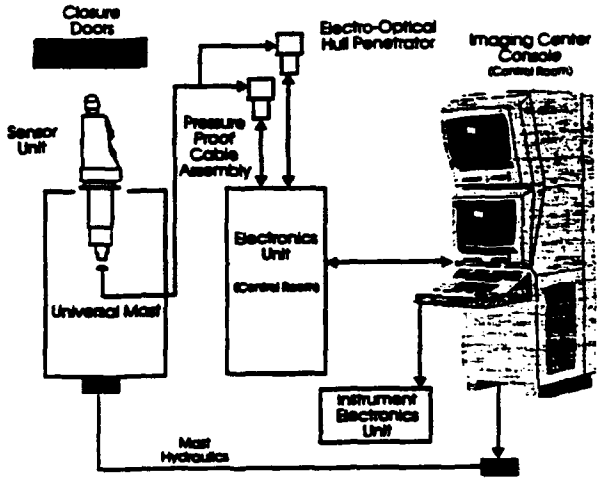
(U) OPN-Combat ID: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: MKXV MOAs still valid.

J. (U) TEST AND EVALUATION: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: F0253* PROJECT TITLE: Navigation & Electro-Optical Support



PHOTONICS MAST SYSTEM

POPULAR NAME: PHOTONICS MAST

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
Photonics Mast Program			4/94-MSII	3Q98 MSIII
ENGINEERING MILESTONES				2Q95-SDR 4Q95-PDR 2Q96-CDR 1Q97-1stEDM
Photonics Mast Program				1Q99-IOC
T&E MILESTONES				
Photonics Mast Program		6/93-TEMP Approval		1Q98-DTII 3Q98-OTII
DSVL Program	9/92 Integration Test			
CONTRACT MILESTONES		1/93-Concept Definition(CD)		
Photonics Program		7/93-CD Delivery	8/94-EMD Award	

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	2.680	1.955	3.640	CONT.	CONT.
SUPPORT CONTRACT	615	509	450	CONT.	CONT.
IN-HOUSE SUPPORT	1.810	300	1.050	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	5.105 *	2.764 *	5.140	CONT.	CONT.

* Previously funded under Program Element 0604514N Project F0253.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: F0253 PROJECT TITLE: Navigation & Elecro-Optical Support

B. (U) DESCRIPTION: There are two major efforts in this project: the Photonics Mast Program and the Doppler Sonar Velocity Log.

(U) The Photonics Mast will replace existing penetrating periscopes and exploit a wide portion of the electro-magnetic spectrum through advanced electro-optical imaging and fiber optics. It will provide major improvements in submarine stealth and infrared imaging capabilities and make extensive use of image enhancement techniques for target identification and classification. The non-hull penetrating design provides freedom in ship construction design as well as space savings. The system will be designed to satisfy Operational Requirement #168-02-88.

(U) The Doppler Sonar Velocity Log (DSVL) is a high accuracy velocity meter being developed for precise measurement of own ship's relative and absolute speed. The DSVL will minimize speed errors introduced into the fire control solution.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Transferred cognizance of DARPA AIPP Non-Penetratory Periscope Project to Navy program of fire control.

b. (U) Conducted Photonics Mast Concept Demonstration reviews.

c. (U) Generated Photonics Mast Test and Evaluation Master Plan (TEMP) and Integrated Logistics Support Plan (ILSP).

d. (U) Initiated Cost and Operational Effectiveness Analysis (COEA) for Photonics.

e. (U) Conducted Atmospheric Propagation Analysis (APA) Field Tests for Photonics.

f. (U) Built DSVL Prism Transducer.

g. (U) Completed DSVL software development and test.

h. (U) Built DSVL Maintenance Assistance Modules (MAMs) and On Board Repair Parts (OBRPs).

i. (U) Conducted DSVL system integration testing.

2. (U) FY 1993 PROGRAM:

a. (U) Award Photonics Mast Concept Demonstration contracts.

b. (U) Evaluate concept definition designs for Photonics.

c. (U) Complete Photonics COEA.

d. (U) Conduct additional APA field tests for Photonics.

e. (U) Conduct underwater explosion tests of selected Photonics components.

f. (U) Conduct Photonics Logistics Readiness Review (LRR).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: F0253 PROJECT TITLE: Navigation & Electro-Optical Support

3. (U) FY 1994 PLANS:

a. (U) Issue Photonics Mast Engineering and Manufacturing Development (EMD) request for proposals.

b. (U) Obtain Photonics Mast Milestone II approval.

c. (U) Conduct explosive shock, radar cross section (RCS) and Infra-Red Signature tests.

d. (U) Install NPP in land-based test site.

e. (U) Award Photonics Mast EMD Contract.

f. (U) Remove Non-Penitrating Periscope from USS Memphis.

4. PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCEN DET New London CT; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC; NAVSURFWARCEN SHIPSYSENGSTA, Philadelphia, PA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVAIRWARCENACDIV, Warminster, PA. CONTRACTORS: PHOTONICS MAST - KOLLMORGEN, Northhampton, MA; Rockwell International, Lanhem, CA; Sperry Marine, Charlottesville, VA; General Electric, Syracuse, NY.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. Technology changes: Not applicable.

2. Schedule changes: Not applicable.

3. Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement 07/87

G. (U) RELATED ACTIVITIES: 0603226E Experimental Evaluation of Innovative Technology - Non-penetrating periscope developed by Kollmorgen for Advanced Research Projects Agency (ARPA).

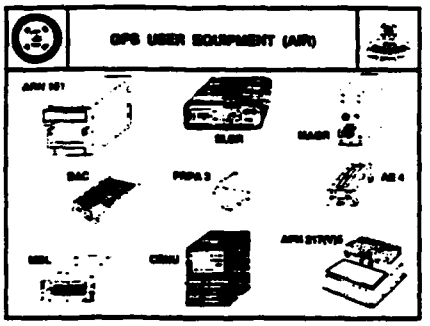
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Photonics Mast development and operational DT/OT IIB at-sea testing is planned for FY 98.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment



POPULAR NAME: NAVSTAR GPS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM	GPS MS III	MAGR/NAVSSI MS III/MS II		
MILESTONES	1/92	3/93		CONT.
ENGINEERING MILESTONES				CONT.
T&E MILESTONES	DT/OT 2/92 DTIIB 5/92 OTIIA 8/92		DT 3/94 OT 3/94	CONT.
CONTRACT MILESTONES				CONT.

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	17.739	23.256	20.309	CONT.	CONT.
SUPPORT CONTRACT	452	464	479	CONT.	CONT.
IN-HOUSE SUPPORT	29.278	22.380	25.837	CONT.	CONT.
GFE/ OTHER	1.760	3.795	3.253	CONT.	CONT.
TOTAL	49.229	49.895	49.878	CONT.	CONT.

B. (U) DESCRIPTION: GPS is a space-based radio positioning and navigation system that provides users with worldwide, all-weather, three-dimensional position, velocity and precise time data based on a constellation of 21 or more satellites. Navy's portion of the GPS program develops user equipment and provides new/increased capability to each type platform through the integration and testing of this equipment. GPS increases the "performance envelope" of each aircraft by enhancing the aircraft's mission capability. GPS integrations involve development of ancillary hardware and software and testing of prototype avionics suites to validate enhancement of mission systems, emulation of Tactical Air Navigation (TACAN) in aircraft and system performance characteristics suitable for operational testing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Began integration engineering on the A-6, C-2A, ES-3A, F-18 and CH-46 aircraft.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

b. (U) Continued integration engineering on the P-3C UDIII, SH-2G, MH-53E, H/KC-130, A-6E, SH-60F UD, ES-3A UD, EA-6B, VH-3D, C-2A, VH-60, F/A-18 and AV-8B aircraft.
c. (U) Continued GPS integration with shipboard command and control systems through the Navigation Sensor System Interface (NAV&SI).
d. (U) Continued Miniaturized Airborne GPS Receiver (MAGR) test and evaluation.
e. (U) Continued efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.
f. (U) Continued shipboard TACAN replacement demonstration.
g. (U) Continued development of Tactical Aircraft Mission Planning System (TAMPS) software to support GPS.
h. (U) Continued systems integration in the Electrically Suspended Gyro Navigator (ESGN).
i. (U) Completed systems integration in the Carrier Navigation System (CVNS), Combat Direction System (CDS) and AN/WSN-5.
j. (U) Achieved MSIII (Approval for Full Production) for AN/WRN-6(V) and AN/ARN-151(V).

2. (U) FY 1993 PROGRAM:
a. (U) Begin integration engineering on the AV-8 (day attack), E-2C(UD), F-14D, S-3B, SH-60B(UD), UH-3H, E-6A and T-45 aircraft.
b. (U) Continue integration engineering on the A-6 and H/KC-130 aircraft.
c. (U) Complete integration engineering on the SH-60F UD, VH-3D, CH-53E, VH-1N, HH-60H/J, F/A-18, MH-53, SH-60B(UD), SH-2G, C-2A, EA-6B, CH-46, ES-3A and P-3C UD III aircraft.
d. (U) Complete MAGR test and evaluation.
e. (U) Continue GPS integration with shipboard command and control systems.
f. (U) Continue systems integration in the ESGN.
g. (U) Continue development of TAMPS software.
h. (U) Complete testing of embedded GPS.
i. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.
j. (U) Begin Precision Lightweight GPS Receiver (PLGR) testing.
k. (U) Achieve MS II for basic NAVSSI and MS III for MAGR.

3. (U) FY 1994 PLANS:
a. (U) Begin integration engineering on the F-14A, AH-1W, AP-3, C-12 and C-9 aircraft.
b. (U) Continue integration engineering on the S-3B aircraft.
c. (U) Complete integration engineering on the A-6E, ES-3A UD, SH-3H, T-45, F-14D, AV-8 (day attack) and H/KC-130 aircraft.
d. (U) Complete systems integration in the ESGN.
e. (U) Continue GPS integration with shipboard command and control systems.
f. (U) Continue testing PLGRs in various applications.
g. (U) Complete development of TAMPS software.
h. (U) Complete testing of embedded GPS.
i. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Air Force Systems Command (Space Systems Division), Joint Program Office, Los Angeles, CA; NCCOSC RDTE DIV DET, Warminster, PA; NAVAIRWARCENACDIV, Indianapolis, IN; NAVAIRWARCENACDIV, Patuxent River, MD; NAVAIRWARCENWPNDIV, China Lake, CA; NAVAVNDEP, Pensacola, FL/San Diego, CA. CONTRACTORS: Grumman Aerospace Corp., Long Island, NY; Boeing Company, Seattle, WA;McDonnell Douglas, St. Louis, MO.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navigation/ID System
PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Joint Acquisition Plan	Dec 1989
Multi-Service TEMP	Dec 1991
Joint ILS Plan	Jul 1991
Navy Training Plan	Oct 1991
DCP/IPS	Dec 1991

G. (U) RELATED ACTIVITIES:
PE 0603203F Advanced Avionics for Aircraft
PE 0603601F Conventional Weapons Technology
PE 0305164F NAVSTAR GPS User Equipment

(U) These are Air Force program elements that contribute to the development and test of GPS receivers and associated peripheral equipment.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN (P-1 LI #88)	16,933	17,350	6,200	CONT.	CONT.
(U) APN BA 5 (P-1 LI #52)		12,040	42,557	CONT.	CONT.
(U) SCN* APN BA 1*					

*In-line production funding. Procurement of GPS hardware not available at this level of detail. Composed of multiple P-1 Line Items.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION DATA:
Standard GPS User Equipment
OT III Complete FY 04

Remarks: Exceeded reliability requirements by a factor of four. Five-channel user equipment found operationally suitable and effective; OPTEVFOR has recommended for fleet use. FOT&E to extend applications to 44 aircraft types has begun and will continue through FY 04.

MAGR	EMBEDDED GPS	NAVSSI
DT/OT Begin Feb 92	DT/OT MAR-OCT 94	DT IIB MAY-JUN 92
Complete Sep 92		OT IIA AUG-SEP 92
MS III MAR 93		MS II MAR 93

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1312	Fixed Distribution System (FDS)	234,516	145,944	102,492	CONT.	CONT.
X1300	Advanced Deployable Systems (ADS)	0	13,269	33,387	CONT.	CONT.
	TOTAL	234,516	159,213	135,879		

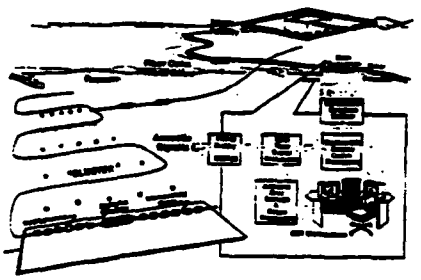
B. (U) DESCRIPTION: Distributed Systems is part of the Integrated Undersea Surveillance System (IUSS). IUSS provides the majority of the U.S. Navy's open ocean detection capability against quiet submarines, including third world diesels. The Distributed Systems program element (PE) 0604784N consists of two projects, X1312 FDS and X1300 ADS, designed to improve the effectiveness and flexibility of Undersea Surveillance.

(U) FDS is a passive acoustic surveillance system for detecting modern quiet submarines using hydrophones, FDS will vital to their mission success as well as long term strategic indications and warning for fleet and national command authorities. FDS represents the nation's sole source of bottom mounted undersea hardware, is modular and can be used FDS can be rapidly deployed in support of regional conflicts or deployed as large 24-year lifetime installations in areas requiring long term coverage. Increasing emphasis is being placed on the deployable, relocatable mission which would allow the U.S. the capability to set up, on short notice, surveillance coverage in regional conflict scenarios. FDS provides the primary intermediate and shallow water capability for a flexible mobile undersea surveillance force. Because of this emphasis, the Navy is developing a rapidly deployable demonstration of the FDS hardware, FDS-Deployable (FDS-D), to prove the capability to be able to respond to regional conflict scenarios in a short time period.

(U) ADS, will build on the FDS-D demonstration as well as the FDS developed underwater hardware and processing technologies and other programs. ADS will incorporate advanced sensors from other technology programs into a family of rapidly deployable systems. This family of systems will be significantly more rapidly deployable and able to be modularly adapted to specific geographic areas in response to regional conflicts involving submarine threats. This project was Congressionally directed in FY92 although funding for this project was not broken out separately until FY93. In FY92, $20.0M is allocated to ADS under project X1312.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distribution System (FDS)



POPULAR NAME: FDS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES				
CDR (Shore Segment)				
Install FDS-D				
Deploy Field One MS III/IOC				
T&E MILESTONES				
DT-2B	6/92			
DT-2D				CONT.
FDS-D				
FDS TECHEVAL				
FDS OPEVAL				
CONTRACT MILESTONES				
FDS Shore EMD	2/92			CONT.
ADS Concept Studies	9/92			
Ship Deployed	9/92			

BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	193,307	118,716	81,241	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	41,209	27,228	21,251	CONT.	CONT.
GFE/ OTHER					
TOTAL	234,516	145,944	102,492	CONT.	CONT.

B. (U) DESCRIPTION: The FDS is part of the IUSS. IUSS provides the majority of the U.S. Navy's open ocean detection capability against quiet submarines, including third world diesels. FDS is a passive acoustic surveillance system for detecting these quieter submarines using hydrophones FDS will vital to their mission success as well as long term strategic indications and warning for fleet and national command authorities. FDS represents the nations's sole source of bottom mounted undersea hardware, is modular and can be

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distribution System (FDS)

FDS can be rapidly deployed in support of regional conflicts or deployed as large 24-year lifetime installations in areas requiring long term coverage. Increasing emphasis is being placed on the deployable, relocatable mission which would allow the U.S. the capability to set up, on short notice, surveillance coverage in regional conflict scenarios. FDS provides the primary intermediate and shallow water capability for a flexible mobile undersea surveillance force. Because of this emphasis, the Navy is developing a rapidly deployable demonstration of the FDS hardware, FDS-Deployable (FDS-D), to prove the capability to be able to respond to regional conflict scenarios in a short time period. The FDS underwater system builds on commercial fiber-optic technology for high data capacities, long trunk cable lengths and extremely high reliability. FDS is designed to be

Shore processing will be workstation based using Non-Development Item (NDI) hardware throughout and the software will be coded in Ada. This FDS processing will form the framework and architecture for all IUSS processing requirements to be procured in the future.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Awarded competitive Shore Signal Information Processing Segment (SSIPS) Engineering and Manufacture Development (EMD) contract.
b. (U) Conducted SSIPS Critical Design Review (CDR) (hardware portion of CDR completed December 1991) and began software development.
c. (U)
d. (U)
e. (U)
f. (U) Continued engineering development of FDS-D.
g. (U)
h. (U) Issued RFP for ADS Concept Study contracts.
i. (U) Awarded ADS Concept Study contracts.
j. (U) Conducted ADS Technology Investment evaluation, initiated relevant technology developments in Active Acoustics, survey, instrumentation, and performance modeling.
k. (U)

l. (U) Initiated planning for Cost and Operational Effectiveness Analysis (COEA) for ADS.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distribution System (FDS)

2. (U) FY 1993 PROGRAM:
a. (U) Conduct incremental software testing and evaluation on SSIPS.
b. (U) Begin integration of hardware and software of shore processing segment.
c. (U)
d. (U)
e. (U)
f. (U)
g. (U) Continue shore segment sortware development.
h. (U) Continue engineering development of FDS-D.

3. (U) FY 1994 PLANS:
a. (U) Conduct incremental software testing and evaluation.
b. (U) demonstratior
c. (U)
d. (U)
e. (U) Analyze data from FDS-D FY94 sea test.
f. (U)
g. (U)
h. (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NCEL, Port Hueneme, CA; NRL, Washington, DC.; NAVUNSEAWARCENDIV, Newport, RI. CONTRACTORS: AT&T Technologies, Inc., Greensboro, NC; AT&T/Bell Laboratories, Whippany, NJ; IBM Corporation, Manassas, VA; TRW, Inc., McLean, VA; AMRON, INC., Arlington, VA; Simplex Wire and Cable Company, Portsmouth, NH; STC Submarine Systems, Inc, Portland, OR; Harris Corp., Melbourne, FL; CACI, Arlington, VA; Applied Research Lab/UT; Austin, TX; Applied Physics Lab/UW, Seattle, WA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION:

Decision Coordination Paper (DCP)	10 May 1989
Milestone II Decision/Acquisition Program Baseline	22 Sep 1989
ILSP Revised	30 Apr 1992
Acquisition Plan #91-18, FDS	14 Aug 1991
TEMP Revised/Approved	30 Sep 1991
Baseline Revised	29 Jan 1992

G. (U) RELATED ACTIVITIES: PE 0204311N, Integrated Surveillance System.

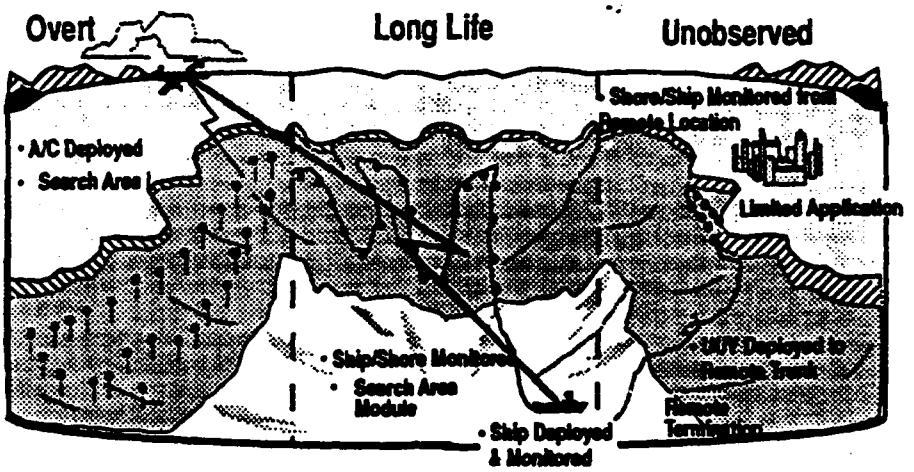
H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

J. (U) TEST AND EVALUATION: See Section A, Schedule and Section C.2 through 4, for future plans.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems
PROJECT NUMBER: X1300 PROJECT TITLE: Advanced Deployable Systems (ADS)



POPULAR NAME: ADS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1992	FY 1993	FY 1994	TO COMPLETE	
PROGRAM MILESTONES			MS-I 6/94	CONT.	
ENGINEERING MILESTONES			SDR 10/93	PDR 11/94	
T&E MILESTONES	Sensor Tests as available with fleet			CONT.	
CONTRACT MILESTONES		PROTOTYPE OPTION	3/94		
BUDGET	FY 1992	FY 1993	FY 1994	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	0	6,008	23,262	CONT.	CONT.
SUPPORT CONTRACT					
IN-HOUSE SUPPORT	0	7,261	10,125	CONT.	CONT.
GFE/ OTHER					
TOTAL	0	13,269	33,387	CONT.	CONT.

