DEPARTMENT OF THE NAVY
FY 1996/FY 1997 BIENNIAL BUDGET ESTIMATES

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JUSTIFICATION OF ESTIMATES
BUDGET ACTIVITY 4
FEBRUARY 1995

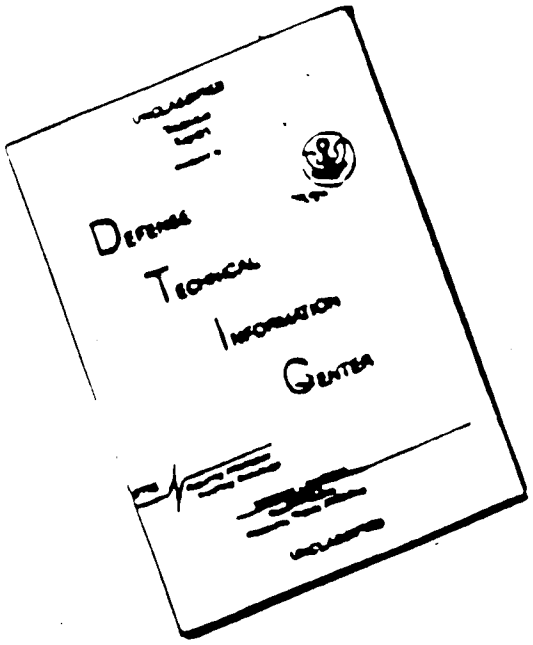
RESEARCH, DEVELOPMENT TEST & EVALUATION, NAVY
DESCRIPTIVE SUMMARIES (U)

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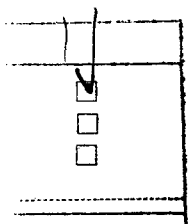
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LINE NO	PROGRAM ELEMENT NUMBER	ITEM NOMENCLATURE	BA	Thousands of Dollars FY 1994	FY 1995	FY 1996	FY 1997	SEC
28	0603207N	Air/Ocean Tactical Application	04	16,031	16,512	16,621	16,523	U
29	0603208N	Training System Aircraft	04	31,821	4,010	3,069	4,005	U
30	0603216N	Aviation Survivability	04	21,068	15,892	7,477	8,166	U
31	0603254N	ASW Systems Development	04	34,512	29,646	30,202	30,762	U
32	0603261N	Tactical Airborne Reconnaissance	04	32,540	45,840	18,924	17,737	U
33	0603382N	Adv Combat System Technology	04	-	3,342	2,803	4,254	U
34	0603451N	Tactical Space Operations	04	-	2,177	1,383	1,326	U
35	0603502N	Surface & Shallow Water Mine Countermeasures	04	44,741	42,173	54,527	53,424	U
36	0603504N	Adv Submarine Combat Systems Dev	04	22,608	22,990	21,281	20,610	U
37	0603506N	Surface Ship Torpedo Defense	04	33,910	20,460	10,049	7,758	U
38	0603512N	Carrier Systems Development	04	11,061	15,193	16,164	16,082	U
39	0603513N	Shipboard System Component Dev	04	27,485	25,930	16,804	13,723	U
40	0603514N	Ship Combat Survivability	04	17,121	14,443	11,649	10,027	U
41	0603525N	PILOT FISH	04	26,290	33,722	78,960	96,753	U
42	0603536N	RETRACT JUNIPER	04	32,195	19,650	10,002	23,100	U
43	0603542N	Radiological Control	04	3,254	3,442	3,202	3,060	U
44	0603553N	Surface ASW	04	-	6,572	6,655	5,972	U
45	0603561N	Advanced Submarine System Dev	04	140,424	81,394	35,748	31,602	U
46	0603562N	Submarine Tactical Warfare Sys	04	6,314	7,321	5,070	4,386	U
47	0603563N	Ship Concept Advanced Design	04	14,243	28,806	16,736	15,511	U
48	0603564N	Ship Prelim Design & Feasibility Studies	04	58,533	31,119	9,708	8,313	U
49	0603570N	Advanced Nuclear Power Systems	04	136,537	126,185	141,835	136,004	U

LINE NO	PROGRAM ELEMENT NUMBER	ITEM NOMENCLATURE	BA	Thousands of Dollars FY 1994	FY 1995	FY 1996	FY 1997	SEC
50	0603573N	Adv Surface Machinery Systems	04	81,954	37,950	39,156	34,699	U
51	0603576N	CHALK EAGLE	04	69,465	57,825	114,175	154,299	U
52	0603582N	Combat System Integration	04	7,437	7,380	5,414	7,180	U
53	0603609N	Conventional Munitions	04	37,401	40,965	31,537	32,304	U
54	0603610N	Advanced Warhead Dev (MK-50)	04	15,821	-	2,993	2,996	U
55	0603611M	Marine Corps Assault Vehicles	04	21,192	34,499	34,157	33,170	U
56	0603612M	MC Mine Countermeasures	04	645	6,434	2,470	3,185	U
57	0603634N	Electromagnetic Effects Protection Dev	04	2,443	-	-	-	U
58	0603635M	MC Ground Combat/Support System	04	24,271	23,168	46,733	51,417	U
59	0603654N	Jt Serv Explosive Ordnance Dev	04	8,981	8,362	7,298	7,020	U
60	0603709N	Advanced Marine Biological System	04	3,387	3,478	-	-	U
61	0603711N	Fleet Tactical Development	04	4,464	4,573	4,268	3,505	U
62	0603713N	Ocean Engineering Development	04	11,672	13,747	5,166	5,267	U
63	0603721N	Environmental Protection	04	52,853	49,239	65,947	55,311	U
64	0603724N	Navy Energy Program	04	4,282	9,028	1,976	2,019	U
65	0603725N	Facilities Improvement	04	1,368	2,493	1,803	893	U
66	0603734N	CHALK CORAL	04	71,162	67,216	71,085	71,199	U
67	0603746N	RETRACT MAPLE	04	105,675	99,895	82,932	100,994	U
68	0603748N	LINK PLUMERIA	04	39,083	29,028	17,879	32,611	U
69	0603751N	RETRACT ELM	04	57,149	36,826	32,561	27,671	U
70	0603755N	Ship Self Defense	04	289,699	217,467	245,620	249,806	U
71	0603763N	Warfare Systems Archit & Engineering	04	4,196	6,724	-	-	U

LINE NO	PROGRAM ELEMENT NUMBER	ITEM NOMENCLATURE	BA	Thousands of Dollars FY 1994	FY 1995	FY 1996	FY 1997	SEC
72	0603785N	Combat Systems Oceanographic Perf Assessment	04	19,594	19,637	16,042	15,411	U
73	0603787N	Special Processes	04	29,114	32,301	72,251	85,544	U
74	0603795N	Gun Weapons Systems Technology	04	25,200	19,075	12,028	27,601	U
75	0603800N	Joint Adv Strike Technology Program	04	29,663	98,272	149,295	199,305	U
76	0604707N	SEW Architecture/Eng Support	04	4,299	4,946	5,742	5,666	U
TOTAL	Demonstration and Validation (Dem/Val)			1,733,158	1,527,347	1,587,397	1,738,171	