B. (U) DESCRIPTION: The Advanced Deployable Surveillance(ADS) program provides for the concept study, prototyping, test, design, development, installation, recovery, and maintenance of ADS. This family of systems will provide a deployable submarine surveillance capability to operational forces in a timely response to tactical and strategic requirements. The systems will include sensors, transmission, processing and interface to the Surveillance Direction System (SDS) and applicable tactical assets as an evolving component of the Integrated Undersea Surveillance System (IUSS). The program uses and expands on technology developed under the Fixed Distributed System (FDS) program, the Advanced Deployable Array (AdDA) program, the Port Area Surveillance (PAS), Sonobouy and ONR programs and the ARIADNE Program.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance Systems
PROJECT NUMBER: X1300 PROJECT TITLE: Advanced Deployable Systems (ADS)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS: Funding and accomplishments for FY92 are under Project X1312.

2. (U) FY 1993 PROGRAM: Accomplishments(Oct-Feb): A Missions Needs Statement (MNS) was signed by Fleet and OPNAV representatives. A Milestone 0 Navy Program Decision Meeting (NPDM) was held on 24 November and resulted in FY92 funds being released to ADS for award of system concept studies. The Defense Appropriations Bill and the Defense Authorizations Act for FY93 transferred funds from the program element for Undersea Superiority Technology Demonstrations (P.E. 0603555N) to the Advanced Deployable Surveillance project under the program element for Distributed Surveillance Systems. Congress directed the Navy to proceed in parallel development of both air and UUV deployed versions of ADS. The new funds allowed ADS to fully fund Navy in-house tasks in FY93 to complement the system study contracts and to begin UUV interface definition earlier than would have otherwise been possible. PLANS:(Mar-Sep); define Milestone I documentation requirements and commence preparation. Plan and execute sea tests for collection of shallow water diesel submarine data with sensors suitable for application in ADS. Continue concept studies.

3. (U) FY 1994 PLANS:

a. (U) Complete concept studies of an ADS system that incorporates both acoustic and non-acoustic sensors, is small enough for deployment by aircraft or unmanned underwater vehicles, and is capable of being reconfigured depending on the mission, but optimized for shallow water ASW against quiet diesel submarines.

b. (U) Provide results of concept studies to support independent COEA study. Evaluate time sensitivity of various deployment options.

c. (U) Provide documentation to support Milestone I decision.

d. (U) Begin prototyping of most promising concepts indicated by concept studies and COEA results.

e. (U) Plan and execute sea test, and analyze sea test data from sensors appropriate for ADS application and incorporate results into prototype developments.

f. (U) Conduct site surveys to support potential future deployments and testing.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC RDTE DIV, San Diego, CA; NAVAIRWARCENACDIV, Warminster, PA; NAVUNSEAWARCENDIV, Newport, RI; NAVSEAWARCEN, Dahlgren Division, White Oak Detachment, Silver Spring, MD; NCEL, Port Hueneme, CA; NRL, Washington, DC. CONTRACTORS: AT&T Technologies, Whippany, NJ; Westinghouse Electric Company, Annapolis, MD; Presearch Incorporated, Fairfax, VA; IBM Corporation, Manassas, VA; BBN Systems & Technologies, Cambridge, MA; BBN Systems & Technologies, Arlington, VA; BBN Systems & Technologies, San Diego, CA; Alliant TechSystems Inc., Mukilteo, WA; Alliant TechSystems Inc., Arlington, VA; E-Systems, Garland Division, Garland, TX; Lockheed Missiles and Space Company, INC., Sunnyvale, CA; Lockheed Sanders, Inc., Nashua, NH; Lockheed Aeronautical Systems Company, Marietta, GA; Planning Systems Inc., McLean, VA; Sparton Corporation, Jackson, MI; Texas Instruments, McKinney, TX; McDonnell Douglas Aerospace-D&ES, Santa Anna, CA; McDonnell Douglas Aerospace, Arlington, VA; Hughes Aircraft Company, Fullerton, CA; Magnavox, Fort Wayne, IN; ORINCON, San Diego, CA; ORINCON, Arlington, VA; Western Instrument, Ventura, CA; Applied Remote Technology, San Diego, Ca; Applied Research Lab/University of Texas (ARL/UT), Austin, TX; Johns Hopkins University/Applied Physics Lab (JHU/APL), Laurel, MD; AMRON, INC., Arlington, VA; TRW, Inc., McLean, VA.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Distributed Surveillance System
PROJECT NUMBER: X1300 PROJECT TITLE: Advanced Deployable Surveillance(ADS)

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Increased emphasis on UUV deployment.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0603747N, Advanced ASW Technology; PE 0603555D, Enhanced Science and Technology Efforts; PE 0204311N, Integrated Surveillance System.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Sensor level testing FY93 through FY95; emphasis on detecting exercises of quiet Diesel Submarines.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0106	Naval Medical Support Capability	113	106	110	CONT.	CONT.
R0132	CNO Program Analysis and Evaluation	479	138	348	CONT.	CONT.
R0133	National Academy of Sciences/Naval Studies Board/ASN Studies	1,400	696	540	CONT.	CONT.
R0147	Operational Strategy and Tactical Effectiveness Analysis	757	215	526	CONT.	CONT.
R2040	Foreign Ship and Submarine Vulnerability Program	952	523	865	CONT.	CONT.
L2097	Manpower, Personnel and Training Studies Support	401*	159*	316	CONT.	CONT.
W2092	Naval Aviation Studies	1,800	823	1,151	CONT.	CONT.
	TOTAL	5,902	2,660	3,856	CONT.	CONT.

* Project funded as R2097 in FY 92-93

B. (U) DESCRIPTION: This program provides analytical support to the Secretary of the Navy (SECNAV) and the Chief of Naval Operations (CNO) as a basis for major policy, planning, and acquisition program execution decisions. It supports research and development strategy development and planning. It supports studies in the areas of manpower, personnel and training, and aviation. It develops analytical tools for evaluating effectiveness of U.S. weapons against potential foreign threat ships and submarines.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: M0106 PROJECT TITLE: Navy Medical Support

C. (U) DESCRIPTION: The Chief, Bureau of Medicine and Surgery has an ongoing need for evaluation of resource management techniques. This project provides an essential management tool to examine and investigate biomedical operations, functions, allocation of resources, personnel training, detailing, and other problems that may affect the relevancy, effectiveness, and efficiency of medical support of the Navy and Marine Corps.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed technical report and disseminated survey findings of medical reservists recalled in support of Operations Desert Shield/Storm.

b. (U) Initiated survey of active duty medical personnel who served during Desert Shield/Storm.

2. (U) FY 1993 PROGRAM:

a. (U) Complete analyses of active duty medical personnel survey and report findings to Surgeon General.

3. (U) FY 1994 PLANS:

a. (U) Determine the incidence and correlates of spontaneous abortion among U.S. Navy women.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Health Research Center, San Diego, CA. CONTRACTORS: San Diego State University Foundation, San Diego, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R0132 PROJECT TITLE: CNO Program Analysis and Evaluation

C. (U) DESCRIPTION: This project provides analytical support to CNO and SECNAV in evaluation of overall balance within total Navy programs. Includes such tasks as (a) evaluation of force capabilities and requirements, (b) analysis of effectiveness of systems under development, and (c) Secretary of Defense directed independent cost and effectiveness analyses of major Navy programs, and items of Congressional interest as they relate to Navy programs. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations as well as the development and maintenance of databases and models. The use of databases and models is driven by the need to objectively and continually assess the impact of reduced funding and/or force drawdown upon Navy programs. They provide Navy planners and decision makers with objective, empirical data with which to make determinations regarding program planning and evaluation issues. The models funded by this account are the primary tools used to formulate program balance in the assessment process (particularly the Readiness, Support and Infrastructure Assessment and the Investment Balance Review). The analyses based on these models formed the heart of the Investment Balance Review, allowing us to formulate and cost-out alternative force structure, manpower, infrastructure and readiness programs.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued and initiated studies and analysis (including development of databases and models) to provide results in support of Navy program decision making. Areas of study included: output measures of training readiness to optimize programming of training resources; establishment of personnel quality requirements to set standards and provide personnel quality to performance cost/benefit analysis; programmatic analysis of Reserve force structure; and development of the Data Base for Resource Appraisal (DBRA) System.

2. (U) FY 1993 PROGRAM:

a. (U) Conduct analyses over a broad range of issues -- from the assessment of application for new technology to the development and testing of improved tactics for today's forces.

b. (U) Update and maintain the Aviation Readiness model and the Ships Resource-to-Readiness model, both of which are an integral part of the Navy's Readiness Assessment.

3. (U) FY 1994 PLANS: Continue developing models and databases for studies to improve decision making and enhance understanding of readiness, sustainability and other programmatic issues. Continue the update and maintenance of the Aviation Readiness model and the Ships Resource-to-Readiness model, both of which are an integral part of the Navy's Readiness Assessment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NPRDC, San Diego, CA. CONTRACTORS: Ogden/ERC Government Systems, Inc., Oakton, VA; NCS, Falls Church, VA.

F. (U) RELATED ACTIVITIES: Program Element 0605873M, Marine Corps Program Wide Manpower System; Program Element 0605154N, Center for Naval Analyses.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R0133 PROJECT TITLE: National Academy of Sciences/ Naval Studies Board/ASN Studies

C. (U) DESCRIPTION: This project supports the core program for the Naval Studies Board. As mutually agreed upon between the CNO and the President of the National Academy of Sciences and with appropriate attention to the influence of the domestic economy, national objectives, social imperatives and anticipated military requirement, the Naval Studies Board will conduct and report upon surveys and studies in the field of scientific research and development applicable to the operation and function of the Navy. Reports consist of a briefing to the Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN(RDA)) and the CNO and staff, and written technical reports. This project supports an Advanced Technology Chair at the Naval Postgraduate School and Technology Initiative Games (TIG) at the Naval War College.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Supported Weinblum Memorial Lecture, Naval Hydrodynamics Symposium, Military Space Symposium and International Science Lecture series.

b. (U) Initiated Congressional mandated Mine Countermeasures Technology Study.

c. (U) Supported Advanced Technology Chair and TIG.

2. (U) FY 1993 PROGRAM:

a. (U) Continue Office of Naval Research (ONR) research opportunities studies, and support C.H. Davis lecture, Weinblum Memorial Lecture Series, International Conference on Numerical Ship Hydrodynamics, Advanced Technology Chair and TIG.

b. (U) Complete Mine Countermeasures Technology Study.

3. (U) FY 1994 PLANS:

a. (U) Continue ONR research opportunities studies and studies related to space technology, and support Naval Hydrodynamics Symposium, Weinblum Memorial Lecture Series, Advanced Technology Chair and TIG.

b. (U) Conduct studies in support of ASN(RDA) and CNO.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Postgraduate School, Monterey, CA; Naval War College, Newport, RI. CONTRACTORS: National Academy of Sciences, Washington, D.C.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R0147 PROJECT TITLE: Operational Strategy and Tactical Effectiveness Analyses

C. (U) DESCRIPTION: This project provides CNO and SECNAV direct analyses of Navy policy, strategy acquisition, and program planning in meeting the following objectives: (a) producing study results impacting upon important programs/issues, (b) identifying and evaluating policy and strategy alternatives and doctrine, and (c) evaluating the capabilities of programmed forces to accomplish missions assigned to the Navy. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations as well as the development and maintenance of databases and models. This project directly supports and is critical for conducting the Navy's joint mission assessments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Addressed Navy program planning issues important to the development of Navy programs for FY 1994 and beyond.

b. (U) Conducted analyses to improve the effectiveness of current weapon systems, help decision makers to select realistic, more effective new systems and continue development of resources to readiness measurement.

c. (U) Continued developing and maintaining readiness models, an econometric data base and a campaign analysis model to support Joint Chief of Staff (JCS) assessment analyses.

d. (U) Developed and enhanced the Integrated Program Assessment System (IPAS).

2. (U) FY 1993 PROGRAM:

a. (U) Continue efforts to conduct studies and perform analysis evaluating concepts and strategies, defining requirements, assessing capabilities, reviewing program alternatives and analyzing program and planning issues.

b. (U) Update the Capabilities Resource Allocation Display (CAPRAD) Database and the IPAS.

c. (U) Support the Integrated Theater Engagement Model (ITEM), a model developed jointly with the Defense Nuclear Agency for analyses of Navy, Air Force, Army and Marine Corps Systems and platforms.

3. (U) FY 1994 PLANS: Continual reviews of the CAPRAD Database will be conducted and econometric/statistical analyses will be performed on the impact of changes, resulting in part from the restructuring of the Operation and Maintenance Appropriations. Plans also include making changes and revalidating the IPAS and other readiness models in order to run these programs under the revised allocation display. On-site training, analysis and enhancements to ITEM are planned.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD. CONTRACTORS: MATHTECH, Inc., Princeton, NJ.

F. (U) RELATED ACTIVITIES: PE 0605873M, Marine Corps Program Wide Manpower System; PE 0605154N, Center for Naval Analyses.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R2040 PROJECT TITLE: Foreign Ship & Submarine Vulnerability Program

C. (U) DESCRIPTION: This project assesses effectiveness of U.S. Navy weapons against potential foreign threat ships and submarines. It develops and upgrades analytical methods and models for evaluating weapon lethality against potential targets and for predicting threat ship/submarine vulnerability. It provides information needed for warhead design during acquisition processes, in-service weapon upgrades, weapon loadout requirements, and for tactical applications of weapons.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed target descriptions (TDs) for

b. (U) Completed terminal weapon effectiveness assessment (TWEA) for

c. (U) Updated ASW Warhead Effectiveness Compendium (ASWWEC).

2. (U) FY 1993 PROGRAM:

a. (U) Develop TDs for

b. (U) Develop TWEAs for

3. (U) FY 1994 PLANS:

a. (U) Develop TDs for

b. (U) Develop TWEAs for

c. (U) Update ASWWEC.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN WHITE OAK DET, Silver Spring, MD; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: L2097 PROJECT TITLE: Manpower, Personnel, and Training Studies Support

C. (U) DESCRIPTION: The Chief of Naval Personnel has an ongoing need for direct analyses of Navy manpower, personnel, and training (MPT) policies and program planning. This project provides an essential management tool to: (a) assess the effectiveness of existing MPT programs, (b) identify needs for new programs, (c) determine required manpower and training mix relative to changing strategic and geopolitical factors, and (d) study the impact of MPT programs on Navy accession, retention, and performance. The program permits OPNAV to more effectively utilize MPT Research and Development expertise to respond to emerging MPT problems beyond Navy's control.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Studied and validated Hospitalman "A" School entry criteria.

b. (U) Performed analysis on Delayed Entry Pool (DEP) attrition by demographic category.

c. (U) Studied relationship of accession source to retention/performance of Navy officers.

d. (U) Developed computerized software system to identify officer candidates for hard-to-fill billet assignments.

2. (U) FY 1993 PROGRAM:

a. (U) Assess utilization/cost of transferring pregnant women from ships.

b. (U) Study and analyze issues relative to force downsizing.

3. (U) FY 1994 PLANS:

a. (U) Assess policies and procedures relative to manpower distribution and training.

b. (U) Examine emergent job market and educational preparation factors affecting accession/retention of top Navy performers.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NTSC, Orlando, FL; NPRDC, San Diego, CA; NAVPGSCOL, Monterey, CA; USNA, Annapolis, MD; NCCOSC RDTE DIV, San Diego, CA; NRL, Washington, DC. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Elements: 0603707N, Manpower, Personnel, and Training Advanced Technology Development; 0604703N, Manpower, Personnel, Training, Simulation and Human Factors; 0602234N, Materials, Electronics and Computer Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: W2092 PROJECT TITLE: Naval Aviation Studies

C. (U) DESCRIPTION: This project supports studies over a wide range of Naval aviation issues as a basis for recommendations to the CNO concerning major policy, planning, and acquisition program decisions. This effort is a management initiative which will allow accounting and allocation of study resources in a timely manner according to priorities. This ongoing program will continue to leverage more detailed program specific analysis in order to gain insight into acquisition of various weapon systems and their impact on force structure, manning levels, operational readiness and carrier air wing (CVW) effectiveness.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed analysis of missile speed and energy requirements using two variants of Advanced Medium Range Air-to-Air Missile and three variants of Air-to-Air Missile.
b. (U) Completed study on Fleet Air Defense with changing world threat and multiple CVW mixes.
c. (U) Completed initial work on threat penetrator analysis for parametric Radar Cross Section (RCS) and speeds.

2. (U) FY 1993 PROGRAM:
a. (U) Continue study to quantify the benefits of enhanced situational awareness through aircraft-aircraft data transfer commencing with high fidelity simulation.
b. (U) Initiate study of hypothetical future Tactical Aircraft (TACAIR) mix to identify critical mission systems and determine impact of weapons procurement decisions on future CVW operational readiness.
c. (U) Initiate study of medium and long range air-to-air missile requirements for postulated aircraft mix versus next generation of tactical threat aircraft.
d. (U) Initiate analysis of Strike Mission Planning options for F-18 E/F and Strike F-14 TACAIR mix in a deployed Carrier Battle Group (CVBG).
e. (U) Pursue active role to ensure all joint aviation analyses consider CVW and CVBG employment.

3. (U) FY 1994 PLANS:
a. (U) Continue studies on next generation air-to-air missile requirements to meet developing threats and new technologies.
b. (U) Continue CVW critical mission system analysis.
c. (U) Initiate Battle Group (BG)/Maritime Action group (MAG) airborne targeting system effectiveness analysis.
d. (U) Define system requirements for Naval aircraft in support of BG/MAG and CVBG operations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVAIRWARCENACDIV, Patuxent, MD. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0031	MCOAG, CNA	4,156*	4,521	4,607	CONT.	CONT.
R0148	Center for Naval Analyses, Navy	24,321**	38,657	38,653	CONT.	CONT.
	TOTAL	28,477	43,178	43,260	CONT.	CONT.

*Project previously funded (FY 1992 and prior) under P.E. 0605153M. Consolidation executed in compliance with Congressional direction.

**Additional CNA funding provided under 0605155N and 0605856N for FY 1992 only. Incorporated execution in compliance with Congressional direction to consolidate CNA funding under a single P.E. beginning in FY 1993.

B. (U) DESCRIPTION: The Center for Naval Analyses (CNA) is the Department of the Navy's (DON) only Federally Funded Research and Development Center (FFRDC). CNA provides independent, objective, and expert analyses based on its unique access to sensitive data and the hands-on exposure to fleet operations gained through its world-wide field program. CNA's continuing program of research is primarily concentrated along 14 categories of study called product areas. These product areas are structured to enhance CNA's focus of applied research and analysis upon the major present and future needs and issues of the Navy and the Marine Corps. Because of rapid advances in technology, changes in the fleet, the increasing complexity of weapon systems, and future reductions in manpower, force structure, and budgets, the Navy and Marine Corps have a greater need for analyses that are both sophisticated and timely, and can only be effectively produced by the DON's FFRDC. CNA is uniquely qualified to meet that need.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses
PROJECT NUMBER: C0031 PROJECT TITLE: Marine Corps Operations Analysis Group

C. (U) DESCRIPTION: This program supports the Marine Corps' portion of the CNA Research Program under the auspices of the DON Annual Study and Analysis Plan for CNA. It is managed as an element of the Marine Corps Studies System (MCSS). This program provides independent research and analysis, those appropriate for an FFRDC, in areas of cost and operational effectiveness analysis (COEA), manpower utilization, training, force structure, weapons systems analysis, operational tests, and field exercise support. This program also provides CNA field representative and scientific analyst support at major Marine Corps commands.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Initiated 90% (35 of 39) of the approved Marine Corps FY 92 studies and analyses programmed for CNA.
b. (U) Staffed 5 of the 6 Field Representative and 7 Scientific Analyst billets in support of major Marine Corps commands.
c. (U) Funded continuation of 11 FY 91 study and analysis initiatives.
d. (U) Completed 28 study and analysis projects including the Advanced Amphibious Assault Program COEA Update, Marine Corps Portable Avionics Test Set, Simulation Offset to Live-Fire Training, Job Performance Measures, and the Analysis of Alternative Maritime Prepositioning Force (MPF) Maintenance Cycle Sites.

2. (U) FY 1993 PROGRAM:
a. (U) Execute the approved portion of the DON's FY 93 Study and Analysis Plan for CNA including "Quick Response" study and analysis requirements. Initiate 4 new study and analysis efforts, 6 Quick Response study and analysis efforts, and provide on-site analytical support to Marine Forces participating in Operation Restore Hope.
b. (U) Staffing of 6 Field Representatives and 7 Scientific Analysts.
c. (U) Continuation of 7 FY 92 study and analysis projects.

3. (U) FY 1994 PLANS:
a. (U) Execute the approved portion of the DON's FY 94 Study and Analysis Plan for CNA including "Quick Response" study and analysis requirements.
b. (U) Staffing of 6 Field Representatives and 7 Scientific Analysts.
c. (U) Continuation of 10 FY 93 study and analysis projects.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Not applicable. CONTRACTOR: CNA, Alexandria, VA.

F. (U) RELATED ACTIVITIES: Program Element 0605151M, Studies and Analysis, Marine Corps, Project C0030 - Studies and Analysis in FY 1992 and 1993. Funds moved to P.E. 0605873M, Marine Corps Program Wide Manpower System, Project C0030 - Marine Corps Studies and Analysis in FY 1994.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses
PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0148	Center for Naval Analyses, Navy	24,321	38,657	38,653	CONT.	CONT.

B. (U) DESCRIPTION: CNA conducts a wide range of projects that provide two fundamental services to the Navy: (1) on-site analyses for unified, specified, or fleet commanders to improve tactics and readiness of existing forces, and (2) analyses for Navy headquarters decision-makers with responsibility for systems acquisition, program planning and budgeting, and manpower management. CNA's studies and analysis capabilities cover a broad range of research areas, including: (a) system testing and fleet employment; (b) warfare capability assessment; (c) strategy, plans, and operations; (d) readiness and sustainability; (e) logistics; (f) warfare modeling; (g) manpower and training; (h) system evaluation and acquisition; (i) resource management; (j) technology assessment; (k) methodology development; (l) tactical development and evaluation; (m) operational testing and evaluation; and, (n) COEA for acquisition milestones. This broad range of analysis is primarily financed in this program element for that effort which is fundamental to maintaining the basic CNA analytic capabilities. CNA's analyses have resulted in substantial improvements in fleet effectiveness and significant cost avoidance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: In addition to the research areas noted above, CNA continued efforts to address concerns of Congress and respond to legislation in areas such as net assessment, operational test and evaluation, and warfare area appraisals, master plans, and investment strategies, as well as specific acquisition issues addressed by COEAs. Some specific examples of research areas were:

a. (U) Developed and applied methodology in support of master plans and investment strategies that allow clear rationale and justification for specific programs, budgets, schedules and quantities, and that provide basis for establishing funding priorities.

b. (U) Developed and refined criteria for use in selecting research and development programs to ensure that these programs are affordable, technically feasible, appropriate to projected threats, and consistent with sound operational and tactical principles.

c. (U) Performed evaluations of new systems during operational testing to ensure that scarce procurement funds are spent on programs that will perform as required.

d. (U) Developed and applied improved techniques for assessing the combat effectiveness of proposed weapon systems and for evaluating methods of improving fleet readiness and sustainability within budget constraints.

e. (U) Performed analysis and assessments of military compensation policy, training (including force structure and training requirements), retraining, and cost-effective medical care in the face of a declining force and manpower pool.

f. (U) Provided an independent objective forum through which the senior leadership of the Department of the Navy can benefit from expert non-governmental advice on complex and contentious issues.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy
PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

g. (U) Conducted COEAs on major acquisition programs.

h. (U) Developed Desert Shield/Desert Storm Operations Lessons Learned.

2. (U) FY 1993 PROGRAM: Address issues of major importance to the Navy's leadership in the research areas noted above. CNA's research program is planned in broad outline on an annual basis, and continually updated to identify specific and emerging requirement studies to be conducted. The frequent review of CNA's program ensures that it is coordinated with other Navy research and that it addresses critical, high-priority issues requiring CNA's innovative and objective approach. In the current and future budgetary climate the Navy must rely even more on CNA in its effort to maximize effectiveness from available resources.

3. (U) FY 1994 PLANS: CNA's research program will be continually updated to ensure CNA's research and studies support the Navy efficiently and effectively. CNA's analytical support will be critical to Navy's transition to smaller budgets in a shifting national security environment. CNA's program will place greater emphasis on COEA's, tactical training, naval environmental issues, infrastructure, maritime contributions to joint operations, roles and missions of Navy, role of Naval Reserve, mine warfare, and efficiencies in readiness, logistics, and manpower.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Not applicable. CONTRACTOR: The Center for Naval Analyses, Alexandria, VA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605155N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation
PROJECT NUMBER: R0151 PROJECT TITLE: Intertype Tactical Development and Evaluation (TAC D&E)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0151	Intertype TAC D&E	15,338 *	3,337	4,456	CONT.	CONT.

* Project previously supported (FY 1992 and prior) Center for Naval Analysis work. Consolidated with PE 0605154N in FY 1993 and out.

B. (U) DESCRIPTION: This Program Element supports all naval warfare task areas and provides technical and analytical support to develop and evaluate tactics for application in various mixes of force structures and weapon systems, including newly introduced systems, in various threat scenarios and directly add to warfighting effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: With analysis support provided by this program, Fleet commanders developed new tactics for:

a. (U) Anti-Air Warfare, Anti-Submarine Warfare, Anti-Surface Warfare, Strike Warfare, Mine Warfare and Amphibious Warfare.
b. (U) Refined Tactical Decision Aids and Fleet Mission Program Library (FMPL) software for desk-top and hand-held computers.
c. (U) Developed Navy Lessons Learned System to include Compact Disc-Read Only Memory.

2. (U) FY 1993 PROGRAM: Develop new and/or advanced tactics to include (but not limited to):

a. (U) Helicopter Counter-Targeting/Anti-Ship Missile Defense.
b. (U) Counter mine warfare.
c. (U) Anti-Air Warfare in a multi-carrier battle group.
d. (U) Joint USN/USAF High Value Unit protection.
e. (U) Non-Nuclear submarines in shallow water.
f. (U) Multi-Ship Quick Reaction Combat Capability.

3. (U) FY 1994 PLANS: As determined by the TAC D&E Steering Committee, continue near-term efforts to correct tactical deficiencies identified through Fleet operations and exercises.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD; COMOPTEVFOR, Norfolk, VA; various Naval laboratories. CONTRACTORS: DELEX, Inc., Tyson's Corner, VA; OMNI Analysis Inc., Norfolk, VA; Analysis and Technology, Stonington, CT; Summit Research Corp, Gaithersburg, MD.

E. (U) RELATED ACTIVITIES: Program Element 0603711N, Fleet Tactical Development and Evaluation Support.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605804N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Technical Information Services
PROJECT NUMBER: R0835 PROJECT TITLE: Technical Information Services

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0835	Technical Information Services	11,609	14,018	10,273	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for controlled access to, and exchange of, technical information by Navy/DoD components and present/potential contractors; consolidates Navy funding to support the Defense Technical Information Center (DTIC) and Information Analysis Centers (IACs); funds the Navy Acquisition Research and Development Center (NARDIC); and supports transfer of Navy technology to business and local governments for civil use (Public Law 96-480, Federal Technology Transfer Act of 1986) through Navy technology publications, Offices of Research and Technology Applications (ORTAs), and promotion of Cooperative Research and Development Agreements (CRADAs).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Funded Navy share of DTIC and IAC services and products.
b. (U) Initiated studies of technology transfer training; developed Navy CRADA guidance; and sponsored laboratory/industry technology transfer meeting.
c. (U) Completed industry Independent Research and Development (IR&D) database CD-ROM demonstration; developed IR&D guidelines for DoD/information exchange; and conducted foreign company site visit.

2. (U) FY 1993 PROGRAM:

a. (U) Oversee Navy funding of DTIC/IACs services; expand input to DTIC and NARDIC; promote use in IR&D program formulation; and support IR&D plan distribution on CD-ROM.
b. (U) Initiate demonstration technology transfer marketing projects; develop and publish second edition of CRADA handbook; fund major laboratory ORTA activities; set up technology transfer gateway systems, establish electronic bulletin board; and initiate technology transfer training.
c. (U) Provide start-up funding for the Advanced Technical Information Support System.

3. (U) FY 1994 PLANS:

a. (U) Coordinate IR&D technical information exchange between the Naval Research Laboratory/Warfare Centers and industry; support production/distribute IR&D plans/projects on CD-ROMs to Naval Research Laboratory/Warfare Centers; promote use of IR&D information in Navy program formulation.
b. (U) Increase joint efforts with other agencies for regional/national technology transfer; coordinate technology transfer training for various levels in-house and publicize to industry.
c. (U) Publicize NARDIC; solicit Navy requirements documents and technical reports to NARDIC and DTIC; expand FACT SHEET content, readership; and oversee Navy share of funding for DTIC/IAC services.
d. (U) Oversee Navy funding for Federal Laboratory Consortium.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605804N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Technical Information Services
PROJECT NUMBER: R0835 PROJECT TITLE: Technical Information Servic

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0115	Supreme Allied Commander Atlantic ASW Research Center (SACLANTCEN)	297 *	322 *	307	CONT.	CONT.
R0149	International Cooperative RDT&E	1,208 *	990 *	1,425	CONT.	CONT.
R0231	ASW System Support	4,092	2,656	3,576	CONT.	CONT.
R0905	Naval Warfare Tactical Analysis	3,382	2,560	3,385	CONT.	CONT.
R1767	NWC Center for Naval Warfare Studies	1,425	1,459	1,254	CONT.	CONT.
R2146	Scientist/Engineer Exchange Program (SEEP)	0 **	0 **	903	CONT.	CONT.
X1795	C3CM Decision Aid System	2,568	2,278	1,937	CONT.	CONT.
	TOTAL	12,972	10,265	12,787	CONT.	CONT.

* R0115, R0149 and R2146 Restructured from PE 0605857N
** Funded in R0149

B. (U) DESCRIPTION: This program provides analytical and management support to the Planning and Programming segments of the Planning, Programming and Budgeting System. Project R0115 provides for the salaries and administrative cost to maintain the U.S. scientific staff assigned to the Supreme Allied Commander Atlantic, Undersea Research Centre (SACLANTCEN), La Spezia, Italy. Additionally, it supports collaboration between U.S./SACLANTCEN scientists, the lease/loan of equipment, and the purchase of expendables to support the Center's scientific program.

(U) Project R0149 provides program management, execution, and support to implement a broad range of cooperative naval R&D initiatives with allied and friendly nations. Program reviews potential cooperative efforts to determine the:

(U) fulfillment of established operational requirements.
(U) enhancement of U.S./allied interoperability and standardization.
(U) utilization of unique foreign technologies.
(U) reduction of U.S. developmental and recurring costs.

(U) Three projects (R0231, R0905, and X1795) support the development of annual joint mission area assessments which provide the analytical underpinnings and basis for programmatic decisions made by Navy's top leadership during the Planning and Programming phases of the PPBS process.

(U) Project R1767 supports activities at the Center for Naval Warfare Studies at the Naval War College.

(U) Under project R2146, selected cooperative programs are fully coordinated with U.S. national programs to ensure mutually supportive action. Such efforts result in the following activities annually:

(U) development and negotiation of approximately 25 international RDT&E Memoranda of Understanding (MOUs) with allied and friendly nations;

(U) management of over 350 information exchange agreements;

(U) management of DoN's Scientist/Engineer Exchange Program (SEEP) involving approximately 40 U.S. and allied personnel; and

(U) participation in DoD directed armaments cooperation, for example Conference of NATO Armaments Directors (CNAD) groups (including the NATO Naval Armaments Group), Senior National Representative (SNR) consultation, and the Technical Cooperation Program (TTCP).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R0115 PROJECT TITLE: Supreme Allied Commander Atlantic ASW Research Centre (SACLANTCEN)

C. (U) DESCRIPTION: This project provides for salary and administrative costs for U.S. Navy scientists at the NATO SACLANTCEN, La Spezia, Italy. It also provides for all U.S. direct support to SACLANTCEN for administering requests for equipment, other assets, services, and to foster collaboration between U.S. and SACLANTCEN scientists. The Centre's unique research facilities and reservoir of oceanographic/acoustic data bases and knowledge are used to augment and complement United States Navy ASW related research.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Supported scientific collaboration in the area of ocean acoustics, ocean/acoustics numerical modeling, and sea floor studies.

b. (U) Provided support to the 1992 Summer Research Assistants Program (funded a U.S. Student).

c. (U) Provided measurement equipment and lab equipment.

d. (U) Supported joint U.S./SACLANTCEN Reverberation Symposium (May 1992).

e. (U) Processed SACLANTCEN/U.S. data taken as part of the Greenland-Iceland-Norwegian Sea Program.

2. (U) FY 1993 PROGRAM: Continue support of scientific collaboration between the U.S. and SACLANTCEN scientists in joint U.S./SACLANTCEN programs. These include programs in Shallow Water acoustics, Mine Countermeasures, and bottom interaction issues of importance to the U.S. Continue to provide hydrophones for use in joint at-sea experiments, support to the SACLANTCEN Summer Research program and provide funds for U.S. Representative and his alternate to Scientific Committee of National Representatives meetings.

3. (U) FY 1994 PLANS: Continue collaboration between the U.S. and SACLANTCEN scientists in the area of shallow water ASW and mine warfare.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS; NRL, Washington, D.C.; NAVUNSEAWARCEN DET, New London, CT; SACLANTCEN, La Spezia, Italy; and NAVSURFWARCENCOASTSYSTA, Panama City, FL. CONTRACTORS: Pennsylvania State University/APL, State College, PA; Lamont-Doherty Geological Observatory, Palisades, NY.

F. (U) RELATED ACTIVITIES: PE 0601153N - Basic Research; PE 0602314N - Undersea Surveillance Weapons Technology; PE 0603207N - Air/Ocean Tactical Applications; PE 0603785N - Combat Systems Oceanographic Performance Assessments.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO SACLANT ASW Research Centre Charter 31 Oct 1962.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R0149 PROJECT TITLE: International Cooperative RDT&E

C. (U) DESCRIPTION: International RDT&E project efforts include: development/negotiation of international MOUs required to implement cooperative research and development projects, management of information and personnel exchange programs, and participation in DoD directed armaments cooperation groups such as Conference of NATO Armaments Directors and The Technical Cooperation Program.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Developed and negotiated over 25 RDT&E cooperative project MOUs and MOU amendments with allied and friendly nations. Concluded AV-8B Harrier II Production and Support MOU with Italy and Spain; a Mechanical Minesweeping MOU with several NATO members; and multilateral MOUs such as Multifunctional Information Distribution System, and NATO Communications Interoperability. Developed and implemented an automated DoD International Agreements System to assist DoD and the other Services in drafting new RDT&E MOUs and to standardize MOU language throughout the Services. Conducted joint reviews of Data Exchange Agreement (DEA) annexes with Australia, Canada, Israel, Sweden, France, Germany, Italy, Japan, The Netherlands, and the UK. Reviewed a total of 237 annexes and revised 108. The Scientist/Engineer Exchange Program (SEEP) funded five DoN engineering assignments to foreign laboratories.

2. (U) FY 1993 PROGRAM: Focus on DoD Critical Technology Plan and Tri-Service Project Reliance efforts to target "high leverage/high payoff" R&D Tech Base cooperative project MOUs. Pursue Command, Control, and Communications (C^3), naval mine warfare, and electronic warfare cooperative project MOUs with key allies and friendly nations. Continue the systematic review of information exchange agreements and make revisions to revitalize DEAs as indicated from prior reviews. Continue to process new DEAs that target new and critical technologies as well as Tri-Service Project Reliance efforts for information exchange. The SEEP will fund the foreign assignments of two engineers/scientists.

3. (U) FY 1994 PLANS: Continue R&D Tech Base MOU targeting efforts and pursuit of C^3, naval mine warfare, and electronic warfare cooperative project MOUs with key allies and friendly nations. Continue to review national programs to determine if international collaboration can lower nonrecurring costs or can exploit innovative technological solutions. Continue to initiate/revise/terminate DEAs to target new technologies and expand, where appropriate, exchanges to include former Eastern Block countries and the Commonwealth of Independent States.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTORS: JIL Systems, Arlington, VA; Booz Allen, Arlington, VA.

F. (U) RELATED ACTIVITIES: PE 0605130D, Foreign Comparative Testing; and PE 0603790D, Nunn Armaments Cooperation.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Effort includes development/negotiation of all DoN R&D international MOUs required to implement cooperative R&D projects. Funding is not project specific.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R0231 PROJECT TITLE: ASW System Support

C. (U) DESCRIPTION: Develops, validates and reviews the Navy's ASW Investment Strategy through the Joint Mission Area Assessment process. Conducts analyses to define ASW requirements, assess ASW programs and performance, and make cost/performance tradeoffs. Supports development of ASW architectures and development, and maintenance of ASW models.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Completed 1992 ASW Master Plan incorporating the requirements for ASW in shallow water and regional conflict.
b. (U) Continued effort on ASW Future Naval Force Requirements Study with emphasis on regional conflict.
c. (U) Continued modification of the ASW weapons model to ensure proper analysis of weapon performance in shallow water.
d. (U) Continued development of ASW Model Maintenance regarding standardization, applicability, and accuracy.
e. (U) Continued effort in design, development and testing of tutorial function for the ASW Tactical Decision Aid.

2. (U) FY 1993 PROGRAM:
a. (U) Support faculty research at U.S. Naval Postgraduate School in areas related to ASW modeling and signal processing.
b. (U) Complete the POM-96 assessment of ASW as defined by Joint Mission Areas through the extensive use of seminar war games.
c. (U) Complete the ASW Future Force Requirements Study.
d. (U) Continue the ASW model maintenance and development initiative.
e. (U) Conduct analysis on third world submarine effectiveness in littoral warfare and determine added value of Low Frequency Active sensors and other developing ASW programs.