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0118 Ocean Measurement Sensors	2,858	2,751	3,002	2,974	2,630	4,021	4,176	4,298	CONT.	CONT.
X0513 Air/Ocean Prediction	1,413	1,506	1,520	1,429	1,465	1,784	1,798	1,850	CONT.	CONT.
X0514 Air/Ocean Shipboard Measurements	1,843	1,766	1,987	1,696	1,891	2,211	2,331	2,397	CONT.	CONT.
X0523 Air/Ocean Data Assimilation	776	814	795	777	795	969	975	1,003	CONT.	CONT.
X0948 Precise Timing and Astrometry	1,387	1,408	1,280	1,273	1,292	1,567	1,579	1,627	CONT.	CONT.
X1596 Satellite Ocean Tactical Application	3,984	4,303	3,918	4,076	4,169	4,890	4,824	5,091	CONT.	CONT.
R1987 Mapping, Charting and Geodesy Techniques	1,582	1,633	1,994	2,153	2,190	2,315	2,332	2,399	CONT.	CONT.
X2008 Tactical Ocean Data Assimilation and Prediction	2,188	2,331	2,125	2,145	2,052	2,509	2,527	2,599	CONT.	CONT.
TOTAL	16,031	16,512	16,621	16,523	16,484	20,266	20,542	21,264	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Increases capabilities of shipboard meteorology and oceanography support to tactically optimize weapon, sensor and platform performance in highly variable oceanic and atmospheric conditions. Projects in 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. Also developed are algorithms to process remotely sensed satellite data for integration into other systems and tactical applications. The projects also provide for advanced development of specialized oceanographic instrumentation and techniques

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

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 Navy.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

(U) COST (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0118 Ocean Measurement Sensors	2,858	2,751	3,002	2,974	2,630	4,021	4,176	4,298	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: R0118, Ocean Measurement Sensors: The project develops highly specialized ultra-high resolution instrumentation systems and measurement techniques in support of CNO-endorsed requirements. The objectives of this project are to develop rapid environmental data collection methods for littoral and hinterland regions to 1) provide an in-situ assessment capability for combatants, 2) to provide the regional commander with continuous environmental data for operational use, 3) develop baseline data for predictive models in areas of potential interest. Climatological forecasting does not work in the littoral. The major challenges include collection and dissemination of data in highly variable meteorological and oceanographic conditions under stressful environmental situations in denied or inaccessible areas over relatively long periods of time.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($900) Transferred Tactical Oceanographic Monitoring System (TOMS) capability to roll on roll off system for all 688 class submarines. Use on SUBDEVRON designated boat as test bed. Demonstrated real time data transmission to central site. Performed side by side comparison with operational UK System Sonar 2081.
- (U) ($350) Developed and demonstrated real time data collection capability for grey ships (Aqua Shuttle) for both immediate tactical use and data bases for predictive models.
- (U) ($250) Completed test and evaluation (T&E) of expendable bioluminescence sensor in support of special operations and NAASW.
- (U) ($200) Completed T&E wave sensor Phase II development for drifting buoys in support of amphibious operations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R0118 PROJECT TITLE: Ocean Measurement Sensors

1. (U) FY 1994 ACCOMPLISHMENTS: (Continued)

- (U) ($175) Initiated clandestine buoy transmitter development.
- (U) ($250) Initiated optical chain for drifting buoys to obtain optical water clarity profiles via Satellite communications.
- (U) ($300) Continued in-situ and remote optical sensor developments for both shallow water Navy requirements and Joint NASA/NAVY NOAA SeaWiFS satellite calibration.
- (U) ($200) Continued collection and evaluation of foreign data bases for Naval Oceanographic Master Data Base
- (U) ($233) Initiated miniature sensor suites to obtain atmospheric Electro-optical (E-O) propagation profiles.

2. (U) FY 1995 PLAN:

- (U) ($280) Complete TOMS T&E. Establish classification levels of data bases within the Naval Oceanographic Office. Transition Program to N872.
- (U) ($50) Evaluate "Over the Horizon" (OTH) radar approach to measuring near shore wave and current conditions directly from assault ships.
- (U) ($245) Initiate miniature integrated real-time dropsonde package for Joint Navy/Army Unmanned Air Vehicle (UAV) project.
- (U) ($498) Complete development of real-time data collection capability for grey ships.
- (U) ($250) Complete expendable wave buoy development in support of amphibious operations.
- (U) ($611) Complete Navy/NOAA/NASA optical sensor development in preparation for FY96 SeaWiFS launch.
- (U) ($245) Complete and demonstrate clandestine buoy transmitter development.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R0118 PROJECT TITLE: Ocean Measurement Sensors

2. (U) FY 1995 PLAN: (Continued)

- (U) ($302) Continue sensor suite for atmospheric E-O propagation.
- (U) ($270) Initiate wind speed and direction sensor for expendable buoy.

3. (U) FY 1996 PLAN:

- (U) ($1117) Initiate development of environmental sensor packages for Remotely Operated Vehicle / Autonomous Unmanned Vehicles (ROV/AUVs) to support joint littoral operations.
- (U) ($750) Continue miniature dropsonde package for Joint Navy/Army Unmanned Air Vehicle (UAV) project/integrate atmospheric E-O sensors.
- (U) ($591) Initiate hinterland clandestine system for environmental monitoring for joint operations.
- (U) ($300) Initiate 6.3 transition of expendable mooring system from 6.2 Ocean Sensors project.
- (U) ($244) Transition miniature Acoustic Doppler Current Profiler (ADCP) development on Covert Littoral Acoustic Mapper (CLAM) to buoy mounted sensor.

4. (U) FY 1997 PLAN:

- (U) ($450) Initiate Over the Horizon radar techniques for wave/current monitoring from amphibious ships.
- (U) ($894) Continue sensors developments for ROV/AUV projects.
- (U) ($415) Continue sensor integration and development of UAV sensors for joint littoral operations.
- (U) ($525) Continue hinterland clandestine system for environmental monitoring for joint operations
- (U) ($389) Continue development of miniature ADCP for buoys.
- (U) ($301) Continue A-sized expendable mooring development.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: R0118
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT TITLE: Ocean Measurement Sensors

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,886	2,876		
(U) FY 1995 Appropriated:		2,876		
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	-28	-125		
(U) FY 1996/97 PRESBUDG Submit:	2,858	2,751	3,002	2,974

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: (FY95 Task Reductions) OTH Radar redirected to 6.2-TOMS very successful transition. Anticipated problems did not surface. Miniature sensors cut due to funding reductions.
FY 1994 - Decrease of 28 for end-of-year execution.
FY 1995 - Decrease of 28 to accommodate Small Business Innovation Research and 97 to reflect undistributed reductions for travel and University Research.

(U) Schedule: Delay in micro/miniature sensor task (3 months).