3. (U) FY 1994 PLANS:
a. (U) Conduct the annual assessment of Joint Mission Areas as pertains to ASW. The assessment is the analytical basis for the Navy's ASW as well as other warfare area investment decisions.
b. (U) Continue support to Naval Post Graduate School.
c. (U) Continue the ASW model maintenance and development initiative.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVUNSEAWARCENDIV, Newport, RI and NAVUNSEAWARCEN DET, New London, CT. CONTRACTORS: CNA, Alexandria, VA; Johns Hopkins University/APL, Laurel, MD; Systems, Planning and Analysis, Inc., Alexandria, VA; Presearch, Inc., Arlington, VA; MITRE Corp., Fairfax, VA; IDA, Alexandria, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R0905 PROJECT TITLE: Naval Warfare/Tactical Analysis

C. (U) DESCRIPTION: This project provides analytical and management support to the DCNO for Resources, Warfare Requirements, and Assessments for all mission areas, including Littoral, Space and Electronic Warfare (SEW), Strike, Surveillance, Strategic Deterrence, Readiness, Sealift, Manpower and the Navy's Investment Balance Review. Funds are used to conduct continuing analyses of Navy's capabilities and limitations in execution of these missions. The Investment Balance Review integrates and prioritizes all assessment areas.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued major master plan updates for the Mine Warfare (MIW), Anti-Air Warfare (AAW), SEW areas and appraisals for the Amphibious Warfare (AMW), AAW, SEW areas.

b. (U) Initiated MIW data base, mine countermeasures effectiveness model and related analytical efforts.

c. (U) Continued to support OSPREY REINDEER.

2. (U) FY 1993 PROGRAM:

a. (U) Continue to fund joint mission area assessments in the following areas: AAW, AMW, Strike Warfare (STK), SEW (Electronic Warfare, Command, Control, Communications, and Intelligence (C^3I)), MIW, Anti-Surface Warfare (ASUW), Cover and Deception Training.

b. (U) Continue to support OSPREY REINDEER.

3. (U) FY 1994 PLANS:

a. (U) Continue to fund joint mission area assessments in the following areas: AAW, AMW, STK, SEW, MIW, ASUW.

b. (U) Continue to support OSPREY REINDEER.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENCOASTSYSTA, Panama City, FL; NRL, Washington, DC; NRL, Orlando, FL; NAVSURFWARCEN CARDEROCK DIV, Bethesda, MD; COMINEWARCOM, Charleston, SC; NAVAIRWARCENWPNDIV, China Lake, CA. CONTRACTORS: Booz-Allen-Hamilton, Arlington, VA; The Aerospace Corporation, El Segundo, CA; Johns Hopkins/APL, Laurel, MD; Global Associates, Arlington, VA.

F. (U) RELATED ACTIVITIES: Supports all Naval Warfare Areas.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R1767 PROJECT TITLE: NWC Center for Naval Warfare Studies

C. (U) DESCRIPTION: Naval War College research activities serve as a focal point, stimulus, and major source of strategic and campaign thought within the Navy. These efforts generate strategy and campaign alternatives, provide for evaluation through wargaming methodologies, and provide recommendations to the CNO and fleet commanders regarding the formulation and execution of strategy.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Provided continuing support to CNO Strategic Studies Group (SSG) and Center for Naval Warfare Studies (CNWS).

b. (U) Provided analytical and campaign option support in response to CNO, UNIFIED and Fleet CINC taskings in such areas as the employment of joint and naval forces in regional crises, drug interdiction, force structure impact of arms agreements, and global economic/political trends.

c. (U) Conducted Global War Game '92 as part of ongoing series of high level, joint, interagency games to study, develop, and assess strategic and campaign concepts.

2. (U) FY 1993 PROGRAM:

a. (U) Provide continuing support to SSG and CNWS.

b. (U) Continue CNO, UNIFIED and Fleet CINC projects and commence major study efforts in such areas as multi-national cooperation options and joint C3I issues.

c. (U) Conduct Global War Game '93.

3. (U) FY 1994 PLANS:

a. (U) Provide continuing support to SSG and CNWS.

b. (U) Continue CNO, UNIFIED and Fleet CINC projects, such as nuclear arms proliferation and multi-national cooperation options, and commence emergent FY 1994 taskings developed during FY 1993.

c. (U) Conduct Global War Game '94.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval War College, Newport, RI. CONTRACTORS: Sonalysts, Inc., Waterford, CT.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: R2146 PROJECT TITLE: Scientist/Engineer Exchange Program (SEEP)

C. (U) DESCRIPTION: The Scientist/Engineer Exchange Program is a DoD program for the exchange of selected U.S. and foreign scientists and engineers in which the Navy participates. SEEP provides on-site working assignments for qualified DoN military and civilian personnel in allied defense laboratories and for the reciprocal assignment of allied personnel to DoN facilities. The SEEP participants are to determine the availability of foreign technologies to meet DoN requirements or to serve as a basis for cooperative projects.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: The SEEP effort was funded in FY 1992 by project R0149. SEEP funded five DoN engineering assignments to foreign establishments in FY 1992, while over 12 foreign engineers and scientists were assigned to DoN research establishments. SEEP funds only the travel, per diem, and foreign language training costs of DoN participants.

2. (U) FY 1993 PROGRAM: The SEEP effort will be funded in FY 1993 by project R0149. Limited funding will continue to restrict the number of DoN participants in SEEP to approximately two engineers/scientists.

3. (U) FY 1994 PLANS: Increase the number of DoN participants to approximately 10 engineers/scientists who will be targeted toward foreign research facilities that possess critical technologies. Based on the evolution of formal relations, selected SEEP candidates may be considered for exchanges with the former Eastern Block countries and the new Commonwealth of Independent States.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIR, Washington, DC; NAVSEA, Washington, DC; SPAWAR, Washington, DC; NAVAIRWARCENACDIV, Warminster, PA; NCCOSC RDT&E DIV, San Diego, CA; NAVSURFWARCEN, CARDEROCK DIV, Bethesda, MD; NAVSURFWARCENDIV, Port Hueneme, CA; NRL-SSC, Stennis Space Center, MS. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 0605130D, Foreign Comparative Testing; and PE 0603790D, Nunn Armaments Cooperation.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management, Technical and International Support
PROJECT NUMBER: X1795 PROJECT TITLE: Command, Control, and Communications Countermeasures (C^3CM) Decision Aid System

C. (U) DESCRIPTION: The C^3CM Decision Aid project is an all source C^3CM simulation and analysis system that simulates, in fine detail, analytical cases ranging from one-on-one to global operational situations. It supports development of warfare system architectures and Space and Electronic Warfare (SEW) systems through effectiveness trade-off analyses. A key element of the C^3CM Decision Aid System is the Space and Electronic Warfare Simulator (SEWSIM), which is designed for use in assessing effectiveness of current and future SEW systems. Its name was changed from Countermeasure Assessment Simulator (CMAS) to SEWSIM in January 1993. SEWSIM is a discrete event, user-interactive simulation model. The model is used to compute specific SEW-related measures of effectiveness (MOE's). Applications include Investment Balance Reviews, Cost and Operational Effectiveness Analyses (COEAs) and other SEW assessments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Defined and loaded adversary C^3I structure for Major Regional Conflict, East (MRC(E)).
b. (U) Assessed effectiveness of SEW systems in MRC(E) and used results to provide analytical support to multi-warfare analysis, ASUW/Strike Master Plan and SEW appraisals.
c. (U) Updated code, data bases, and documentation.
d. (U) Initiated accreditation of SEWSIM.

2. (U) FY 1993 PROGRAM:
a. (U) Assess effectiveness of SEW systems in Defense Planning Guidance/Joint Chief of Staff (DPG/JCS) Concurrent Scenario to support POM-96 appraisal and multi-warfare analysis.
b. (U) Purchase hardware components for Phase 1 of a 3-phase SEWSIM computer upgrade to achieve increased processing capability.
c. (U) Perform software and database, threat enhancements, and initiate conditional logic research.
d. (U) Complete SEWSIM accreditation process.

3. (U) FY 1994 PLANS:
a. (U) Assess effectiveness of SEW systems in DPG/JCS approved scenario in support of Investment Balance Reviews and Joint Mission Area Assessments. Include the concept of COPERNICUS and alternative implementation approaches.
b. (U) Expand post-processing analysis capabilities.
c. (U) Use algorithms in SEWSIM to support the overall Navy model neckdown strategy and development of a Joint Navy Model.
d. (U) Perform software and database enhancements to enable SEWSIM to maintain pace with platform and system updates and threat enhancements, including the characterization and fusion at each Command/Control (C^2) node.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCCOSC, San Diego, CA; NRL, Washington, DC; NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Technical Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0100	Biomedical Support for Submarine Systems	1,210	1,355	1,154	Cont.	Cont.
R0128	Management and Technical Support, Strategic	8,108*	1,882	1,413	Cont.	Cont.
Z1038	Acoustic and Non-Acoustic Analysis Support	1,327	1,316	1,214	Cont.	Cont
	TOTAL	10,645	4,553	3,781	Cont.	Cont.

*Project previously supported (FY 1992 and prior) Center for Naval Analyses work. Consolidated with P.E. 0605154N in FY 1993 and out.

B. (U) DESCRIPTION:

1. (U) M0100 Biomedical Support for Submarine Systems - Provides biomedical knowledge necessary to increase effectiveness and enhance performance of critical submarine tasks with particular emphasis on development and assessment of improved visual and auditory sonar techniques to improve the operator's ability to detect, track and classify multiple targets. Recent rapid improvements in enemy operational capabilities now require reestablishment of this project to obtain maximum performance from all components of submarine sonar systems.

2. (U) R0128 Management and Technical Support, Strategic - Develops strategic and theater nuclear concepts, determines technology requirements, defines systems and options for strategic deterrence requirements for strategic force survivability, examines reentry system requirements in support of sea-based strategic (nuclear and conventional) deterrent systems, and establishes Navy Deterrent Command, Control and Communications requirements. It includes assessment of future strategic deterrent forces and capabilities, the implications of that deterrence on national security policy, and consequential force requirements and employment policies for deterrent forces. Develops policy recommendations concerning arms control and its effect on Naval forces, both nuclear and conventional. This project provides unique support necessary to produce optimum future naval contributions to conventional and nuclear forces to provide strategic deterrence.

3. (U) Z1038 Acoustic and Non-Acoustic Analysis Support - Provides for research and development of new data collection and analysis techniques in support of sensor and weapons system development; supports development of effective ASW tactics through technical analysis of operational scenarios; provides unique hardware and software development at the Office of Naval Intelligence (ONI).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: M0100 PROJECT TITLE: Biomedical Support for Submarine Sys

C. (U) DESCRIPTION: Provides biomedical knowledge necessary to increase effectiveness and enhance performance of critical submarine tasks with parti emphasis on development and assessment of improved visual and auditory sonar techniques to improve the operator's ability to detect, track and classify multiple targets. Additionally, operator-machine interface and submarine habitability issues are investigated.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Recommended to Naval Sea Systems Comman (NAVSEA) 256 shades of gray resolution for visual displays; reported effectiveness of detection using binaural separation; reported analysis of e detection algorithms for detecting targets; recommended to NAVSEA minimal digitization parameters for delivery of a high quality audio signal to the s operator; produced a single sonar display that fused multiple processing vie the same data; delivered recommendations to NAVSEA on audio alarms, tactical display formatting and symbology, and display abbreviation construction for BSY-2.

2. (U) FY 1993 PROGRAM: Report detection performance with analysis and synthesis by rule; determine effects of filtering spatial frequency componen displayed images on operator performance; deliver to NAVSEA report on sona noise surveys, with discussion of implications for auditory task performance headset selection.

3. (U) FY 1994 PLANS: Report to NAVSEA degradations in audio circuitry BQQ-5 sonar, with recommendations for improvements; demonstrate effectivenes image shading to provide impression of three dimensional (3-D) display for v sonar data; recommend specifications for active noise canceling sonar headse deliver to NAVSEA hardware and performance assessments of real time temporal signal processing techniques; demonstrate effectiveness of non-uniform data scaling techniques to enhance target detection on 256 gray shade displays; provide 1/3 octave filter parameters that improve detection and target manag for specific targets and sea states.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSUBMEDRSCHLAB, New London, CT. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 0603792N, Advanced Technology Transition, R1 Advanced Technology Demonstrations.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: R0128 PROJECT TITLE: Management and Technical Support, Strategic

C. (U) DESCRIPTION: Provide Strategic Force Structure analysis to aid CNO, SECNAV, JCS, and OSD in support of the National Military Strategy. Evaluate strategic force balance, capabilities, and survivability. Assess future needs and develop plans and testing requirements for future systems to meet those needs. Continually improve Strategic Forces to support national policy. Asse the strategic deterrence (conventional and nuclear) forces and capabilities in the Navy.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Examined Strategic Force Structure effectiveness with weapon system and warhead reductions due to Arms Control limitations. Completed the Submarine Ballistic Missile Nuclear (SSBN) sufficiency and security studies. Developed a cost effectiveness methodology determining strategic force mixes. Assessed Strategic Triad survivability. Researched and updated targeting/footprint areas. Completed Strategic Policy Analysis Group (SPAG) and STRATPLAN 2010 studies.

2. (U) FY 1993 PROGRAM: Complete the Future Deterrence Study that provide strategic vision of the Navy's role in deterrence during the 21st century. Assess the strategic deterrence (conventional and nuclear) force structure and capability in the Navy. Support the analyses of programs which enhance strate deterrence. Develop methodology for measuring deterrence capability of weapon and platforms. Commence Trident SSBN employment alternatives study. Assess t impact of Arms Control negotiations and propose a Navy policy that supports a win-win agreement for the Arms Control process.

3. (U) FY 1994 PLANS: Continually evaluate and improve Strategic Force Structure, survivability, targeting, C3 networking, and SSBN deployments. Balance our Force Structure to meet present and future strategic deterrence requirements and analyze regional threats.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA. CONTRACTORS: Academy for Interscience Methodology, Hinsdale, IL; Mitre Corporation, McLean, VA; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; and Argonne National Laboratories, Argonne, IL.

F. (U) RELATED ACTIVITIES: PE 0603311F, Advanced Strategic Missile Systems (technology exchange); PE 0101221N Strategic Submarine and We pons System Support, J0091 Fleet Ballistic Missile Systems, S0004 Trident Submarine System Improvement, and J0951 Trident II; PE 0605864F, Test and Evaluation.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: Z1038 PROJECT TITLE: Acoustic and Non-Acoustic Analysis Support

C. (U) DESCRIPTION: Research and development of new data collection and analysis techniques in support of sensor and weapons system development; supp development of effective ASW tactics and through technical analysis; provides unique hardware and software development at the Office of Naval Intelligence (ONI).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Continued technical analysis of ; research in non-traditional and on site analysis and training . Developed modeling for predictions of active sonar. Implemented a new shallow water propagation loss model for improved measurement exploitation.

2. (U) FY 1993 PROGRAM: Complete Phase I update for frequencies; new modeling for "Re of World" diesel research; develop additional capabilities to track quiet diesels in shallow water; develop processing capabilities for ; additional development of shallow water propaga loss; continue ; develop new FDS data exploitation.

3. (U) FY 1994 PLANS: Develop database systems for customer on-demand access; add processing tools for , refine models, with emphasis on research new signature characterization methods; expand shallow water environmental database and models; refine automatic incorporate exploitation from ; enhan FDS exploitation;

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: ONI, Suitland, MD; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NCCOSC RDTE DIV, San Diego, CA; and NAVUNSEAWARCE DET, New London, CT. CONTRACTORS: Applied Physics Laboratory/University of Washington; and Planning Systems Inc., Sunnyvale, CA.

F. (U) RELATED ACTIVITIES: PE 0604784N, Distributed Surveillance Systems; PE 0204311N Integrated Surveillance System, X0766 Integrated Underwater Surveillance System Detection/Classification Systems, and X0758 Surveillance Towed Array Sensor System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	ONR Science and Technology Management	49,332	54,380	51,307	CONT.	CONT.
R1855	Science/Engineering Training Support	528	622	456	CONT.	CONT.
M0104	NAVMED Management Support	6,699	7,601	7,913	CONT.	CONT.
X0832	Central Management Support	1,372	1,685	1,091	CONT.	CONT.
	TOTAL	57,931	64,288	60,767	CONT.	CONT.

B. (U) DESCRIPTION: This program supports the Office of Naval Research (ONR), small non-overhead distributing Navy R&D activities, and medical research laboratories. It pays salaries, rent, utilities, printing, supplies, materials, and other day-to-day costs that are necessary to support these Navy activities that administer and execute the Navy's R&D program. The vast majority of these costs are fixed costs which primarily support scientists and engineers working on the Navy Science and Technology Program. For overhead distributing activities, this program covers costs not chargeable to overhead or to customers such as base closure and severance pay costs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135 PROJECT TITLE: ONR Science and Technology Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	ONR Science and Technology Management	49,332	54,380	51,307	CONT.	CONT.

B. (U) DESCRIPTION: This project supports ONR management and direction for the entire Navy Science and Technology program. ONR sponsors scientific advances which benefit all Navy mission areas, including anti-submarine warfare and anti-air warfare, and supports the fleet's ability to operate from a position of technological superiority. Functions performed include: (1) scientific and technical direction of the nationwide Category 6.1 basic research program with colleges, universities, and Navy laboratory and warfare centers; (2) scientific and technical direction of the 6.2 exploratory development program through the Navy's R&D laboratory and warfare centers; (3) management and formulation of the Navy advanced technology development program (Category 6.3A); (4) management, resource formulation, program assessment, and contract negotiation/administration of the entire Navy basic research and exploratory development program; (5) program management and administrative support to selected research programs of Strategic Defense Initiative Office (SDIO), Defense Advanced Research Projects Agency (DARPA), Chief of Naval Operations (CNO), and Small Business Innovative Research (SBIR); and (6) coordination of the Navy's Technology Base program within the context of total DoD/Government (e.g., National Science Foundation, National Academy of Sciences) R&D initiatives in order to obtain maximum scientific advances. This project funds salaries, rent, utilities, supplies, and other fixed costs at ONR Headquarters and field offices.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS: The project provided for basic costs of the ONR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it paid salaries of scientific and engineering personnel who directed the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2), and advanced technology development (Category 6.3A) programs at the nation's universities/colleges, Navy laboratories, and private industry. In addition to its Navy Science and Technology mission, ONR provides important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project are fixed costs, such as salaries, building rent, communications, etc. The project continued to provide support for the ONR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135 PROJECT TITLE: ONR Science and Technology Management

2. (U) FY 1993 PROGRAM: The project will continue to provide for basic costs of the ONR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it pays salaries of scientific and engineering personnel who direct the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2), and advanced technology development (Category 6.3A) programs at the nation's universities/colleges, Navy laboratories, and private industry. In addition to its Navy Science and Technology mission, ONR provides important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project are fixed costs, such as salaries, building rent, communications, etc. The project will continue to provide support for the ONR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

3. (U) FY 1994 PLANS: The project will continue to provide for basic costs of the ONR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it will pay the salaries of scientific and engineering personnel who direct the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2), and advanced technology development (Category 6.3A) programs at the nation's universities/colleges, Navy laboratories, and private industry. In addition to its Navy Science and Technology mission, ONR will provide important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project will be fixed costs, such as salaries, building rent, communications, etc. The project will continue to provide support for the ONR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: ONR, Arlington, VA; ONREUR, London, England; ONRASIA, Tokyo, Japan; ONRDET Boston, MA; and ONRDET Bay St. Louis, MS. CONTRACTORS: Not applicable.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1 (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0605862N, RDT&E,N Instrumentation Modernization, which funds investment items for the activities covered in this program element.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: R1855 PROJECT TITLE: Science/Engineering Training Support

C. (U) DESCRIPTION: Project provides funds for long term professional education and training for Navy civilian scientists and engineers to maintain and update essential skills and develop new expertise as needed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Provided long-term professional training and education to 60 persons.

2. (U) FY 1993 PROGRAM: Provide long-term professional training and education for about 60 persons with increased fiscal support provided per person.

3. (U) FY 1994 PLANS: Provide long-term professional training and education for about 55 persons.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS. Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: X0832 PROJECT TITLE: Central Management Support

C. (U) DESCRIPTION: This project supports centrally managed inter-warfare center and corporate laboratory projects such as the Federation of Systems Analysis Directors (FOSAD), support for corporate video teleconferencing (VTC), joint planning, and other emerging issues which cut across the Navy Warfare Centers and Corporate Laboratory. This project is managed by the Navy Laboratory/Center Coordinating Group (NLCCG). Funds will be used for the oversight and support of system evaluations and concept investigations, planning for cross warfare center/laboratory VTC, maintenance and expansion of corporate databases and historical archives, support of multiple user test site issues, preparation and review of the Navy's RDT&E Management Briefs, and reports on corporate issues involving capital investment planning, technical program structure and business plans.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Provided oversight and support to the centrally managed intercenter/laboratory projectss. For example:

a. (U) Coordinated ongoing development of VTC services among the Warfare Centers and Naval Research Laboratory.

b. (U) Completed development of processes to recommend and prioritize advanced concepts.

c. (U) Former Director Navy of Laboratories corporate initiatives, databases and historical archives expanded to include all NLCCG organizations.

d. (U) Corporate contractual vehicles for structural analyses secured and maintained.

e. (U) Collected, reviewed, published, and distributed the RDT&E Management Briefs.

2. (U) FY 1993 PROGRAM: Continue to provide support as described above.

3. (U) FY 1994 PLANS: Provide oversight and support of system evaluations and concept investigations, planning for cross warfare center/laboratory VTC, maintenance and expansion of corporate data bases and historical archives, support of multiple user test site issues, preparation and review of the Navy's RDT&E Management Briefs, and reports on corporate issues involving capital investment planning, technical program structure and business plans.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVSURFWARCENDIV, Dahlgren, VA; NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVUNSEAWARCENDIV, Newport, RI; NCCOSC RDTE DIV, San Diego, CA; and NRL, Washington, D.C. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY:
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: M0104 PROJECT TITLE: NAVMED Management Support

C. (U) DESCRIPTION: This project supports certain program-wide management and operational costs at the Naval Medical Research and Development Command and specified Naval Medical Research Laboratories that do not distribute overhead. Funds are used for general administrative expenses including salaries of support personnel, centralized technical services, common support costs under host-tenant agreements, routine maintenance and repair of buildings and costs of laboratory support provided by other agencies/commands.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Provided management support for operations at Naval Medical Research and Development Command Headquarters, three in-house laboratories and two detachments.

2. (U) FY 1993 PROGRAM: Continue to provide support as described above.

3. (U) FY 1994 PLANS: Provide management support for operations at Naval Medical Research and Development Command Headquarters, three in-house laboratories and two detachments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVMEDDRSCHDEVCOM, Bethesda, MD; NAVDENRSCHINSTITUTE, Great Lakes, IL; NAVMEDRSCHU No. 2, Manila, RP; NAVMEDRSCHU No. 3, Cairo, EG; NAVMEDRSCHU No. 2 Detachment, Jakarta, ID; NAVMEDRSCHINSTITUTE Detachment, Lima, PE. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 0605862N, RDT&E,N Instrumentatio Modernization, funds investment items and general purpose equipment for activities supported by this program element.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION

A. RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0137	ONR Science & Technology Instrumentation Modernization	1,981	4,981	618	CONT.	CONT.
M0105	NAVMED Instrumentation and Material Support	3,852	5,988	3,946	CONT.	CONT.
S0353	NAVSEA Instrumentation and Material Support	1,167	1,305	901	CONT.	CONT.
W0566	NAVAIR Instrumentation and Material Support	2,087	2,631	1,282	CONT.	CONT.
X0799	SPAWAR Material Support	39	318	238	CONT.	CONT.
X0833	Instrumentation & Material Support	338	1,320	0	0	17,953
S1957	Large Cavitation Channel	5,460	5,397	31,826	0	120,000
I .149	NPRDC Instrumentation Modernization	**	345	608	CONT.	CONT.
	TOTAL	14,924	22,285	39,419	CONT.	CONT.

** Funded in Project R0137 in FY 1992

B. (U) DESCRIPTION: This program element funds investment costs at certain Navy research, development, test, and evaluation laboratories and facilities. These laboratories and other facilities are involved in diverse activities such as: medical research including research of new methods of combat casualty care; energy conservation; weapons testing; personnel related research and development; and a number of other programs. This program provides for research equipment in support of multiple program requirements at the Medical Research laboratories, funds the Large Cavitation Channel (LCC) facility and supports the Office of Naval Research (ONR) headquarters and field offices/detachments.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: R0137 PROJECT TITLE: ONR S&T INSTRUMENTATION MODERNIZATION

C. (U) DESCRIPTION: This project purchases ADP and general support equipment for the Office of Naval Research (ONR) headquarters and field offices/detachments. In FY's 92 and 93, this project also provided for the acquisition and installation of essential general purpose research equipment at Naval Research Laboratory, Stennis Space Center (NRLSSC formerly NOARL) for oceanographic, marine geosciences, acoustic, and atmospheric research and development programs. NRLSSC equipment will be purchased out of the defense business operation fund beginning in FY 94.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Purchased ADP and general support equipment for ONR headquarters and field offices/detachments.

b. (U) NRLSSC obtained research equipment to support RDT&E,N efforts:

(1) (U) Marine Geosciences with purchase of the In Situ Sediment Acoustic Measurement System (ISSAMS) to measure compressional and shear wave velocity and attenuation in surficial sediments required to improve the predictability of the environment in which most Navy systems operated; and with the Mapping, Charting, and Geodesy Computer Systems Upgrade to provide state-of-the-art product development and optimization for enhanced data processing and analysis.

(2) (U) Ocean acoustic measurements with the completion of the NRL Digital Acquisition Buoy System (NDABS) to provide a versatile acoustic data acquisition system with quick response and cost efficiency.

(3) (U) Atmospheric Science with acquisition of a Large Scale Computer (LSC) Desktop Workstation System required to conduct research and development on the Navy's Class VII LSC and to deliver operational prediction models.

2. (U) FY 1993 PROGRAM:

a. (U) Will purchase ADP and general support equipment for ONR headquarters and field offices/detachments.

b. (U) NRLSSC will purchase research equipment to support oceanography, marine geosciences, acoustics, and atmospheric science programs which will include data processing systems, at-sea acoustic measurement equipment, and laboratory research equipment. Some of the major purchases will be the Towed Array Signal Processing System, a Multiplexed Hydrophone Array for acoustic measurement, a Computer System Expansion for satellite research, a Multispectral Image Processing System for remote sensing, and the completion of the Low Frequency Sidescan System.

3. (U) FY 1994 PLANS: Will purchase ADP and general support equipment for ONR headquarters and field offices/detachments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRLSSC, Stennis Space Center, MS and Monterey, CA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: PE 0605861N (RDT&E,N Science and Technology Management Support), and Navy R&D science and technology programs.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: M0105 PROJECT TITLE: NAVMED INSTRUMENTATION & MATERIAL SUPPORT

C. (U) DESCRIPTION: This project funds the procurement of new and replacement general purpose analytical and research support equipment, minor construction, alterations, equipment installation, and first destination transportation cost of newly purchased equipment for the Naval Medical Research and Development Command Headquarters, eight Medical Research laboratories and three detachments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Provided support for repairs of laboratory spaces and improvements to aging facilities. Made progress toward DDR&E directed goal in meeting American Association for Accreditation of Laboratory Animal Care standards.
b. (U) Provided new technology analytical instrumentation and replacement of obsolete research equipment.

2. (U) FY 1993 PROGRAM: Continue to provide support as described above.

3. (U) FY 1994 PLANS:
a. (U) Provide support for repairs of laboratory spaces and improvements to aging facilities.
b. (U) Provide new technology analytical instrumentation and replacement of obsolete research equipment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHDEVCOM, Bethesda, MD; NAVAEROMEDRSCHLAB, Pensacola, FL; NAVBIODYNLAB New Orleans, LA; NAVDENRSCHINSTITUTE Great Lakes, IL; NAVHLTHRSCHCEN San Diego, CA; NAVMEDRSCHINSTITUTE Bethesda, MD; NAVSUBMEDRSCHLAB New London, CT; NAVMEDRSCHU TWO, Jakarta, ID; NAVMEDRSCHU THREE, Cairo, EG; NAVMEDRSCHU TWO DET, Manila, RP; NAVMEDRSCHINSTITUTE DET, Lima PE; NAVMEDRSCHINSTITUTE TOX DET WPAFB, OH. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 0605861N, RDT&E,N Science and Technology Management Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: S0353 PROJECT TITLE: NAVSEA INSTRUMENTATION AND MATERIAL SUPPORT

C. (U) DESCRIPTION: Funding in this project is used for procurement of needed safety and station equipment; first destination transportation; and the hulk program, providing storage, basic configuration, and maintenance of RDT&E target ships.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Procured engineering support equipment and upgraded production for hardware explosive ordnance disposal publication. Provided technical, maintenance, and management services, and first destination transportation. Identified target ship for conversion for future T&E requirements. Partial conversion of Ex-John Paul Jones is completed; remainder pending weapons systems T&E schedule changes.

2. (U) FY 1993 PROGRAM:

a. (U) Procure and upgrade safety and station equipment and first destination transportation; continue to provide technical, maintenance, and storage management services for T&E hulk pool targets in support of weapons systems testing programs.

3. (U) FY 1994 PLANS:

a. (U) Procure and upgrade safety and station equipment and first destination transportation; continue to provide technical, maintenance and storage management services for T&E hulk pool targets in support of weapons systems testing programs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Pt. Mugu, CA

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: W0566 PROJECT TITLE: NAVAIR INSTRUMENTATION AND MATERIAL SUPPORT

C. (U) DESCRIPTION: This is a continuing project that supports energy conservation and environmental compliance and pollution prevention related projects at the Naval Air Warfare Center and the Naval Undersea Warfare Center Detachment AUTEC, Andros Island, Bahamas. This project also supports instrumentation/equipment and minor construction and alterations at the Naval Air Warfare Center, Weapons Division Detachment (NAVAIRWARCENWPNDIV DET), Albuquerque, NM, formerly the Naval Weapons Evaluation Facility (NWEF).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Provided funding to the Naval Air Warfare Center Aircraft Division, Patuxent River and Trenton and the Naval Air Warfare Center Weapons Division, Point Mugu and China Lake for environmental protection and energy conservation projects.

b. (U) Provided support to the NAVAIRWARCENWPNDIV DET for minor construction and alterations including replacement of wiring in some office spaces, and provided required security improvements and procurement/ replacement of aircraft instrumentation equipment.

2. (U) FY 1993 PROGRAM:

a. (U) Provide funding to continue project requirements including compliant storage equipment and facilities for hazardous waste, repair/replacement of PCB transformers, and removal/replacement of leaky underground storage tanks.

b. (U) Support NAVAIRWARCENWPNDIV DET aircraft instrumentation requirements as the transfer to China Lake continues.

3. (U) FY 1994 PLANS: Environmental compliance and energy conservation are ongoing and will continue as the Navy must comply with all environmental laws, from federal, state, and local agencies. This program provides funding to improve energy conservation at the NAVAIRWARCEN sites.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV DET, Albuquerque, NM; NAVUNSEAWARCEN DET AUTEC, Andros Island, Bahamas; NAVAIRWARCENACDIV, Patuxent River, MD and Trenton, NJ; NAVAIRWARCENWPNDIV, Point Mugu, CA and China Lake, CA. CONTRACTORS: Various small contracts for instrumentation equipment, and environmental/energy projects and equipment.

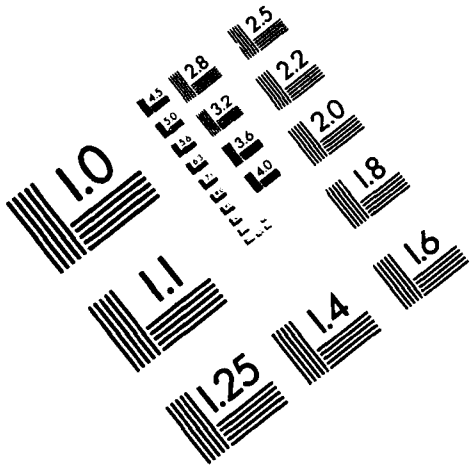
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G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

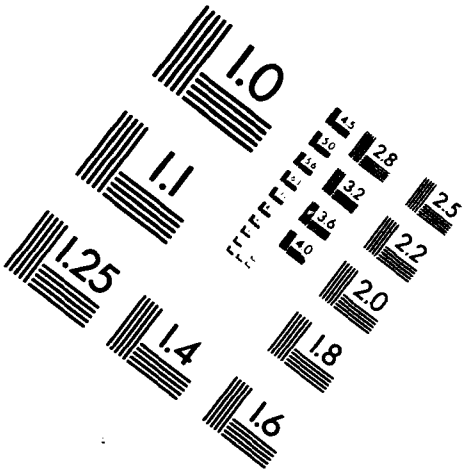
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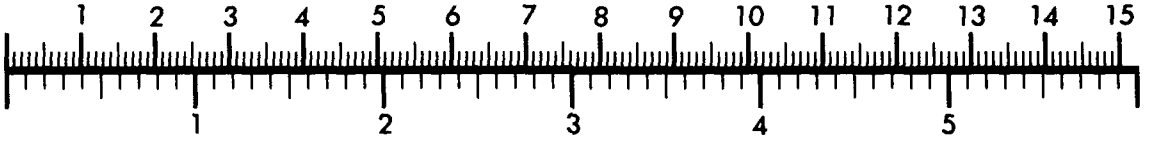




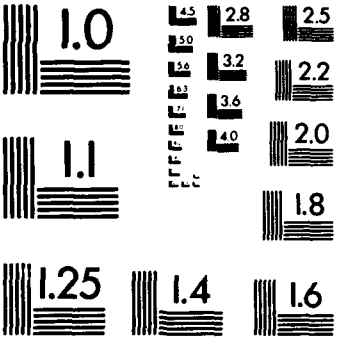
Association for Information and Image Management
1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

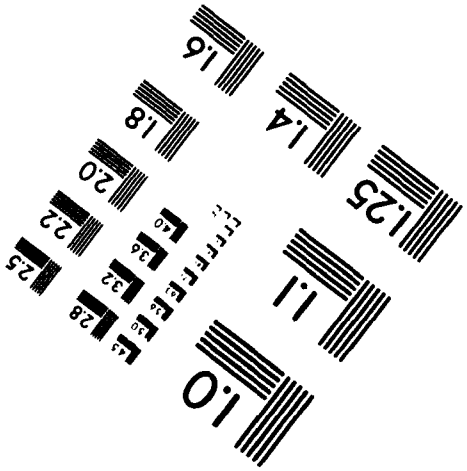


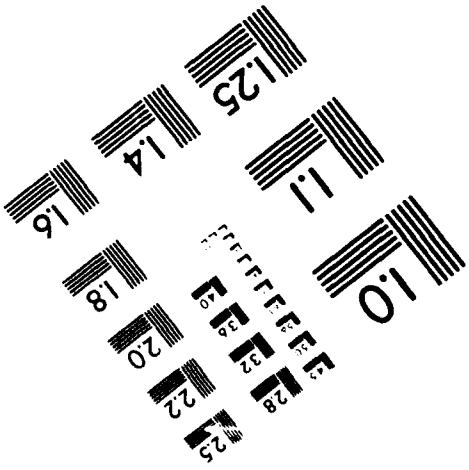
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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: X0799 PROJECT TITLE: SPAWAR MATERIAL SUPPORT

C. (U) DESCRIPTION: This project provides for shipping newly procured research and development material from the manufacturers to the first destination (First Destination Transportation Cost).

D. (U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Provided First Destination Transportation funding as described above.

2. (U) FY 1993 PROGRAM: Provide for First Destination Transportation charges from manufacturer to first destination.

3. (U) FY 1994 PLANS: Provide for First Destination Transportation charges from manufacturer to first destination.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: S1957 PROJECT TITLE: LARGE CAVITATION CHANNEL (LCC)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1957	Large Cavitation Channel	5,460	5,397	31,826	0	120,000

B. (U) DESCRIPTION: This project funds the leasehold contract for the realty and buildings that house the Large Cavitation Channel (LCC) facility operated by the Naval Surface Warfare Center, Carderock Division (NAVSURFWARCEN CARDEROCKDIV). The contract funds the base rent for the facility; supplemental rent for realty improvements; and additional rent for taxes, assessments, and insurance. The LCC is a pressure-controlled water channel similar to a windtunnel used for acoustic and hydrodynamic testing of large scale models of surface ships, submarines, and torpedoes. At present, propellers and other propulsors are tested in cavitation tunnels using small model sizes in the absence of the hull and appendages. In the past, it has been possible to account for the influence of the hull on the model propeller tests by using an extensive background of practical experience. Now, however, high performance hulls, appendages, and propulsors are being designed to meet special requirements, such as reduced noise, reduced vibration, and high efficiency, to which existing data and experience do not apply. Present test techniques have failed to predict or resolve problems of cavitation erosion and vibration and noise problems. These particular failures have increased costs and delayed for a year or more bringing some ships into full service. The cavitation channel will provide the capability to measure the acoustic and hydrodynamic performance of hull, propulsor, and appendages as an integrated package. Thus, model tests in the channel will reliably predict full scale performance, which will enable quieter and more efficient ship designs to be developed while avoiding the above mentioned problems. LCC operations are reimbursably funded through NAVSURFWARCEN CARDEROCKDIV Defense Business Operations Fund.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

   a. (U) Completed channel acquisition contract.
   b. (U) Conducted calibration and "shakedown" tests.
   c. (U) Initiated propeller testing.
   d. (U) Initiated torpedo testing.

2. (U) FY 1993 PROGRAM:

   a. (U) Continue LCC operations and leasehold payments.

3. (U) FY 1994 PLANS:

   a. (U) Continue LCC operations.
   b. (U) Exercise option to buy out LCC, resulting in significant economical cost savings in outyears versus continued annual rental cost of approximately $6M per year. Discounted savings will total $27.6M in the first eight years.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: S1957 PROJECT TITLE: LARGE CAVITATION CHANNEL (LCC)

4. (U) PROGRAM TO COMPLETION: Not Applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD. CONTRACTOR: CBI NA-CON, INC, Memphis, TN.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.
2. (U) Schedule changes: Not applicable.
3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E INSTRUMENTATION MODERNIZATION
PROJECT NUMBER: L2149 PROJECT TITLE: NPRDC INSTRUMENTATION MODERNIZATION

C. (U) DESCRIPTION: Project provides for acquisition and installation of essential general research equipment, minor construction and minor repairs at the Navy Personnel Research and Development Center (NPRDC). Advances in manpower, personnel and training (MPT) technologies require continual upgrades to supporting hardware, laboratory equipment and facilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: (Funded under Project R0137)
   a. (U) Modernized and enhanced research capabilities.
   b. (U) Built facility to process and maintain technical equipment.
   c. (U) Modernized fire protection and plumbing systems in areas housing research equipment and personnel.
   d. (U) Rehabilitated NPRDC research support facilities.