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) RELATED RDT&E: PE 0101224N (SSBN Security and Survivability Program)
PE 0604218N (Air/Ocean Equipment Engineering)

D. (U) SCHEDULE PROFILE: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R0118 PROJECT TITLE: Ocean Measurement Sensors

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	1,443	1,343	1,500	1,420
b. Developmental Test & Evaluation	1,140	1,113	1,199	1,244
c. Program Management Support	255	270	275	280
d. Travel	20	25	28	30
Total	2,858	2,751	3,002	2,974

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable

C. (U) FUNDING PROFILE: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0513 Air/Ocean Prediction	1,413	1,506	1,520	1,429	1,465	1,784	1,798	1,850	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops numerical oceanographic and atmospheric models for the Navy's Large Scale Computers at the Fleet Numerical Meteorology and Oceanography Center, Monterey, CA and the Naval Oceanographic Office, Stennis Space Center, MS. Other models under development in this project focus on sea ice, ocean thermal structure and ocean circulation prediction. In addition, the project develops expert systems/artificial intelligence applications which utilize the model output data to afford decision makers a better understanding of operational limitations imposed by the environment.

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($184) Completed development of and transition prototype tropical cyclone forecasting expert system.
- (U) ($283) Completed development and transition relocatable high resolution atmospheric model and began development of a tactical scale nested atmospheric forecast model.
- (U) ($474) Continued development of a Northern Hemisphere Pacific ocean circulation model.
- (U) ($472) Began development of next generation of the Navy Operational Global Atmospheric Prediction System (NOGAPS) with increased resolution and more accurate physics.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

2. (U) FY 1995 PLAN:

- (U) ($243) Complete development and transition of upgraded tropical cyclone forecasting expert system.
- (U) ($402) Continue development of a tactical scale nested atmospheric forecast model.
- (U) ($393) Complete development of Northern Hemisphere Pacific ocean circulation model and begin transition to operational use.
- (U) ($468) Continue development of the next generation NOGAPS. Begin development of global coupled air-ocean-ice model which exploits next generation computer technology.

3. (U) FY 1996 PLAN:

- (U) ($510) Deliver next generation NOGAPS for operational use.
- (U) ($170) Begin development of advanced aerosol model.
- (U) ($350) Complete development of and transition tactical scale nested atmospheric forecast model to large scale computer.
- (U) ($490) Continue development of global coupled air-ocean-ice model.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

4. (U) FY 1997 PLAN:

- (U) ($395) Begin Massively Parallel Processor (MPP) version of NOGAPS.
- (U) ($227) Continue development of advanced aerosol model.
- (U) ($369) Begin development of shipboard version of tactical scale nested model.
- (U) ($438) Deliver global coupled air-ocean-ice model for operational use.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,413	1,513		
(U) FY 1995 Appropriated:		1,513		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-7		
(U) FY 1996/97 PRESBUDG Submit:	1,413	1,506	1,520	1,429

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $3K to accomodate Small Business Innovation Research and $4K to reflect undistributed reductions for University Research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	1,397	1,481	1,495	1,404
b. Travel	16	25	25	25
Total	1,413	1,506	1,520	1,429

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NRL	WX	N/A	CONT.	CONT.	7,343	1,413	1,506	1,520	1,429	CONT.	CONT.
Support and Management											
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0513
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Prediction

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	7,343	1,413	1,506	1,520	1,429	CONT.	CONT.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	7,343	1,413	1,506	1,520	1,429	CONT.	CONT.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0514 Air/Ocean Shipboard Measurements	1,843	1,766	1,987	1,696	1,891	2,211	2,331	2,397	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($871) Continued advanced development of data connectivity with the Tactical Air Mission Planning System (TAMPS), Tomahawk and other strike Warfare Systems. Continued development of data connectivity and interfaces with other C2 systems.
- (U) ($400) Continued advanced development of data compression and visualization techniques.
- (U) ($572) Completed Light Detection and Ranging (LIDAR) atmospheric profiler advanced development. Began development of additional SMOOS sensors and an autonomous sensor suite for small ships such as the Cyclone Class Patrol Craft (PC).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X0514 PROJECT TITLE: Air/Ocean Shipboard Measurements

2. (U) FY 1995 PLAN:

- (U) ($708) Demonstrate advanced development of data connectivity with the TAMPS, C2 systems, Tomahawk and other strike warfare systems. Continue development of data connectivity and interfaces with other C2 systems.
- (U) ($300) Continue advanced development of data compression techniques.
- (U) ($250) Deliver data visualization software for transition.
- (U) ($508) Continue advanced development of additional SMOOS sensors and an autonomous sensor suite for small ships such as the Cyclone Class Patrol Craft (PC).

3. (U) FY 1996 PLAN:

- (U) ($650) Complete data connectivity with the TAMPS, Tomahawk and other strike warfare systems. Continue development of data connectivity and interfaces with other C2 systems.
- (U) ($300) Complete development and deliver Basis Image data compression technique. Continue development of additional data compression techniques.
- (U) ($250) Establish Advanced Data Visualization Laboratory (ADVL) at the Naval Research Lab (NRL). Begin development of stereoscopic, holographic and dynamic data visualization methods.
- (U) ($458) Complete advanced development of the autonomous sensor suite for small ships. Continue development of additional SMOOS sensors such as a LIDAR wind profiler, an Infrared (IR) extinction sensor and a hull mounted sea surface temperature sensor.
- (U) ($329) Begin Test and Evaluation of Non-development items in support of data connectivity, visualization, interfaces and C2 systems.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X0514 PROJECT TITLE: Air/Ocean Shipboard Measurements

4. (U) FY 1997 PLAN:

- (U) ($550) Complete data connectivity with the AEGIS C2 system. Continue development of data connectivity and interfaces with other C2 systems.
- (U) ($346) Continue Test and Evaluation of Non-developmental items in support of data connectivity, visualization, interfaces and C2 systems.
- (U) ($150) Complete development and deliver Fractal data compression technique. Continue development of additional data compression techniques.
- (U) ($250) Transition stereoscopic data visualization software. Continue development of holographic and dynamic data visualization methods.
- (U) ($400) Complete development of the SMOOS LIDAR wind profiler. Continue development of additional SMOOS sensors.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,843	1,964		
(U) FY 1995 Appropriated:		1,964		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-198		
(U) FY 1996/97 PRESBUDG Submit:	1,843	1,766	1,987	1,696

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0514
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Shipboard

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $21K to accomodate Small Business Innovation Research and $177K to reflect undistributed reductions for University Research, consulting services and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). Provides for transition to engineering development.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0514
PROJECT TITLE: Air/Ocean Shipboard Measurements

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Sensor Development	545	500	450	350
b. Software Development	818	901	1,172	931
c. Contactor Engineering Support	460	350	350	400
d. Travel	20	15	15	15
Total	1,843	1,766	1,987	1,696

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not applicable.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0523 Air/Ocean Data Assimilation	776	814	795	777	795	969	975	1,003	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops systems and associated software to process and manage remotely-sensed environmental data at Oceanography Centers ashore and on board ships equipped with the AN/SMQ-11 satellite receiver/recorder. 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).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($303) Continued development of capabilities to ingest data into environmental data base from new satellite sensors such as radar altimeters, Special Microwave Imagers and Synthetic Aperture Radars.
- (U) ($123) Completed code conversion of numerical models for CRAY-90.
- (U) ($200) Began modifications to TESS(3) DBMS to accommodate increased capabilities afforded with new hardware and systems software.
- (U) ($150) Completed development of DBMS for TESS(3) remote workstation.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Data Assimilation

2. (U) FY 1995 PLAN:

- (U) ($370) Complete development of capability to ingest data into environmental data bases from satellite radar altimeters; continue development of capabilities to ingest data from other new satellite sensors such as Special Microwave Imagers and Synthetic Aperture Radars.
- (U) ($225) Continue modifications to TESS(3) DBMS to accommodate increased capabilities afforded with new hardware and systems software.
- (U) ($219) Begin exploitation of new relational data base management technologies for large scale computers and TESS(3).