2. (U) FY 1993 PROGRAM:
   a. (U) Upgrade computer processing software and network systems.
   b. (U) Upgrade technical library's storage and retrieval capabilities.
   c. (U) Integrate visual information processing components.
   d. (U) Initiate development of a "virtual reality" research lab.
   e. (U) Complete minor repairs and upgrades to meet habitability and safety requirements.

3. (U) FY 1994 PLANS:
   a. (U) Purchase equipment to create distributed processing systems.
   b. (U) Purchase equipment to meet emerging requirements in research.
   c. (U) Continue development of a "virtual reality" research lab.
   d. (U) Rehabilitate and repair facilities to meet safety, health and efficiency requirements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NPRDC, San Diego, CA.; NCCOSC, San Diego, CA; CONTRACTORS: Public Works Center (PWC), San Diego, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1999	Oceanographic Research Ship Support	14,805	4,331	0	CONT.	CONT.
S0354	RDT&E Ships Support	13,816	21,786	17,971	CONT.	CONT.
W0568	RDT&E Aircraft Flight Hours	10,951	12,066	10,480	CONT.	CONT.
W0569	RDT&E Aircraft Support	46,041	57,160	52,136	CONT.	CONT.

B. (U) DESCRIPTION: This continuing program provides support for ships and platforms required to accommodate Research, Development, Test and Evaluation (RDT&E) of new systems. The RDT&E ships and aircraft inventory is required to adequately test new and improved weapon systems, stay current with the threat, and increase warfighting capability of the fleet. The program provides integrated logistics support of aircraft at selected field activities; provides depot level rework of aircraft, engines, components for the Navy inventory of RDT&E aircraft; and provides support ships and aircraft bailed to contractors for Navy RDT&E projects. Costs covered under this element include aircrew training/proficiency, fuel, supplies, equipment, modification, repair, Aviation Depot Level Repairables, Special Flight Test Instrumentation Pool equipment, overhaul of ships and aircraft, as well as Organizational, Intermediate, and Depot maintenance of ships and aircraft in the Navy RDT&E inventory.

(U) This program element also supports oceanographic research ships which provide services to Navy laboratories, systems commands and Navy funded laboratories for basic research, detailed site and weapon specific investigation and fleet support.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0354	RDT&E Ships Support	13,816	21,786	17,971	CONT.	CONT.

B. (U) DESCRIPTION: This project provides for operation and maintenance of platforms use as Sea Based Test Sites in support of the Navy Research, Development, Test & Evaluation (RDT&E) program. These are USS DOLPHIN (AGSS 555), the Floating Instrumentation Platform (FLIP) and the Oceanographic Research Buoy (ORB). EX-USS DECATUR (DDG-31) is being supported by this line as the Self-Defense Test Ship (SDTS). Testing aboard these platforms reduces the number of fleet units required to support RDT&E efforts. The SDTS provides the capability of testing self defense weapon systems to within their minimum ranges. A major cost of the project is regularly scheduled ship overhauls. The USS DOLPHIN will undergo a regular overhaul during FY 1992-1994. The remainder of the funds are used for purchase of supplies and equipment, fuel and petroleum products, repairs and supporting modifications. Most costs are fixed and are associated with simply having these platforms in the inventory. A lesser portion varies with the tempo and type of ship operations and provides for systems improvement and replacement planning. The nature of the operation is determined by the overall Navy/Department of Defense R&D testing program.

(U) The Montreal Protocol of 1989 and the Clean Air Act of 1990 require cessation of chloroflurocarbons/hydrochloroflurocarbons venting in 1992 and cessation of production 1997. USS DOLPHIN's Thermoelectric Air Conditioning (TEAC) plant, is being evaluated for use on Navy submarines and surface ship's and will act as a test bed for future designs to comply with this protocol/legislation. Live fire test requirements for Navy torpedoes against diesel electric submarines will put heavy demands on USS DOLPHINS's schedule.

(U) The current and projected Anti-Ship Cruise Missile (ASCM) threat requires self-defense weapon systems capable of adequately countering the ASCM's into the year 2000. The National Defense Authorization Act for FY 1987, section 910, "Testing of Certain Weapons System and Munitions" requires live-fire lethality testing of major weapons systems. Operational and safety constraints limit realistic live-fire lethality testing with manned Navy ships and thus drive the requirement for having an afloat, unmanned, remotely controlled SDTS. Ex-USS DECATUR will be converted to the SDTS and plans call for testing Close-In-Weapons System (CIWS), NATO Sea Sparrow Missile System (NSSMS), Rolling Airframe Missile (RAM), and future short range Anti-Air Warfare systems against realistic threat presentations in an at-sea environment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) USS DOLPHIN tested/evaluated acoustic characteristics of submarines for the MK 48 and MK 50 torpedo programs; USS DOLPHIN achieved high data rate communications via green laser with the Advanced Research Projects Agency (ARPA's) Unmanned Undersea Vehicle (UUV) while submerged and acoustically controlled the untethered UUV. Both accomplishments were "firsts" between a submerged submarine and a UUV. Evaluated passive sonar technology; spread spectrum Low Probability Intercept acoustic data transmission; and TEAC systems. USS DOLPHIN began its FY 1992-1994 required overhaul in June 1992.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

b. (U) FLIP/ORB were used to conduct underwater acoustic propagation and noise research to support Anti-Submarine Warfare (ASW) and weapons (OT3A) needs and new technology development, as well as the shallow water vertical Directional Frequency Analysis and Recording (DIFAR) array experiment and the Noise on Basalt and Sediment Project. The annual inspection of FLIP's hull was conducted in drydock to monitor fatigue and corrosion and make repairs as needed.

c. (U) EX-USS DECATUR completed Phase I of the conversion to the SDTS at Naval Shipyard Puget Sound (NAVSHIPYD Puget Sound). Installed NATO Sea Sparrow Missile System, Target Acquisition System Mk-23, propulsion, electrical power generation, and ship control systems. Refurbished and modified ship systems required to support Hull Mechanical and Electrical designs for combat system support.

2. (U) FY 1993 PROGRAM:

a. (U) USS DOLPHIN is in a regular overhaul at Naval Shipyard Mare Island (NAVSHIPYD Mare Island). The overhaul completes in early FY 1994. The scope of work planned for the overhaul is the minimum required to maintain Submarine Safety (SUBSAFE) certification and support safe platform operations. No platform enhancements are planned. Planning for FY 1994 and future RDT&E operations continues. Commander in Chief, Pacific Fleet (CINCPACFLT) personnel assist in the USS DOLPHIN overhaul work, within their capability, to minimize the impact of higher shipyard labor rates.

b. (U) FLIP/ORB continues to conduct research in underwater acoustic and non-acoustic phenomena to support ASW surveillance and weapons (OT3A) needs, ocean technology development, and participate in the ONR Accelerated Research Initiative (ARI) marine boundary layer experiment. Develop initial specifications/drawings package for future FLIP overhaul. Conduct drydock inspection of FLIP and repair hull as needed.

c. (U) EX-USS DECATUR/SDTS will complete Phase II conversion to SDTS at NAVSHIPYD Puget Sound. A helicopter flight deck, SLQ32(V3) Electronic Warfare System and 400 Hz electric power systems are being installed. The SDTS will be towed to its home port of Port Hueneme, CA, to complete post shipyard conversion including operational checkout of installed combat systems, installation of ship and combat system remote controls, and outfitting.

3. (U) FY 1994 PLANS:

a. (U) USS DOLPHIN completes its regular overhaul at NAVSHIPYD Mare Island in the first quarter. USS DOLPHIN enters a post overhaul availability at it's home port in San Diego, CA, to install special scientific sensors and equipment during second and third quarter. USS DOLPHIN commences normal operations in third quarter with the Wide Area Undersea Surveillance Program. MK 50 Torpedo Program testing and SEAWOLF/Attack Submarine material evaluations will be supported. Testing of sea floor bottom mapping for ARPA will be conducted and coordinated with Navy Oceanographic Office. Planning will begin for Submarine Laser Communications with a Satellite testing. USS DOLPHIN continues to support near ocean bottom operations and other RDT&E programs, modeling sonar propagation, testing UUVs, testing sensors, TEAC systems, and communication systems.

b. (U) FLIP/ORB continues to conduct research in underwater acoustic and non-acoustic phenomena to support ASW surveillance and weapons (OT3A) needs and ocean technology development. Continue participation in ARI marine boundary layer experiment. Support shallow water vertical array acoustics experiment. Drydock inspection is conducted on FLIP and repaired as needed. Complete design and contract drawings for planned major overhaul/replacement of FLIP's hull structure.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: S0354 PROJECT TITLE: RDT&E Ships Support

c. (U) EX-USS DECATUR/SDTS completes outfitting and checkout of installed combat systems and associated remote controls. Installation of CIWS, fire prevention system, ship wide alarm system, and conversion/certification of missile magazine are accomplished. Sea trials are conducted to test ship and combat systems at Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), Pt Mugu, CA following conversion. Final approval of all applicable operational, safety, and maintenance documentation is given by NAVAIRWARCENWPNDIV and the SDTS is certified for and conducts live fire operations to support RAM, CIWS, NSSMS, and other self defense systems as may be required. NAVAIRWARCENWPNDIV performs the operation and maintenance of SDTS ship systems. The NSSMS (RIM-7R) Follow-On Test and Evaluation is conducted on SDTS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Port Hueneme, CA; NAVAIRWARCENWPNDIV, Point Mugu, CA; SUPSHIP, Seattle, WA and San Diego, CA; NAVSHIPYD, Mare Island, Vallejo, CA and Puget Sound, Bremerton, WA; NAVWARASCEN, Corona, CA; NCCOSC RDTE DIV, San Diego, CA; NAVSURFWARCEN CARDEROCK DIV, Bethesda, MD; NAVSURFWARCEN DET, Annapolis, MD; NRL, Washington, DC. CONTRACTORS: Applied Research Laboratories, Austin, TX; Charles Stark Draper Laboratories, Cambridge, MA; University of California, San Diego, CA; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not applicable.

2. (U) Schedule changes: Not applicable.

3. (U) Cost changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: FLIP: PE 0602314N, Undersea Surveillance and Weapons Technology (OT3B, OR3A, OT3A); PE 0602435, Oceanographic and Atmospheric Technology (RL3B, OT3B); PE 0602111, Surface and Aerospace Target Surveillance Weapons Technology (OR1A); USS DOLPHIN: PE 0603226E, Unmanned Underwater Vehicles.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: W0568 PROJECT TITLE: RDT&E Aircraft Flight Hours

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0568	RDT&E AIRCRAFT FLIGHT HOURS	10,951	12,066	10,480	CONT.	CONT.

B. (U) DESCRIPTION: This non-acquisition project provides aircraft flight hours/operating support for Research, Development, Test & Evaluation (RDT&E) programs at six Naval Air Systems Command/Office of Naval Research (NAVAIR/ONR) activities. Support includes aircrew training, pilot Naval Air Training and Operating Procedures Standardization (NATOPS) proficiency/currency requirements, annual simulator training, transition to new aircraft types, organizational and intermediate level maintenance and associated consumables, including petroleum, fuel, and lubricants.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Flew 9,100 flight hours for pilot training/qualification and for testing support of RDT&E projects. New aircraft initial qualifications and proficiency flying on F-14D, F/A-18D, AH-1W, ES-3A, E-6A, and T-45 occurred.

b. (U) Provided the maintenance and support for 23 separate type/model/series aircraft required by RDT&E Projects.

2. (U) FY 1993 PROGRAM:

a. (U) Plan to fly 9,600 flight hours in FY 1993. The increase in flight hours reflects significant aircraft inventory transitions to newer, more sophisticated airframes that require more flight hour training for initial qualifications and proficiency maintenance. As older aircraft leave the inventory (e.g. A-7) as part of the process of RDT&E infrastructure reduction, more effort and expense is required to retrain pilots and aircrew on the newer aircraft (ES-3A, E-6A, T-45, F-14D, AH-1W, V-22) and their respective simulators. Transitioning of the aircraft, proficiency flying, and maintenance effort of Naval Weapons Evaluation Facility (NWEF), Alburquerque, NM, to Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), China Lake, CA, commences.

b. (U) Continue providing the maintenance and support for aircraft required by RDT&E projects. Updated aircraft replacements to continue (F/A-18D, T-45, E-6A, ES-3A).

3. (U) FY 1994 PLANS:

a. (U) Plan to fly 9,400 flight hours in FY 1994. The aircraft transition and reduction will still be a main driver for this period. The more sophisticated aircraft transitions in the RDT&E inventory (e.g. F-14D, F/A-18D, T-45, ES-3A, E-6A) and support for new test aircraft (e.g. X-31, V-22) will increase the flight hours needed for qualifications and proficiency to support the RDT&E programs, as well as increase the costs/hour of aircraft operation. Aircraft and pilot/aircrew transition of work from NWEF to NAVAIRWARCENWPNDIV, will be completed this fiscal year. Transition and integration of aircraft and pilots/aircrew of Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV), Warminster, PA, to NAVAIRWARCENACDIV, Patuxent River, MD, commences.

b. (U) Continue providing the maintenance and support for aircraft required by RDT&E projects. Updated aircraft replacement to continue (F/A-18D, P-3B/C, T-45, ES-3A, E-6A).

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: W0568 PROJECT TITLE: RDT&E Aircraft Flight Hours

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Warminster, PA; NAVSURFWARCEN COASTSYSTA, Panama City, FL; NAVAIRWARCENWPNDIV (non-range), Point Mugu, CA; NRL, Washington, DC; NAVWPNEVALFAC, Albuquerque, NM; and NAVTRASYSCEN, Orlando, FL. CONTRACTORS: Dyncorp, Dallas, TX; Sikorski, Stratford, CT; and Kay and Associates, Chicago, IL.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: W0569 PROJECT TITLE: RDT&E Aircraft Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0569	RDT&E Aircraft Support	46,041	57,160	52,136	CONT.	CONT.

B. (U) DESCRIPTION: This continuing project provides for the Depot level maintenance, modification and rework of over 190 Navy Research, Development, Test & Evaluation (RDT&E) fixed and rotary wing aircraft required to accommodate test and evaluation of weapons systems in development. It also supports engines, aircraft material condition and field inspections, and emergency repair. In addition, it provides for Individual Material Readiness List (IMRL) tools and support equipment needed to perform aircraft maintenance; modification of in-service aircraft and other systems for application to and compatibility with RDT&E requirements; provides Special Flight Test Instrumentation Pool (SFTIP) equipment, shared/reused by programs to reduce/eliminate procurement lead times and save money when provided as Government Furnished Equipment (GFE); Aviation Depot Level Repairables (AVDLRs), which are spare/replacement installed aircraft parts and components; and support of aircraft bailed to contractor facilities. The project is funding the RDT&E modification of three Naval Research Lab (NRL) replacement P-3 aircraft, and engine, landing gear, and avionics upgrades for ten P-3A aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: The following programs were supported: Standard Depot Level Maintenance (SDLM), IMRL, engine support for 59 type/model/series, SFTIP and AVDLRs for over 190 aircraft in the RDT&E inventory, and contractor bailed aircraft (41 aircraft) support including consumables. Due to the high pass rate of material condition/Aircraft Service Period Adjustment (ASPA) inspections in the prior year, more aircraft of the RDT&E inventory will reach ASPA inspection numbers 3 and 4 in FY 1993. As complicated RDT&E aircraft, these aircraft will cost more than usual to rework. New aircraft entering the inventory included E-6A, ES-3A, and T-45 aircraft. Eleven aircraft were reworked with available resources, other aircraft that required rework that were unfunded became candidates for the RDT&E inventory reduction program through early retirement. The RDT&E conversion of the first NRL P-3 was initiated and is due for completion first quarter FY 1993. The Naval Air Logistics Command Information System (NALCOMIS) operated at Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV), Patuxent River, MD, for the first full year and was implemented at Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), Pt Mugu, CA.

2. (U) FY 1993 PROGRAM: The program will support the following: SDLM, IMRL, engine support for 59 type/model/series, SFTIP and AVLDRs for 180 aircraft in the RDT&E inventory, and contractor bailed aircraft (41 aircraft) support including consumables. The cost of reworks and maintenance support is steadily rising, and is higher on average for newer individual aircraft types now entering the RDT&E inventory mix. Additional aircraft entering the inventory include ES-3A, E-6A, and T-45. Twenty aircraft are projected requiring SDLM rework. The RDT&E conversion of the first replacement NRL P-3 aircraft will be completed by the end of the second quarter FY 1993. Upgraded engines and avionics for the RDT&E P-3A inventory are slated to begin first quarter FY 1993. One DC-130A (former Fleet Electronic Warfare Support Group (FEWSG) asset) will require SDLM overhaul. NALCOMIS implementation continues, and the Maintenance Training Improvement Program (MTIP) will be implemented at Naval Air Warfare Center Aircraft Division (NAVAIRWARCENWPNDIV), Pt Mugu, CA. Naval Weapons Evaluation Facility (NWEF), Albuquerque, NM, will commence transition of its RDT&E aircraft, test flight and maintenance requirements to Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), China Lake, CA, this year.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support
PROJECT NUMBER: W0569 PROJECT TITLE: RDT&E Aircraft Support

3. (U) FY 1994 PLANS: The following programs are included: SDLM, IMRL, engine support for 61 type/model/series, SFTIP and AVLDRs for 170 aircraft in the RDT&E inventory, and contractor bailed aircraft (41 aircraft) support including consumables. An estimated nineteen aircraft will require SDLM rework. Avionics, engine and landing gear upgrades of the RDT&E P-3A inventory will be ongoing. RDT&E conversion of the second NRL P-3 aircraft will commence. One DC-130A (former FEWSG asset) will require SDLM rework. Transition of NWEF aircraft and maintenance requirements to NAVAIRWARCENWPNDIV, China Lake, CA, will be completed this FY. Transition of NAVAIRWARCENACDIV, Warminster, PA, aircraft and maintenance requirements to NAVAIRWARCENACDIV, Patuxent River, MD, will commence. NALCOMIS and MTIP will continue to operate at NAVAIRWRCENACDIV, Patuxent River, MD, and NAVAIRWARCENWPNDIV, Pt Mugu. CA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV, Patuxent River, MD and Warminster, PA; NAVSURFWARCENCOASTSYSTA, Panama City, FL; NAVAIRWARCENWPNDIV, Pt Mugu and China Lake, CA; NRL, Washington, DC; NAVAIRWARCENWPNDIV, China Lake, CA; NAVWPNEVALFAC, Albuquerque, NM; NAVUNSEAWARCEN DET AUTEC, Andros Island, Bahamas; NAVAVNDEPOT, Norfolk, VA, North Island, CA, Pensacola, FL, Cherry Point, NC, Jacksonville, FL, and Alameda, CA; DPRO, Stratford, CT, Bethpage, NY, and Ft Worth, TX; NAVAVNMAINTOFF, Patuxent River, MD. CONTRACTORS: Dyncorp, Dallas, TX; Beech Air Services, Inc., Madison, MS; Grumman, Bethpage, NY; Grumman Technical Services Inc., Orlando, FL; and Kay and Associates, Chicago, IL.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0541	AUTEC	45,961	49,211	49,023	CONT.	CONT.
W0653	NAWCWPNDIV	146,947	155,514	145,867	CONT.	CONT.
W0654	NAWCACDIV	98,155	102,406	98,532	CONT.	CONT.
TOTAL		291,063	307,131	293,422	CONT.	CONT.