3. (U) FY 1996 PLAN:

- (U) ($203) Complete development of capability to ingest data from Special Microwave Imagers and Synthetic Aperture Radars. Begin development of capabilities to ingest data from other new satellite sensors such as Ocean Color and Vertical Sounders.
- (U) ($300) Complete modifications to TESS(3) DBMS to accomodate increased capabilities afforded with new hardware and systems software.
- (U) ($150) Continue exploitation of new relational data base management technologies for large scale computers and TESS(3).
- (U) ($142) Begin development of object-oriented DBMS.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Data Assimilation

4. (U) FY 1997 PLAN:

- (U) ($212) Continue development of capabilities to ingest data from other new satellite sensors such as ocean color and altimeters
- (U) ($265) Transition relational data base management technologies for large scale computers and TESS(3).
- (U) ($300) Continue development of object-oriented DBMS.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	776	820		
(U) FY 1995 Appropriated:		820		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-6		
(U) FY 1996/97 PRESBUDG Submit:	776	814	795	777

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Data Assimilation

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $4K to accomodate Small Business Innovation Research and $2K to reflect undistributed reductions for University Research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). Provides engineering development for AN/SMQ-11, TESS(3) and other related systems.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0523
PROJECT TITLE: Air/Ocean Data Assimilation

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	776	814	795	777
Total	776	814	795	777

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Data Assimilation

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Various	Various		CONT.	CONT.	4,752	776	814	795	777	CONT.	CONT.
Support and Management											
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X0523
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Air/Ocean Data Assimilation

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	4,752	776	814	795	777	CONT.	CONT.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	4,752	776	814	795	777	CONT.	CONT.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0948 Precise Timing and Astrometry	1,387	1,408	1,280	1,273	1,292	1,567	1,579	1,627	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project upgrades 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. It also develops 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. It also develops advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of positions of both faint and bright star, satellite tracking, and space debris studies.

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($182) Developed clock environmental test bed ensemble.
- (U) ($150) Performed VLBI fiber optics tests and VLBI satellite data transfer tests.
- (U) ($500) Designed operational Charge-Coupled Device (CCD) telescope and acquired first infrared detectors for transit telescope and interferometer.
- (U) ($555) Conducted first test observations with prototype interferometer and tested large wide-field CCD on transit telescope.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0948
PROJECT TITLE: Precise Timing and Astrometry

2. (U) FY 1995 PLAN:

- (U) ($150) Evaluate improved stored ion clock physics package.
- (U) ($100) Verify Clock Environment Behavior Models (CEBM) and test new CEBM time scale algorithm.
- (U) ($422) Start Infrared development for optical interferometer.
- (U) ($536) Construct large-scale CCD arrays for electronic astrography.
- (U) ($200) Evaluate VLBI fiber optics vs. satellite data transfer and design final VLBI data transfer system.

3. (U) FY 1996 PLAN:

- (U) ($150) Demonstrate optimum clock stability and precision at the nanosecond level from application of more accurate environmental stability and clock model algorithms.
- (U) ($150) Complete evaluation of stored ion clock physics package.
- (U) ($350) Demonstrate the capability of optical interferometry for precise positions.
- (U) ($430) Initiate demonstration of large scale CCD arrays for electronic astrography.
- (U) ($200) Continue development of infrared capability for optical interferometer.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

PROJECT NUMBER: X0948
PROJECT TITLE: Precise Timing and

4. (U) FY 1997 PLAN:

- (U) ($100) Evaluate time transfer capabilities via fiber optic network.
- (U) ($150) Demonstrate capabilities of the Global Positioning System (GPS) for UTI/Polar Motion determination.
- (U) ($400) Complete demonstration of prototype optical interferometer for astrometry.
- (U) ($373) Complete demonstration of large scale CCD arrays for electronic astrography.
- (U) ($250) Complete development of infrared capability for optical interferometer.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,387	1,441		
(U) FY 1995 Appropriated:		1,441		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-33		
(U) FY 1996/97 PRESBUDG Submit:	1,387	1,408	1,280	1,273

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X0948 PROJECT TITLE: Precise Timing and

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $29K to accomodate Small Business Innovation Research and $4K to reflect undistributed reductions for University Research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0602435N, Project RM35G83, Astronomy, exploratory development in general areas covered in this summary, 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.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0948
PROJECT TITLE: Precise Timing and Astrometry

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	1,387	1,408	1,280	1,273
Total	1,387	1,408	1,280	1,273

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X0948 PROJECT TITLE: Precise Timing and Astrometry

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Various	Various		CONT.	CONT.	7,700	1,387	1,408	1,280	1,273	CONT.	CONT.
Support and Management											
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X0948
PROJECT TITLE: Precise Timing and Astrometry

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	7,700	1,387	1,408	1,280	1,273	CONT.	CONT.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	7,700	1,387	1,408	1,280	1,273	CONT.	CONT.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1596 Satellite Ocean Tactical Application	3,984	4,303	3,918	4,076	4,169	4,890	4,824	5,091	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops concepts and software techniques for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite-borne sensors. Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products. The software developed under this project is planned for use in Mainframe computers and in the Tactical Environmental Support System - TESS(3).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,565) Completed development of expert system for electromagnetic refractivity. Continued development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,719) Began transition of ocean color sensor and scatterometer data operational capability. Continued development of algorithms for Synthetic Aperture Radar (SAR), altimeters, ocean color sensors and scatterometers.
- (U) ($700) Continued fleet exercise participation for validation of algorithm and the development of methods for littoral zone analysis.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X1596
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Satellite Ocean Tactical Application

2. (U) FY 1995 PLAN:

- (U) ($1,807) Begin transition of a cloud pattern recognition expert system. Continue development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,821) Complete transition of SAR operational capability and continue transition of ocean color sensor and scatterometer data operational capability. Continue development of new algorithms for SAR, altimeters, ocean color sensors and scatterometers.
- (U) ($375) Complete development of prototype littoral zone analysis software.
- (U) ($300) Continue Fleet Exercise participation for validation of algorithm.