B. (U) DESCRIPTION: This program provides institutional maintenance and operations support for: the Naval Undersea Warfare Center Detachment Atlantic Undersea Test and Evaluation Center (NAVUNSEAWARCEN DET AUTEC), Andros Island, Bahamas; the Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV), Point Mugu and China Lake, CA; the Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV), Patuxent River, MD and Trenton, NJ. These Test and Evaluation (T&E) activities make up the Navy portion of the Department of Defense's Major Range and Test Facility Bases. These activities are chartered to develop, refine and maintain the capability and capacity to perform the full spectrum of developmental and operational T&E required by Navy research, ensuring the development/acquisition of technologically advanced weapons systems. Adequate state-of-the-art and realistic T&E is paramount in providing the operational forces with effective weapon systems to counter a dynamic threat environment. Project W0653 also supports three DC-130A multiple-target-launch-capable aircraft. Effective FY 1994, the T&E Modernization Project W2125 and the individual facility Improvement and Modernization efforts have been consolidated and transferred to a new PE 0604759N, Major Test and Evaluation Investment Program, Project W2195.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0541 PROJECT TITLE: Atlantic Undersea Test and Evaluation Center (AUTEC)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0541	AUTEC	45,961	49,211	49,023	CONT.	CONT.

B. (U) DESCRIPTION: The Atlantic Undersea Test and Evaluation Center (AUTEC) provides a deep water Test and Evaluation (T&E) facility for making selected underwater acoustic measurements, testing and calibrating sonars, and providing accurate underwater, surface and air tracking data on test participants. Naval Undersea Warfare Center Detachment AUTEC (NAVUNSEAWARCEN DET AUTEC), Andros Island, Bahamas, includes the Weapons Range, Fleet Operational Readiness Accuracy Check Site, Weapons Acoustic Measurement Capabilities and an Ocean Haul Down Facility for large buoyant bodies. The Weapons Range provides three dimensional (undersea, surface, air) precision tracking capability in support of Anti-Submarine Warfare Development Test and Evaluation and Operational Test and Evaluation. Major training operations including Fleet readiness exercises and tactical development trials are also conducted on the weapons range. The Fleet Operational Readiness Accuracy Check Site provides the capability to accurately calibrate and align electronic, optical, acoustic, and navigational systems installed on submarines and surface ships. The NAVUNSEAWARCEN DET AUTEC at West Palm Beach, Florida, provides technical expertise in tracking systems, liaison and test planning with range users, test scheduling, and logistic support. All Improvement and Modernization efforts have been consolidated and transferred to a new PE 0604759N, Major Test and Evaluation Investment, Project W2195.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued to maintain and repair the physical plant; purchased critical marine spares; performed marine craft maintenance; continued contract administration support and rental payments to Bahamian government.

b. (U) Continued civilian pay, general and administrative, printing, communication and supplies required to maintain and operate the Major Range and Test Facility Base (MRTFB).

c. (U) Continued lease payments for facilities at West Palm Beach.

2. (U) FY 1993 PROGRAM:

a. (U) Continue to maintain and repair the physical plant; maintain adequate marine spares and marine craft readiness; provide Operations Security (OPSEC) maintenance and operations; continue contract administration support and rental payments to Bahamian government.

b. (U) Continue civilian pay, general and administrative efforts required to maintain and operate MRTFB.

c. (U) Continue lease payments for facilities at West Palm Beach.

3. (U) FY 1994 PLANS:

a. (U) Continue to maintain and repair the physical plant; maintain adequate spares; provide OPSEC maintenance and operations; continue contract administration support and rental payments to the Bahamian government.

b. (U) Continue civilian pay, general and administrative efforts required to maintain and operate MRTFB.

c. (U) Continue lease payments for facilities at West Palm Beach.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Technical services are performed by the NAVUNSEAWARCENDIV, Newport, RI; COMNAVOCEANCOM, Bay St. Louis, Stennis Space Center, MS. CONTRACTORS: AUTEC RANGE SERVICES, West Palm Beach, FL.

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0541 PROJECT TITLE: Atlantic Undersea Test and Evaluation Center (AUTEC)

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0604759N, Major Test and Evaluation Investment program. This program corrects major deficiencies in T&E and increase T&E support effectiveness.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: The United States Government has an agreement with the Commonwealth of the Bahamas concerning the provision of sites for United States Defense purposes. An agreement was signed 6 February 1992 for a five (5) year extension ending in January 1998. Each year agreements are made with U.S. Foreign Military Sales Office and international customers to use the range for testing various weapon systems.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Naval Air Warfare Center Weapons Division

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0653	NAWCWPNDIV	146,947	155,514	145,867	CONT.	CONT.

B. (U) DESCRIPTION: The Pacific Missile Test Center and the Naval Weapons Center have been consolidated under the new Naval Air Warfare Center. These two Major Range and Test Facility Base (MRTFB) activities are now called the Naval Air Warfare Center Weapons Division (NAVAIRWARCENWPNDIV) Point Mugu and China Lake. Project W0653 provides over land and over sea ranges to the Department of Defense and other government agencies for launching, tracking and collecting data in support of: Test and Evaluation (T&E) of airborne weapon systems; aircraft and weapon integration; personnel parachutes; recovery systems; guided and ballistic missiles; satellite and space vehicle research; and various development and fleet training programs. Range support includes: metric tracking of test objects; command, control, and destruct for range safety purposes; communications; frequency interference control and analysis; collection, processing and display of telemetered data. This project also funds DC-130 aircraft supporting a multiple target launch capability. Other test capabilities include: rocket motor, warhead and other missile component test facilities; the Electronic Combat Range, formally called the Electronic Warfare Threat Environment Simulation; static Radar Cross Section (RCS) measurement facility and parachute/weapon recovery system test facilities. This project funds facility costs not chargeable to the user. All Improvement and Modernization efforts have been consolidated and transferred to a new PE 0604759N, Major Test and Evaluation Investment, Project W2195.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued indirect civilian pay and contractor cost required to manage, operate, maintain of MRTFB.

b. (U) Performed engineering development impacting range and target systems, aircraft maintenance, weapons storage, and air operations.

c. (U) Continued sustaining maintenance material and spare parts for range and target instrumentation/equipment systems. Continued maintenance and repair of MRTFB facilities.

d. (U) Continued travel, transportation, printing, communications, supplies and equipment necessary to manage and sustain MRTFB operations.

e. (U) Continued annual leases for off shore island and remote location instrumentation sites.

f. (U) Continued support for the NAVSURFWARCEN CARDEROCKDIV, Bethesda, MD open ocean RCS facility located at Santa Cruz island.

g. (U) Initiated design phase of Uninterruptable Power Source (UPS) program to support range operations and range safety requirements.

h. (U) Continued support of maintaining the R-2508 Air Space Control System.

i. (U) Continued annual utility costs and facility service contracts and payment of workmen's compensation cost for MRTFB employees. Contributed a share of the Command General and Administrative (G&A) budget.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Naval Air Warfare Center Weapons Division

i. (U) Continued flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.
j. (U) Completed rehosting of the Mosaic Direct Access Radar Channel (MDARC) for R-2508 Air Space Control.

2. (U) FY 1993 PROGRAM:
a. (U) Continue indirect civilian pay and contractor costs required to manage, operate, maintain MRTFB.
b. (U) Perform engineering development impacting range and target systems, aircraft maintenance, weapons storage, and operations.
c. (U) Continue sustaining maintenance material and spare parts for range and target instrumentation/equipment systems. Continue the maintenance and repair of MRTFB facilities.
d. (U) Continue travel, transportation, printing, communication, supplies and provide equipment necessary to manage and sustain MRTFB operations.
e. (U) Continue annual leases for off shore island and remote location instrumentation sites.
f. (U) Complete support for NAVSURFWARCEN CARDEROCKDIV open ocean RCS facility located at Santa Cruz island.
g. (U) Begin the procurement phase of UPS program to support range operations and safety requirements.
h. (U) Continue annual utility costs, facility service contracts and payment of workmen's compensation cost for MRTFB employees. Continue to contribute to G&A expense.
i. (U) Continue flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.
j. (U) Initiate the DC-130 target air launch capability maintenance contract and other overhead costs.
k. (U) Continue support of maintaining the R2508 Air Space Control System.

3. (U) FY 1994 PLANS:
a. (U) Continue indirect civilian pay and contractor costs required to manage, operate, maintain MRTFB.
b. (U) Perform engineering development impacting range and target systems, aircraft maintenance, weapons storage and air operations.
c. (U) Continue sustaining maintenance material and spare parts for range and target instrumentation/equipment systems. Continue maintenance and repair of MRTFB facilities.
d. (U) Continue travel, transportation, printing, communications, supplies and minor equipment necessary to manage and sustain MRTFB operations.
e. (U) Continue annual leases for off shore island and remote location instrumentation sites.
f. (U) Complete the procurement of UPS systems for critical range operations and safety systems.
g. (U) Continue support of maintaining the R-2508 Air Space Control System.
h. (U) Continue annual utility costs, facility service contracts and payment of workmen's compensation cost for MRTFB employees. Continue to contribute to G&A expense.
i. (U) Continue flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.
j. (U) Continue the DC-130 target air launch capability maintenance contract and other overhead costs.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0653 PROJECT TITLE: Naval Air Warfare Center Weapons Division

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, Point Mugu and China Lake, CA; NAVAIRWPNSTA, Point Mugu and China Lake, CA., (including outlying field, San Nicolas Island). CONTRACTORS: Computer Sciences Corporation, Los Angeles, CA; UNISYS, New York, NY; SRS Technology, Newport Beach, CA; Grumman Technical Services, Titusville, FL; Control Data Corporation, Minneapolis, MN; ERAI, Ridgecrest, CA; COMARCO, Ridgecrest, CA; Boeing Computer Support Services, Ridgecrest, CA; LORAL Electronic Systems, Ridgecrest CA; Research Development Lab, Ridgecrest, CA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0604759N, Major Test and Evaluation Investment program. This program corrects major deficiencies in T&E and increases T&E support effectiveness.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0654 PROJECT TITLE: Naval Air Warfare Center Aircraft Division

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0654	NAWCACDIV	98,155	102,406	98,532	CONT.	CONT.

B. (U) DESCRIPTION: The Naval Air Test Center and the Naval Air Propulsion Center have been consolidated under the new Naval Air Warfare Center. These two Major Range and Test Facility Base (MRTFB) activities are now called the Naval Air Warfare Center Aircraft Division (NAVAIRWARCENACDIV) Patuxent River, MD and Trenton, NJ. Project W0654 funds full-spectrum research, development, test and evaluation (RDT&E), engineering, and fleet support for air platforms. The product areas include aircraft systems technology, propulsion RDT&E, flight test and engineering, avionics design and production,and aircraft-platform interface. Flight Test and Engineering Group (FTEG) Patuxent River, performs development, test and evaluation of manned and unmanned air vehicle systems, including mission systems, equipment, subsystems, components, and support systems. NAVAIRWARCENACDIV has extensive airfield, flight test range, aircraft system test facilities and simulation laboratories. This project also provides complete technical and engineering support and associated RDT&E plant and facilities for air-breathing propulsion systems; this includes their accessories and components, fuels, and lubricants. NAVAIRWARCENACDIV has extensive facilities for conducting both installed and uninstalled aircraft engine Development, Test and Evaluation (DT&E). This project funds facility costs not chargeable to the user. All Improvement and Modernization efforts have been consolidated and transferred to a new PE 0604759N, Major Test and Evaluation Investment, project W2195.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Continued maintenance and repair of Test and Evaluation (T&E) facilities, instrumentation, and equipment.
b. (U) Leased building for engineering and administrative personnel.
c. (U) Repaired/upgraded the header pit deck, cooling tower sluice gate valves, T&E plant circuit breakers, and exhauster wing bridge crane.
d. (U) Continued civilian pay and contractor costs required to manage, operate and maintain the MRTFB.
e. (U) Continued travel, transportation, printing, communications, supplies and minor instrumentation/equipment systems.
f. (U) Continued annual utility costs and facility service contracts.
g. (U) Continued payment of workmen's compensation cost for MRTFB employees.
h. (U) Continued flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.

2. (U) FY 1993 PROGRAM:
a. (U) Continue maintenance and repair of aircraft and engine T&E facilities, instrumentation and equipment.
b. (U) Continue the airfield runway repair program.
c. (U) Replace test cell fire protection system, replace motor control centers, rewind exhauster electric motors, maintain exhauster aftercoolers.
d. (U) Continue lease on building for engineering and administrative personnel.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0654 PROJECT TITLE: Naval Air Warfare Center Aircraft Division

e. (U) Continue civilian pay and contractor costs required to manage, operate, and maintain the MRTFB.
f. (U) Continue travel, transportation, printing, communications, supplies, and minor instrumentation/equipment systems.
g. (U) Continue annual utility costs and facility service contracts.
h. (U) Continue payment of workmen's compensation cost for MRTFB employees.
i. (U) Continue flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.

3. (U) FY 1994 PLANS:

a. (U) Continue maintenance and repair of aircraft and engine T&E facilities, instrumentation, and equipment.
b. (U) Replace boiler refractory, substation, transformers, and repair closed circuit water valves.
c. (U) Install upgraded communication and navigation equipment in long range aircraft to support extended range operations.
d. (U) Continue lease on building for engineering and administrative personnel.
e. (U) Continue the airfield runway repair program.
f. (U) Continue civilian pay and contractor costs required to manage, operate and maintain the MRTFB.
g. (U) Continue travel, transportation, printing, communications, supplies, and minor instrumentation/equipment systems.
h. (U) Continue annual utility costs and facility service contracts.
i. (U) Continue payment of workmen's compensation cost for MRTFB employees.
j. (U) Continue flight hour costs to maintain pilot proficiency in aircraft used to support the MRTFB mission.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENACDIV FTEG, Patuxent River, MD; NAVAIRWARCENACDIV, Trenton, NJ; CHESNAVFACENGCOM, Washington, DC. CONTRACTORS: Southern Maryland Electric, Hughesville, MD; Dyncorp, Reston, VA; Universal Fuel, Lexington Park, MD; Holmes and Narver, Inc., Orange County, CA; USA Asbestos Removal Company, Clifton, NJ; TUCS Cleaning Services, Inc., West Orange, NJ; Interstate Waste Removal Company, Trenton, NJ; KEI Industrial Services, Inc., Levittown, PA; York International, Malvern, PA.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0604759N, Major Test and Evaluation Investment program. This program corrects major deficiencies in T&E and increases T&E support effectiveness.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605865N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Operational Test and Evaluation Capability
PROJECT NUMBER: R0831 PROJECT TITLE: Operational T&E Force Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0831	Operational Test and Evaluation Force Support	7,622	8,717	8,329	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides Commander, Operational Test and Evaluation Force (COMOPTEVFOR) general support funding for the planning, conducting, and reporting of operational test and evaluation of Navy weapon systems acquisition projects, and the validation of tactics as required by directives of the Secretary of Defense and by Public Law.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Issued operational test evaluation reports to the Chief of Naval Operations (CNO) and Secretary of the Navy (SECNAV) in support of production decisions and fleet introduction decisions for new weapon systems. Also assumed additional responsibility for operational testing of non-tactical automated information systems (AIS).

2. (U) FY 1993 PROGRAM:

a. (U) Issue operational test and evaluation reports to the CNO and SECNAV in support of production decisions and fleet introduction decisions for new weapon systems. Continue operational testing of non-tactical AIS.

3. (U) FY 1994 PLANS:

a. (U) Operationally test and evaluate CNO projects commensurate with authorized funding level.

b. (U) Maintain level of effort associated with the DOD 5000 acquisition guidance which requires increased COMOPTEVFOR involvement in early operational assessments, developmental testing, and the Cost and Operational Effectiveness Analysis.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMOPTEVFOR, Norfolk, VA; NAVAIRWARCENWPNDIV, China Lake, CA; NAVUNSEAWARCENDIV, Keyport, WA; NAVAIRWARCENWPNDIV, Point Mugu, CA; NAVSURFWARCENDIV, Dahlgren, VA; and NAVSURFWARCENDIV, Port Hueneme, CA. CONTRACTOR: PRC, Norfolk, VA.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605866N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Navy Space and Electronic Warfare Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0739	Navy C4I Top Level Requirements	3,323	1,416	2,977	CONT.	CONT.
X0706	EMI Reduction and Radio Frequency Management*	3,564	3,513	2,842	CONT.	CONT.
	TOTAL	6,887	4,929	5,819	CONT.	CONT.

*Funded in Program Element 0605803N in FY 1992 and 1993.

B. (U) DESCRIPTION:

1. (U) R0739 Navy C4I Top Level Requirements - Analyzes fleet requirements and Research and Development technology to develop top level plans for operating Navy Communications, Command and Control, Computers, and Intelligence (C4I) and space systems in the Space and Electronic Warfare (SEW) mission area.

2. (U) X0706 Electro Magnetic Interference (EMI) Reduction and Radio Frequency (RF) Management - develops advanced technology to identify and reduce electromagnetic interference sources from Navy systems and platforms.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605866N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Navy Space and Electronic Warfare Support
PROJECT NUMBER: R0739 PROJECT TITLE: Navy C4I Top Level Requirements

C. (U) DESCRIPTION: Provides analysis of fleet requirements and R&D technology to develop top level plans for operating Navy Communications, Command, Control, Computers, and Intelligence (C4I) and space systems in the Space and Electronic Warfare (SEW) mission area.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Identified technologies, systems, and tactics required to conduct the counter-communications, counter-surveillance, and counter-targeting missions of SEW.

b. (U) Developed a Navy SEW R&D strategy that will identify technological advancements needed for SEW systems of the future.

c. (U) Continued development of Navy SEW plans and investigation of promising technologies for SEW applications.

2. (U) FY 1993 PROGRAM:

a. (U) Identify programs and actions needed to increase efficiency of C4 links by implementing C4 architectures to provide user pull, vice provider push, of information.

b. (U) Continue development of Navy SEW plans and investigation of promising technologies for SEW applications.

3. (U) FY 1994 PLANS:

a. (U) Identify programs and actions needed to develop a common tactical picture for command and control applications.

b. (U) Relate the effects of changing surface ship force structure to Navy Command and Control System Ashore and Afloat requirements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRWARCENWPNDIV, China Lake, CA; NRL, Washington, D.C.; NCCOSC WC ISE DIV, San Diego, CA; NAVPGSCOL, Monterey, CA. CONTRACTORS: Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605866N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Navy Space and Electronic Warfare Support
PROJECT NUMBER: X0706 PROJECT TITLE: EMI Reduction and RF Management

C. (U) DESCRIPTION: This project develops advanced technology to identify and reduce Electro Magnetic Interference (EMI) sources from Navy systems and platforms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Completed requirements analysis and Navy Acceptance Testing of the Automated Spectrum Planning, Engineering, Coordination and Tracking System (ASPECTS). Delivered the Communication Planning Module (CPM) and Frequency Management Module (FMM) to the fleet for use and user feedback.

b. (U) Developed preliminary criteria for the Battle Force (BF) EMI Evaluation Simulator (BEES) to quantify BF, platform and system level performance with and without EMI degradation. Defined the Electromagnetic Environment (EME) for baseline BF scenarios. Completed software development of BEES Analyst Terminal (BAT) to give BEES an exercise monitoring and control capability.

c. (U) Convened the Fiber Optic Working Group and began investigating fiber optics technology to improve Navy Electro Magnetic Compatibility (EMC). Organized the Composite Materials Working Group. Applied Waveform Recording and Playback System (WRaPS) to specific BF scenarios to validate its outputs.

d. (U) Validated coherent measurement test methods for use in measuring the effects of transients in electrical circuits.