3. (U) FY 1996 PLAN:

- (U) ($1,420) Complete transition of a cloud pattern recognition expert system. Continue development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,823) Continue transition of ocean color sensor and scatterometer data operational capability. Continue development of new algorithms for SAR, altimeters, ocean color sensors and scatterometers.
- (U) ($375) Begin development of advanced littoral zone analysis software.
- (U) ($300) Continue fleet exercise participation for validation of algorithms.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X1596 PROJECT TITLE: Satellite Ocean Tactical Application

4. (U) FY 1997 PLAN:

- (U) ($1,422) Complete Expert System for atmospheric fronts and cumulus cloud analysis. Continue development of additional expert systems for satellite oceanographic and atmospheric feature analyses.
- (U) ($1,596) Continue transition of ocean color sensor and scatterometer data operational capability. Continue development of new algorithms for SAR, Altimeters, Ocean Color sensors and scatterometers.
- (U) ($375) Continue development of advanced littoral zone analysis software.
- (U) ($383) Begin airborne vs. satellite validation of SAR ocean feature analysis.
- (U) ($300) Continue fleet exercise participation for validation of algorithms.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,984	4,325		
(U) FY 1995 Appropriated:		4,325		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-22		
(U) FY 1996/97 PRESBUDG Submit:	3,984	4,303	3,918	4,076

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X1596 PROJECT TITLE: Satellite Ocean Tactical Application

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $9K to accomodate Small Business Innovation Research and $13K to reflect undistributed reductions for University Research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X1596
PROJECT TITLE: Satellite Ocean Tactical Applications

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	3,984	4,303	3,918	4,076
Total	3,984	4,303	3,918	4,076

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not applicable.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

Date: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1987 Mapping, Charting & Geodesy Techniques	1,582	1,633	1,994	2,153	2,190	2,315	2,332	2,399	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: R1987, Mapping, charting & Geodesy Techniques: This project develops new charting and bathymetric survey techniques necessary to reduce the existing 300 ship year shortfall in coastal hydrographic survey requirements. Presently 70% of the world's coastline is not adequately charted. The requirements are originated by Fleet Commander in Chief's (CINCS) and the Commandant of the Marine Corps, and validated by the Defense Mapping Agency in support of littoral and expeditionary operations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($458) Continued digital MC&G analysis and evaluation of weapons systems input.
- (U) ($700) Initiated high speed data rate communication link development to transmit real time acoustic bathymetry images from unmanned remotely controlled vehicle. Married new bathymetry system, ancillary oceanographic and atmospheric sensors to real time display.
- (U) ($366) Initiated covert Littoral Acoustic Mapper (CLAM) development for held special forces underwater navigation and data collection.
- (U) ($58) Completed evaluation of existing airborne laser bathymetric systems (Canadian/Swedish)

2. (U) FY 1995 PLAN:

- (U) ($500) Continue digital MC&G evaluation and collection of data for weapons systems input.
- (U) ($508) Continue development of near shore bathymetric data collection via remotely controlled vehicle.
- (U) ($100) Complete and demonstrate CLAM to special forces as requested.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R1987 PROJECT TITLE: Mapping, Charting & Geodesy Techniques

2. (U) FY 1995 PLAN: (Continued)

- (U) ($276) Establish specifications for fixed wing laser bathymetry system for navy purchase, prepare sensors and test ranges for evaluation and optimization.
- (U) ($249) Investigate transfer of nearshore data collection technology from overt controlled vehicles to convert autonomous vehicles.

3. (U) FY 1996 PLAN:

- (U) ($809) Continue Test and Evaluation of sensors for Sea Lion Remotely Operated Vehicle / Autonomous Unmanned Vehicle (ROV/AUV), add expendable sensors, automate vehicle controls, install real time map generation and integrate environmental sensors from 6.3 Ocean Measurement Sensor (OMS) program.
- (U) ($535) Continue development of Airborne Laser capability, implement tidal correction algorithm and initiate multispectral scanner capability.
- (U) ($650) Information Management and continue Digital Mapping, Charting & Geodesy Support Program (DMAP) functions.

4. (U) FY 1997 PLAN:

- (U) ($675) Continue Sea Lion demonstration and evaluations, complete automated vehicle controls, continue map generation project, and integration of OMS transitioned sensors.
- (U) ($793) Airborne Laser project, complete tide algorithm, continue multispectral scanner, and add interferometric Global Positioning System (GPS) (3D position) capability.
- (U) ($685) Information Management and continue DMAP functions.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R1987 PROJECT TITLE: Mapping, Charting & Geodesy Techniques

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,566	1,655		
(U) FY 1995 Appropriated:		1,655		
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	16	-22		
(U) FY 1996/97 PRESBUDG Submit:	1,582	1,633	1,994	2,153

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes as per new budget direction (12/22/94)
FY 1994 - Decrease of 16 for end-of-year execution.
FY 1995 - Decrease of 17 to accommodate Small Business Innovation Research and 5K to reflect undistributed reductions for travel and University Research.

(U) Schedule: Minimal impact on schedule.

(U) Technical: Minimal technical impact

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) RELATED RDT&E: PE 0601153N (Defense Research Sciences)
PE 0305160N (Defense Meteorological Satellite)

D. (U) SCHEDULE PROFILE: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications PROJECT NUMBER: R1987 PROJECT TITLE: Mapping, Charting & Geodesy Techniques

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	783	828	1,012	1,067
b. Developmental Test & Evaluation	642	640	809	906
c. Program Management Support	145	150	155	160
d. Travel	12	15	18	20
Total	1,582	1,633	1,994	2,153

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands): Not Applicable

C. (U) FUNDING PROFILE: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2008 Tactical Ocean Data Assimilation and Prediction	2,188	2,331	2,125	2,145	2,052	2,509	2,527	2,599	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops new techniques for environnmental data assimilation, for both conventional and satellite remotely sensed data, and includes the development of tactical models to utilize these data. Artificial Intelligence, Expert and Rule-Based systems are emphasized. The goal is to provide the Navy with a real-time, stand-alone, shipboard tactical scale atmospheric and oceanographic forecasting capability in accordance with the Pre-Planned Product Improvement (P3I) plan for the Tactical Environmental Support System - TESS(3).

(U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($830) Completed development of the 3D Vapor, Liquid, Solid Tracking (VLSTrack) model for upper air effluents. Continued development of Electromagnetic/ Electro-optical (EM/EO) environmental models.
- (U) ($1,098) Delivered the Mediterranean Sea oceanographic model. Continued development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Yellow Sea, and Sea of Japan.
- (U) ($260) Began incorporation of expert system/artificial intelligence techniques.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROJECT NUMBER: X2008
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

2. (U) FY 1995 PLAN:

- (U) ($860) Complete development Systems' of next generation range dependent EM/EO and VLSTrack models for TESS(3). Begin incorporation of Expert Systems' applications in these areas.
- (U) ($1,136) Complete development of Yellow Sea oceanographic model. Continue development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Sea of Japan and other selected geographical locations in response to emergent requirements.
- (U) ($335) Continue incorporation of expert system/artificial intelligence techniques in the 4D assimilation of tactical scale data.

3. (U) FY 1996 PLAN:

- (U) ($724) Complete incorporation of Expert Systems applications in the EM model. Continue to incorporate Expert Systems' applications in the EO and VLSTrack models.
- (U) ($1,111) Continue development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Sea of Japan and other selected geographical locations, such as the Persian Gulf, Gulf of Oman and the Arabian Sea in response to emergent requirements.
- (U) ($290) Continue incorporation of expert system/artificial intelligence techniques in the 4D assimilation of tactical scale data.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603207N PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application PROJECT NUMBER: X2008 PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

4. (U) FY 1997 PLAN:

- (U) ($715) Complete incorporation of Expert Systems' applications in the EO and VLSTrack area.
- (U) ($204) Begin development of surface-to-air and surface-to-surface EO model.
- (U) ($936) Complete development of the Arabian Sea model. Continue development of coastal and enclosed basin tactical scale oceanographic models for the Sea of Okhotsk, Sea of Japan and other selected geographical locations such as the Persian Gulf and the Gulf of Oman in response to emergent requirements.
- (U) ($290) Complete incorporation of expert system/artificial intelligence techniques in the 4D assimilation of tactical scale data.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,188	2,342		
(U) FY 1995 Appropriated:		2,342		
(U) Adjustments from Approp./FY95 PRESBUDG:	0	-11		
(U) FY 1996/97 PRESBUDG Submit:	2,188	2,331	2,125	2,145

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X2008
PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY95 decrease of $4K to accomodate Small Business Innovation Research and $7K to reflect undistributed reductions for University Research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - TESS(3) will incorporate data assimilation techniques and models.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Feb 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603207N
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Application
PROJECT NUMBER: X2008
PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	2,188	2,331	2,125	2,145
Total	2,188	2,331	2,125	2,145

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not applicable.

C. FUNDING PROFILE: Not applicable.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1142 T-45 Improvements	28,241	258	516	511	0	0	0	0	0	731,397
H1150 Joint Primary Aircraft Trainer	3,580	3,752	2,553	3,494	3,674	0	0	0	0	17,053
TOTAL	31,821	4,010	3,069	4,005	3,674	0	0	0	0	748,450

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) The T45TS mission is to provide undergraduate jet pilot training for 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.

(U) The Joint Primary Aircraft Training System (JPATS) is an ACAT 1D, non-developmental item (NDI), commercial pilot 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 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 U.S. Air Force is the executive service. This element funds Navy participation in the joint program and Navy unique requirements.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1142 T-45 Improvements	28,241	258	516	511	0	0	0	0	0	731,397

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilots, and selected 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 (CP21) (including a 1553 avionics architecture and multi-functional displays) is funded for FY 92 - FY 94 with production and retrofit incorporation into the entire system beginning in FY 95.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($6,417) Completed contractor demonstration and Navy flight tests.
- (U) ($0) Completed TECHEVAL in November 93.
- (U) ($224) Completed OPEVAL in April 94. "T45TS is determined to be operationally effective and operationally suitable". Approval for fleet introduction is recommended.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT NUMBER: H1142 PROJECT TITLE: T-45 Improvements

(U) FY 1994 ACCOMPLISHMENTS (cont'd):

- (U) ($19,977) Delivered CP21 prototype in March 94. Completed digital cockpit prototype fabrication. Conducted ground tests, Navy and contractor flight tests and evaluation.
- (U) ($1,623) Supported CP21 technical reviews, technical documentation analyses, software verification, and planning of flight test program.

2. (U) FY 1995 PLAN:

- (U) ($0) Obtained MS III approval in January 1995.
- (U) ($157) Conduct review and analysis of T-45 claim.
- (U) ($40) Continue support of CP21 technical reviews and conduct Operational Assessment for CP21 (2Q/95).
- (U) ($61) Conduct technical and program risk assessments.

3. (U) FY 1996 PLAN:

- (U) ($516) Support and conduct tests to expand the aircraft operating envelope (center of gravity limit expansion and slat dynamic landing loads).

4. (U) FY 1997 PLAN:

- (U) ($511) Support and conduct tests to expand the aircraft operating envelope (increase cruise maneuverability and expanded stores carriage and release).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1142
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: T-45 Improvements

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	28,560	263	XXX	XXX
(U) FY 1995 Appropriated:	XXX	263	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	-319	-5	XXX	XXX
(U) FY 1996/7 PRESBUDG Submit:	28,241	258	516	511

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY94 reduction of $319K reflects a End-of-Year Execution Update Adjustment and the FY95 $5K reduction is for SBIR.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
• (U) APN Line 15 & 16	299,881	245,415	316,084	346,850	294,696	290,983	301,566	295,943	CONT.	CONT.
• (U) APN-5	0	6,272	4,949	32,331	37,309	23,573	31,375	3,511	CONT.	CONT.
• (U) APN-6 (Spares) Line 48	15,393	25,848	24,904	22,146	21,720	29,395	23,316	23,087	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT NUMBER: H1142 PROJECT TITLE: T-45 Improvements

(U) RELATED RDT&E:

(U) PE 0603216N (Aviation Survivability)
(U) PE 0604777N (Navigation/ID System)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		2Q/MS III			
Engineering Milestones	2Q/CP21 DELV	2Q/CP21 OA			
T&E Milestones	1Q/TECHEVAL 3Q/OPEVAL				
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1142
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: T-45 Improvements

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. CP21 Development	21,550	40	0	0
b. T45 Testing	6,524	0	516	511
c. Program Support	167	218	0	0
Total	28,241	258	516	511

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1142
PROGRAM ELEMENT TITLE: Training Systems Aircraft PROJECT TITLE: T-45 Improvements

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:											
CP21 MCAIR St. Louis, MO	SS/CPIF	5/92	65,084	65,084	45,107	19,977	0	0	0	0	65,084
FSED MCAIR St Louis, MO	FFP	10/84	559,827	559,827	559,827						559,827
Misc. In-House	WX	N/A	86,160	86,160	84,587	1,573	40	0	0	0	86,200
Support and Management:					198	167	218	0	0	0	583
Test and Evaluation:											
CLS MCAIR St. Louis, MO	SS/FFP	10/93	2,700	2,700	0	2,700	0	0	0	0	2,700
NAWC/PAX	WX	10/95	15,062	15,062	10,435	3,600	0	516	511	0	15,062
Misc. In-House	WX	N/A	1,941	1,941	1,717	224	0	0	0	0	1,941

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:				0	0	0	0	0	0	0
Support and Management:				0	0	0	0	0	0	0
Test and Evaluation:				0	0	0	0	0	0	0

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training Systems Aircraft
PROJECT NUMBER: H1142
PROJECT TITLE: T-45 Improvements

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	689,521	21,550	40	0	0	0	711,071
Subtotal Support and Management	198	167	218	0	0	0	365
Subtotal Test and Evaluation	12,152	6,524	0	516	511	0	19,961
Total Project	701,871	28,241	258	516	511	0	731,397

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1150 Joint Primary Aircraft Trainer	3,580	3,752	2,553	3,494	3,674	0	0	0	0	17,053

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: JPATS is an ACAT 1D, 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 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 U.S. Air Force is the executive service for this joint program. This element funds Navy participation in the program and Navy unique requirements.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Training

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($50) Completed Office of Secretary Defense directed streamlining Working Group Review.
- (U) ($348) Began training command support for requirement development and system interface.
- (U) ($1,600) Started Navy unique anthropometry analysis.
- (U) ($779) Began technical and manufacturing process analysis in support of aircraft source selection for Request for Proposal (RFP) released in May 94.
- (U) ($328) Developed the ground based training system (GBTS) RFP.