2. (U) FY 1993 PROGRAM:

a. (U) ASPECTS: Tailor ASPECTS for USMC. Begin developing a High Frequency (HF) analysis capability, incorporating engineering checks into the Allocation Application Package, tailoring fleet system software for Navy Electro Magnetic Spectrum Center (NAVEMSCEN)/Navy System Commands (SYSCOM) and developing database transfer enhancements. Expand Electro Magnetic Compatibility Analysis Program (EMCAP) to include 100 platforms.

b. (U) Integrate the BEES analysis criteria into the BAT to develop a post BF exercise EMI analysis capability. Develop Detection-to-Engagement module for BEES to assess the EMI degradation of the performance of Anti-Air Warfare Combat Systems. Develop WRaPS as authentic signal match of BF EMI.

c. (U) Evaluate promising fiber optic technology applications. Develop new test procedures for evaluating shielding effectiveness of composite materials.

d. (U) Develop new criteria and Navy requirements for inclusion in ML-STD-461/462.

3. (U) FY 1994 PLANS:

a. (U) ASPECTS: Incorporate Navy user feedback into ASPECTS development. Complete HF analysis capability, incorporating engineering checks into the Allocation Application Package and tailoring software for NAVEMSCEN and SYSCOMs. Begin development of Terrain Analysis Capability and continue to develop and incorporate database transfer enhancements. Add algorithms to EMCAP to include Identification, Friend or Foe (IFF) and Electronic Warfare (EW) systems.

b. (U) Integrate BEES analysis criteria into BAT to develop a post exercise EMI analysis capability at platform system levels.

c. (U) Begin to develop WRaPS test and evaluation applications for use in avoiding EMI in the procurement of Navy Systems.

d. (U) Integrate automated combat system EMC analysis tool into BEES.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NCCOSC WC ISE DIV, San Diego, CA; NRL, Washington, D.C.; ECAC, Annapolis, MD. CONTRACTORS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Surveillance/Reconnaissance Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1992 ACTUAL	FY1993 ESTIMATE	FY1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Z1034	Tac Sat Recon Office	12,211	9,329	16,940	CONT.	CONT.
X1368	Nav Space Sys Act La	382	109	0		
R2007	Space Mgmt Support	1,133	1,070	923	CONT.	CONT.
	TOTAL	13,726	10,508	17,863	CONT.	CONT.

B. (U) DESCRIPTION: Space Electronic Warfare Surveillance/Reconnaissance Support provides resources for Tactical Exploitation of National Capabilities (TENCAP). This unique, low-cost, high payoff project was established by Congress in 1977

The Space Management Support project supports various Navy space research and development projects and space systems testing.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Surveillance/Reconnaissance Support
PROJECT NUMBER: Z1034 PROJECT TITLE: Tac Sat Recon Office

A. RESOURCES (U): (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Z1034	Tac Sat Recon Office	12,211	9,329	16,940	CONT.	CONT.

B. (U) DESCRIPTION: Established to exploit all National and Service sensor systems to improve tactical support to fleet operational commanders. Project also supports fleet exercises, which provide the venue for testing modifications to existing programs and being made aware of new requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:

a. (U) Continued development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e., shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

b. (U)

c. (U)

d. (U) Developed semi-automated data extraction and analysis capabilities, hosted on the Composite Tactical Display, to assist analysts during contingency operations in geographic areas where comprehensive intelligence databases do not currently exist.

e. (U) Continued advanced planning on a Navy Joint Non-Cooperative Target Identification system.

f. (U) Tested experimental sensors on the space shuttle.

g. (U)
forces in supp

2. (U) FY 1993 PROGRAM:

a. (U) Continue development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e. shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

b. (U)

c. (U)

d. (U)

e. (U)

f. (U)

g. (U) Start prototype development on a Navy Joint Non-Cooperative Target Identification system which will start an Advanced Technology Demonstration in FY93.

h. (U) Continue testing experimental sensors on the space shuttle.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Surveillance/Reconnaissance Support
PROJECT NUMBER: Z1034 PROJECT TITLE: Tac Sat Recon Office

i. (U)

j. (U)

k. (U)

3. (U) FY 1994 PLANS:

a. (U) Continue development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e. shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

b. (U)

c. (U)

d. (U)

e. (U)

f. (U)

g. (U) Complete prototype development on a Navy Joint Non-Cooperative Target Identification system and demonstrate its capabilities in a joint exercise/operation.

h. (U) Continue development of innovative technologies to exploit

i. (U) Continue testing experimental sensors on the space shuttle.

j. (U)

k. (U)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Work performed under compartmented contracts.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Surveillance/Reconnaissance Support
PROJECT NUMBER: Z1034 PROJECT TITLE: Tac Sat Recon Office

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0603451N Tactical Space Operations

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Space Electronic Warfare Surveillance/Reconnaissance Support
PROJECT NUMBER: R2007 PROJECT TITLE: Space Mgmt Support

C. (U) DESCRIPTION: This project provides resources to the Naval Space Command for the conduct of its support testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS:
a. (U) Explored C2 and data distribution architecture for guidance in the development of the Functional Description for the Tactical Ground Station.
b. (U) Provided technical expertise required for tactical integration of space derived Multi Spectral Imagery prototype workstation designed for Fleet use.
c. (U) Evaluated technologies for support of the evolution of the SEW concept as part of revision to Naval Space Technology Plan.
d. (U) Evaluated potential technologies which may be applied to the NAVSPACECOM Directed Search Satellite System concept exploration.

2. (U) FY 1993 PROGRAM:
a. (U) Conduct assessments of identified C2 and data distribution architecture options for space-derived support to the fleet.
b. (U) Complete prototyping and commence test and demonstration of system for tactical integration of space-derived information.
c. (U) Complete technology evaluation for support of the evolution of the SEW concept as part of revision to Naval Space Technology Plan.
d. (U) Conduct technology evaluation for using over the horizon radars to predict solar storm warning up to seventy-two hours in advance.

3. (U) FY 1994 PLANS:
a. (U) Commence prototyping of equipment to provide most cost effective C2 and data distribution architecture for space support to the fleet.
b. (U) Complete test and demonstration of system for tactical integration of space-derived information.
c. (U) Commence technology supplement for support of the evolution of the SEW concept as part of revision to Naval Space Technology Plan.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSURFWARCENDIV, Dahlgren, VA; NRL, Washington DC, CONTRACTOR: TBD.

F. (U) RELATED ACTIVITIES: PE 0102427N, Project X0125, Naval Space Surveillance; PE 0605867N, Project Z1034, Tactical Satellite Reconnaissance Office.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605871M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Tactical Exploitation of National Capabilities
PROJECT NUMBER: C1424 PROJECT TITLE: Tactical Exploitation of National Capabilities

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1424	TENCAP	1,247	1,191	1,314	CONT.	CONT.

B. (U) DESCRIPTION: This program is designed to enhance the ability of tactical USMC forces to exploit the capabilities of national intelligence gathering systems. Congressionally directed, it requires close liaison with the intelligence community and involves complex and highly-sensitive activities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Participated in National Intelligence Systems Development (NISD). Prepared one Tactical Impact Statement (TIS) on National Intelligence Systems as required by Congress. Pursued emerging technology with Defense Support Project Office (DSPO) and other Services. Updated the Marine Corps Master Intelligence Plan (MCMIP), and wrote the Signals Intelligence/Electronic Warfare (SIGINT/EW) Plan and Human Intelligence (HUMINT) Plan. Explored and demonstrated alternate communication/dissemination paths. Participated in Tactical Exploitation of National Capabilities (TENCAP) system demonstrations and exercises at Fleet Marine Force (FMF) and supporting establishment. Participated in planning for Joint Chiefs of Staff (JCS)-directed TENCAP Special Project 93.

2. (U) FY 1993 PROGRAM: Participate in NISD and technology assessments with DSPO. Submit TIS as required by Congress. Participate in JCS Special Project Planning, JCS Special Project 93, and Corrective Actions Review Committee. Revise Marine Corps Intelligence Planning System (MCIPS) and MCMIP plans, SIGINT/EW, HUMINT, Marine Corps Imagery Intelligence Plan (MCIIP), and TENCAP as required. Demonstrate TENCAP system capabilities with the FMF. Coordinate TENCAP training/exercise support for Marine Corps units.

3. (U) FY 1994 PLANS: Participate in NISD and technology assessments. Submit TIS as required by Congress. Participate in JCS Special Project Planning, JCS Special Project 94, and Corrective Actions Review Committee. Revise MCIPS plans as required. Demonstrate TENCAP system capabilities. Coordinate TENCAP training/exercise support for the FMF.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: SPAWARSYSCOM, Washington, D.C. NAVSYSMGMTACT, Washington, DC; NAVAIRWARCENACDIV, Warminster, PA; NCCOSC RDTE DIV, San Diego, CA. CONTRACTORS: Not applicable.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605873M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Program Wide Manpower System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0030	Marine Corps Studies & Analysis[1]	2,424	909	6,734	CONT.	CONT.
C0033	OT&E[2]	1,268	1,717	3,269	CONT.	CONT.
C0073	HUM RES[3]	3,238	3,429	4,371	CONT.	CONT.
	TOTAL	6,930	6,055	14,374	CONT.	CONT.

1 Previously funded in Program Element (PE) 0605151M.
2 Previously funded in PE 0605156M.
3 Previously funded in PE 0603732M.

B. (U) DESCRIPTION: This PE provides the analytical foundation for the Marine Corps Studies System (MCSS), including mandated Mission Area Analyses (MAAs) and Cost and Operational Effectiveness Analyses (COEAs). The MCSS is the front end of the Marine Corps' acquisition system and supports the Concepts Based Requirements System. In addition, the PE supports Marine Corps Operational Test and Evaluation (OT&E) Activity representatives for Marine Corps OT&E and OT&E performed by Fleet Marine Force Commanders and Technical Support Activities. The PE also funds the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605873M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Program Wide Manpower System
PROJECT NUMBER: C0030 PROJECT TITLE: Marine Corps Studies & Analysis

C. (U) DESCRIPTION: This program provides the analytical foundation for the Marine Corps Studies System (MCSS). The MCSS is the front end of the Marine Corps' acquisition system and supports the Concepts Based Requirements System. This program funds a variety of studies to include: mandated Mission Area Analysis (MAA); technology assessments; force structure analysis; weapons systems analysis; concept development and analysis studies; cost benefit analysis; training assessments; feasibility analysis; scenario development; and system threat analysis. The MCSS also funds Milestone I Cost and Operational Effectiveness Analysis (COEA) studies in support of Program Objective Memorandum initiatives. This program provides quantitative information to decision makers on which to base improvements to doctrine, training and education, force structure and procurement. The MCSS also provides analytical support for decisions related to the resolution of current problems identified by the operating forces.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS (Funded under PE 0605151M):
a. (U) Initiated approximately 91% (31 of 34) of the studies (including MAAs and COEAs) approved in the FY 1992 Marine Corps Studies Master Plan (MCSMP).
b. (U) Continued 15 studies initiated during FY 1991 including those studies that were modified to incorporate Operation Desert Shield/Storm analytical requirements.
c. (U) Completed 19 studies including the Marine Corps Aviation Mishap Rate Assessment, Crisis Interaction Requirements (Phase I), Planning Factors Approach (Phase I), Mines/Minelaying and Countermines, Casualty Estimation, Marine Corps Ground Ammunition War Material Requirements, 4 MAAs and 1 COEA.

2. (U) FY 1993 PROGRAM (funded under PE 0605151M): Fund the continuation of 9 ongoing FY 1992 studies including 2 MAAs (Transportation and Health Services), 3 COEAs (Tactical Combat Operations, Light Armored Vehicle (LAV) Day/Night Sight, and Tactical Control and Analysis Center) and 4 general studies Measures of Effectiveness (MOEs) for Readiness and Sustainability, and Manning and Equipping Combat Engineering and Support Battalions.

3. (U) FY 1994 PLAN: Execute an estimated 92% of the studies approved in the FY 1994 MCSMP. This includes 9 mandated MAAs and 25 COEAs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORPS Working Groups, Quantico, VA., and DOD Top Level Schools (Army War College, Navy War College, Marine Corps University, and ARC Penn State) who will perform the work at MARCORSYSCOM, Quantico, VA. CONTRACTORS: PRC, Woodbridge, VA; Atlantic Systems Engineering Corp., Dumfries, VA; Potomac Systems Engineering, Arlington, VA; Management Systems Application, Chesapeake, VA.

F. (U) RELATED ACTIVITIES: PE 0605154N, Center for Naval Analysis, Project C0031, Marine Corps Operations Analysis Group.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605873M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Program Wide Manpower System
PROJECT NUMBER: C0033 PROJECT TITLE: Operational Test and Evaluation Support

C. (U) DESCRIPTION: This program supports Marine Corps Operational Test and Evaluation Activity (MCOTEA) representatives for Marine Corps OT&E and OT&E performed by Fleet Marine Force Commanders and Technical Support Activities. This program also provides for OT&E of systems prior to procurement by the Marine Corps to include test planning, operational testing, and independent evaluation report preparation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Wrote test plans, conducted Initial Operational Test and Evaluation (IOT&E) and published Independent Evaluation Reports (IERs) for Heavy Equipment Trailer, Javelin, and Tray Ration Heating System. Wrote test plans and conducted Early Operational Assessment (EOA) of Advanced Amphibious Assault and published an EOA report. Participated in multi-service testing of C-17 aircraft loading. Wrote test plans for combined Developmental Test/Operational Test (DT/OT) of Light Armored Vehicle - Air Defense (LAV-AD).

2. (U) FY 1993 PROGRAM: Write test plans and participate in multi-service EOA of Unmanned Aerial Vehicle - Medium Range (UAV-MR), Unmanned Aerial Vehicle - Short Range (UAV-SR), and publish EOA reports. Write test plans, conduct Operational Assessments (OA) and write OA report for the Global Positioning System Interface Unit. Write test plans, conduct IOT&E and publish IERs for the Anti-Personnel Obstacle Breaching System (APOBS), LAV-AD, STINGER Night Sight, Advanced Tactical Air Command Central, LAV-Day/Night Sight (LAV-DNS), Secondary Imagery Dissemination System (SIDS), Intelligence Analysis System (IAS), and the IAS product improvement program for Marine Expeditionary Forces. Participate in multi-service testing and publish IERs for the Global Positioning System (Handheld) and the Advanced Anti-Tank Weapon System - Medium (AAWS-M/JAVELIN). Participate in multi-service testing of C-17 aircraft loading. Participate in the Follow-On Test and Evaluation (FOT&E) of the Lightweight Early Warning Detection Device (LEWDD).

3. (U) FY 1994 PLANS: Complete multi-service testing of C-17 aircraft loading and publish an IER. Write test plans, conduct IOT&E and publish IERs for the Technical Control and Analysis Center (TCAC-II), Position Location Reporting System Communications Enhancement (PCE), Assualt Amphibious Vehicle (AAV7A1) Product Improvement Program, and the Amphibious Assault Vehicles Mine Rake (AAV Mine Rake). Participate in multi-service testing and publish IERs for the Joint Service Imagery Processing System (JSIPS) and the Advanced Field Artillery Tactical Data System (AFATDS). Participate in the FOT&E of the Pedestal Mounted Stinger (PMS).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCOTEA, Quantico, VA; MARCORSYSCOM, Quantico, VA; NAVAIRWARCENWPNDIV, China Lake, CA; APG, Aberdeen, MD; DPG, Salt Lake City, UT; and MCTSSA, Camp Pendleton, CA. CONTRACTORS: COMARCO, Arlington, VA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605873M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Program Wide Manpower System
PROJECT NUMBER: C0073 PROJECT TITLE: Human Resources Management and Forecasting

C. (U) DESCRIPTION: This program funds the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force and develops techniques and methods that advance enlisted and officer occupational assignment, promotions and career track planning in the Marine Corps while end strength is reduced and force structure is changed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1992 ACCOMPLISHMENTS: Completed: Optical Digital Imaging (ODI) prototype of Temporary Disabled-Retirement List records to provide insight into benefits and problems with ODI in records management; Enlisted Planning System (EPS) Selective Reenlistment Bonus Module; Joint Job Performance Measurement (JJPM) maintenance skills analysis; and JJPM sub-project.

2. (U) FY 1993 PROGRAM: Develop: ODI prototype for Fitness Report Processing to test and evaluate functionality and applicability of digital imaging for storage, control and management of fitness reports; complete EPS user interface and Enlisted Bonus Module. Develop a prototype of a system based on a historical relational database, allowing users easy access to the data needed to perform their jobs. The prototype will be the basis for future development of Human Resource Decision Support System (HRDSS) which will improve our manpower management capabilities, especially in areas requiring predictions of future behavior. Begin Manpower Process Modernization (MPM) sub-project by testing existing software and developing prototypes for solving large mathematical optimization problems.

3. (U) FY 1994 PLANS: Complete EPS Promotion Planning Module. Continue HRDSS development by designing database. Continue MPM optimization development and testing. Begin research toward linking manpower optimizers with standard modeling and query languages. Develop ODI prototype for Automated Board Processing System to enhance the current procedure used to support the selection and promotion board processes.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NPRDC, San Diego, CA and DOT, Washington, DC. CONTRACTORS: Dynamic Concepts, Incorporated, Washington, DC.

F. (U) RELATED ACTIVITIES:

1. (U) This program adheres to Tri-Service Reliance Agreements on Manpower & Personnel, with oversight and coordination provided by the Joint Directors of Laboratories.

2. (U) This program is related to all armed services' Human Resources Management and Forecasting efforts, including PEs: 0603707N, Manpower, Personnel, & Training Adv Technology Development; 0603007A, Human Factors, Personnel, and Training Advanced Technology; 0603227F, Personnel, Training, and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0901600N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Contract Administration/Audit
PROJECT NUMBER: R2203 PROJECT TITLE: Contract Administration/Audit

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1992 ACTUAL	FY 1993 ESTIMATE	FY 1994 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2203	Contract Administration/Audit	0*	0*	164,360	Cont.	Cont.

* Previously funded under O&M,N.

B. (U) DESCRIPTION: (U) The FY 1994 budget reflects the portion of the Department's estimate for contract audit and management services that will be incurred as a result of contract awards made in this appropriation. These funds will be used to finance Defense Contract Audit Agency (DCAA) and Defense Contract Management Command (DCMC) services that are performed in support of programs budgeted in this appropriation.

(U) This represents a change from the way the budget was presented last year and reflects a Congressional and Departmental initiative to move toward mission budgeting which calls for an improved method of budgeting and justifying resources. The visibility of total costs related to contract awards and administrative requirements is improved in this presentation because support service funding for related contracts is included in this appropriation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1992 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1993 PROGRAM: Not applicable.

3. (U) FY 1994 PLANS:

a. (U) Fund DCAA support for requested and required audits of Navy Research, Development, Test and Evaluation (RDT&E) contracts.

b. (U) Fund DCMC support for Navy RDT&E contracts accounting and financial advisory services for negotiation, administration, and settlement of contracts and subcontracts.

c. (U) Fund DCMC services for Navy RDT&E contracts including: ensuring contractor compliance with cost, delivery, technical, quality and other terms of the contract; accepting products on behalf of the government; providing program management support; and ensuring that contractors are paid.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DCAA, Alexandria, VA; DCMC, Wright-Patterson Air Force Base, OH. CONTRACTORS: Not Applicable.

E. (U) COMPARISON WITH AMENDED FY 1993 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.

2. (U) Schedule Changes: Not applicable.

3. (U) Cost Changes: Not applicable for this submission.

FY 1994 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0901600N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Contract Administration/Audit
PROJECT NUMBER: R2203 PROJECT TITLE: Contract Administration/Audit

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: All Navy RDT&E program elements are potentially related depending on contracts awarded in FY 1994.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.