2. (U) FY 1995 PLAN:

- (U) ($475 FY94 Funds and $1,060 FY95 Funds)Continue technical analysis in support of source selection and any USN unique requirements for data or analysis. Scheduled to reach MS II in July 95.
- (U) ($190) Continue training command support for requirement development and system interface.
- (U) ($208) Continue manufacturing process analysis for source selection.
- (U) ($1,350) Complete Navy unique anthropometry analysis.
- (U) ($367) Revise GBTS planning package for contract change proposal.
- (U) ($102) Review preliminary logistics support analysis development for source selection.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Training

3. (U) FY 1996 PLAN:

- (U) ($475 FY95 Funds and $1,582 FY96 Funds) Provide engineering support for air vehicle technical reviews/analysis, test and evaluation data analysis, conduct aircraft Critical Design Review (CDR) (3Q/96) and conduct aircraft Preliminary Design Review (PDR) (1Q/96). Begin joint qualification test and evaluation effort.
- (U) ($180) Continue training command support for requirement development and system interface.
- (U) ($280) Review and qualify manufacturing and production process development plans.
- (U) ($389) Subsequent to GBTS award (Jun 96) provide engineering support for GBTS development, review, test and data analysis.
- (U) ($122) Continue reviews of logistics support analysis development.

4. (U) FY 1997 PLAN:

- (U) ($190) Continue training command support for requirement development and system interface.
- (U) ($2,727) Continue engineering support for air vehicle technical reviews/analysis, joint test and evaluation and begin support for joint operational testing.
- (U) ($164) Conduct Integrated Logistics Support plan analysis and facility preparations.
- (U) ($413) Continue engineering support for GBTS development, review, test and data analysis.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Training

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,585	3,854	XXX	XXX
(U) FY 1995 Appropriated:	XXX	3,854	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	-5	-102	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	3,580	3,752	2,553	3,494

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY94 reduction of $5K reflects End-of-Year Execution Update and the FY95 reduction of $102 reflects undistributed adjustments.

(U) Schedule: The program slip for the aircraft PDR, aircraft CDR and the GBTS award is due to source selection being delayed.

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
• (U) APN-3 Line 16 JPATS	0	0	0	0	0	0	108,356	209,920	CONT.	CONT.
• (U) APN-6 (Spares) JPATS	0	0	0	0	0	0	4,551	11,088	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1150
PROJECT TITLE: Joint Primary Aircraft Training

(U) RELATED RDT&E: Not Applicable

(U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q MS II			3Q/99 MS III
Engineering Milestones			1Q A/C PDR 3Q A/C CDR		
T&E Milestones			2Q A/C QT&E		1Q/98 OA 4Q/98 A/C MOT&E 4Q/99 GBTS MOT&E
Contract Milestones	3Q A/C RFP	4Q A/C AWARD	3Q GBTS AWARD		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Training

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Program Mgmt Support	0	191	90	100
b. Travel	112	100	90	100
c. Government Eng. Support	3,044	2,542	1,602	2,387
d. ILS	46	102	122	164
e. Training Devel. Support	328	367	389	413
f. Contractor Eng. Support	0	390	210	280
g. Cost Analysis	50	60	50	50
Total	3,580	3,752	2,553	3,494

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603208N PROJECT NUMBER: H1150
PROGRAM ELEMENT TITLE: Training System Aircraft PROJECT TITLE: Joint Primary Aircraft Training

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development					0	0	0	0	0	0	0
Support and Management:											
Misc. In-House:											
Various	WX	10/95	17,053	17,053	0	3,580	3,752	2,553	3,494	3,674	17,053
Test and Evaluation					0	0	0	0	0	0	0

GOVERNMENT FURNISHED PROPERTY: Not Applicable

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603208N
PROGRAM ELEMENT TITLE: Training System Aircraft
PROJECT NUMBER: H1150
PROJECT TITLE: Joint Primary Aircraft Training

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	0	0	0	0
Subtotal Support and Management	0	3,580	3,752	2,553	3,494	3,674	17,053
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	0	3,580	3,752	2,553	3,494	3,674	17,053

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0097 Aircrew Impact Injury Prevention	3,767	1,824	957	328	0	0	0	0	0	22,545
W0584 Aircraft Protective Clothing & Devices	11,320	8,775	1,719	3,200	3,494	4,573	4,615	4,735	CONT.	CONT.
W0591 Aircraft Survivability & Vulnerability	3,148	2,583	2,505	2,145	2,324	3,030	3,056	3,131	CONT.	CONT.
W0592 Aircraft & Ordnance Safety	1,665	1,423	1,148	1,280	1,391	1,833	1,848	1,894	CONT.	CONT.
W1819 Carrier Aircraft Fire Suppression System	1,168	1,307	1,148	1,213	1,234	1,516	1,527	1,566	CONT.	CONT.
TOTAL	21,068	15,892	7,477	8,166	8,443	10,952	11,046	11,326	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Aviation Survivability addresses the issues of aircrew and platform survivability, focusing on enhancing overall chances for protection and enhanced performance. The capabilities addressed under this program element counter emerging threats of next generation operational weapons systems and enhance combat effectiveness in future operational mission scenarios.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(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 physiological effects and injuries. Aircrew Protective Clothing and Devices develops, demonstrates and validates technology options that enhance aircrew capability to perform mission and ensures 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 aircraft.

(U) The three remaining projects focus platform survivability, to address not only the reductions in aircraft susceptibility to enemy and non-combat threats but also aircraft and 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. Carrier Aircraft Fire Suppression Systems develop improved firefighting systems and fire protective measures for aircraft carriers.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION and VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0097 Aircrew Impact Injury Prevention	3,767	1,824	957	328	0	0	0	0	0	22,545

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,900) Modified vertical acceleration test equipment for female human response experiments.
- (U) ($625) Continued development of standardized volunteer head-neck kinematic database.
- (U) ($1,000) Completed Phase I of two-dimensional cervical spine injury model; initiated Phase II.
- (U) ($100) Initiated statistical of historical (male) impact database.
- (U) ($90) Initiated physiological stress analysis.
- (U) ($52) Continued long-term medical follow-up of human research volunteers.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: M0097
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Impact Injury Prevention

2. (U) FY 1995 PLAN:

- (U) ($1,824) Analyze male/female head-neck response differences.

3. (U) FY 1996 PLAN:

- (U) ($957) Continue, cataloging and organizing existing databases for computerized archival storage and retrieval.

4. (U) FY 1997 PLAN:

- (U) ($328) Complete computerized database archive.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,728	1,142	XXX	XXX
(U) FY 1995 Appropriated:	XXX	1,842	XXX	XXX
(U) Adjustments from Appro/PRESBUDG	39	-18	XXX	XXX
(U) FY 1996/97 PRESBudget Submit:	3,767	1,824	957	328

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 94 increase reflects local below threshold reprogramming (end-of-year execution update). FY 95 adjustments reflect various Congressional undistributed reductions.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: M0097
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Impact Injury Prevention

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not Applicable

(U) RELATED RDT&E:

(U) PE 0602201F (Aerospace Flight Dynamics)
(U) PE 0604264N (Aircrew Systems Development)
(U) PE 0604506F (Aircrew Systems Development)

D. (U) SCHEDULE PROFILE: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO584 Aircrew Protective Clothing and Devices	11,320	8,755	1,719	3,200	3,494	4,573	4,615	4,735	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops, demonstrates, and validates technology options for functionally integrated aircrew and life support systems designed to enhance mission effectiveness, in-flight protection and emergency survivability. These developments are in accordance with Operational Requirements Documents, such as OR# 210-05-88 for Chemical/Biological (C/B) Protection, OR# 099-05-087 for Laser Eye Protection; Joint Mission Need Statements for a Helmet Mounted High Off-Boresight (HOBS) Cueing/Display System , Air Warrior (AW)System (formerly Aircrew Integrated Ensemble) and advanced anti-G systems; Non-Acquisition Program Development Documents for advanced crew station designs, emergency egress/crash systems and integrated crew protection/performance enhancement systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:
   - (U) ($1,400) Initiated developmental flight test program for HOBS Cueing/Display System.
   - (U) ($450) Completed Laser Visor Eye Protection (LVEP) laboratory and flight test evaluation.
   - (U) ($2,123) Continued Advanced Technology Crew Station (ATCS) contracted system design efforts.
   - (U) ($592) Flight tested Advanced Integrated Life Support System (AILSS) prototypes.
   - (U) ($300) Developed Advanced Aircrew Oxygen Delivery System (AAODS) test hardware and continued model development.
   - (U) ($300) Tested helicopter crashworthiness (CW) prototype devices with helicopter CW seats.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: WO584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

- (U) ($100) Initiated helicopter cockpit safety analysis/design.
- (U) ($120) Completed C/B threat and vulnerability analysis.
- (U) ($930) Initiated joint Navy/Army AW design study.
- (U) ($3,000) Continued Navy tasks in joint US Navy/US Air Force (USN/USAF) escape project.
- (U) ($250) Provided Biofidelic Manikin (BFM) prototypes for testing in project M0097.
- (U) ($1,755) Continued development of Advanced Helmet Vision System (AHVS).

2. (U) FY 1995 PLAN:

- (U) ($455) Achieve AILSS MS II transition.
- (U) ($300) Develop BFM for MS II transition.
- (U) ($375) Attain LVEP MS II transition.
- (U) ($345) Continue Navy tasks in joint Navy/Army AW project.
- (U) ($639) Develop an improved ejection seat for current and future Navy/Marine aircraft.
- (U) ($160) Reach MS II transition of CW load attenuator hardware.
- (U) ($288) Begin construction of test hardware for helicopter crash safety designs.
- (U) ($1,345) Continue ATCS contractor system design efforts.
- (U) ($425) Flight test AAODS designs; complete AAODS system design model.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: WO584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

- (U) ($4,123) Continue development of an AHVS, to include a Tactical Aircraft and an Integrated Helmet System.
- (U) ($300) Initiate tri-service Joint Affordable Cockpit Integration Program (JACIP).

3. (U) FY 1996 PLAN:
   - (U) ($350) Commence design of flightworthy AAODS Ceramic Oxygen Generation System (COGS) for tactical aircraft.
   - (U) ($350) Continue Navy tasks for joint Navy/Army development of AW System.
   - (U) ($369) Initiate DT-1 flight test evaluation of day targeting AHVS.
   - (U) ($250) Initiate workload and mission performance evaluation of ATCS designs in Dynamic Flight Simulator (DFS).
   - (U) ($250) Continue development of controllable propulsion systems for ejection seats in USN/USMC aircraft.
   - (U) ($150) Continue tri-service Joint Affordable Cockpit Integration Program (JACIP).

4. (U) FY 1997 PLAN:
   - (U) ($700) Continue flightworthy AAODS COGS design.
   - (U) ($600) Continue Navy tasks for joint development of AW system.
   - (U) ($293) Continue AHVS day targeting DT-1 and commence night ground targeting evaluation.
   - (U) ($500) Continue workload and mission performance DFS evaluation of contractor ATCS designs.
   - (U) ($744) Initiate dynamic sled testing to demonstrate prototype hardware for new controller and propulsion for improved ejection seat systems in USN/USMC tactical aircraft.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

- (U) ($363) Continue JACIP development with focus on cockpit information management.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget	11,320	3,475	XXX	XXX
(U) FY 1995 Appropriated:	XXX	8,975	XXX	XXX
(U) Ajustments from Appro/95PRESBUDG:	0	- 220	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	11,320	8,755	1,719	3,200

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 95 cut of $220 reflects various Congressional undistributed reductions (University Research, CSS reduction, travel and SBIR).

(U) Schedule: Not applicable.

(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

(U) RELATED RDT&E:

(U) PE 0602201F (Aerospace Flight Dynamics)
(U) PE 0602233N (Mission Support Equipment)
(U) PE 0604264N (Aircrew Systems Development)
(U) PE 0604706F (Aircrew Systems Development)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q MS II AILSS 4Q MS II LVEP 4Q MS II CW Load Attenuator 4Q MS II BFM			
Engineering Milestones					
T&E Milestones			3Q DT-1 AHVS		
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Engineering	4,553	1,014	350	1,013
b. Primary Hardware Development	1,665	1,035	350	600
c. Developmental Test & Evaluation	2,542	1,098	619	1,337
d. Contractor Engineering Support	1,500	4,205	100	100
e. Government Engineering Support	1,020	1,340	250	100
f. Travel	40	63	50	50
Total	11,320	8,755	1,719	3,200

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0584
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILITY PROJECT TITLE: Aircrew Protective Clothing & Devices

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAWC WRM	WX	10/95				2,780	2,960	829	1650	CONT	CONT
NAWC,WRM	Various Contracts					2,467	3,460	240	600	CONT	CONT
NAWC, LAKE	WX	2/96				1,460	950	250	350	CONT	CONT
NAWC, PAX	WX	10/95				1,150	417	200	300	CONT	CONT
NSWC, IH MD	WX	2/96				410	725	150	250	CONT	CONT
NUSC,	WX	N/A				60	0	0	0		
NCCOSC, CA	RX	N/A				376	0	0	0		
USASSDC	MIPR	N/A				350	180	0	0		
NAVSEA	PD	N/A				225	0	0	0		
AAC ST LOUIS MO	MIPR	N/A				500	0	0	0		
WPAFB, OH	MIPR	N/A				100	0	0	0		
WPAFB	MIPR	N/A				11300	0	0	0		
Rockwell, L.A., CA	F33615	92C2290									
Support and Management											
NRCC	RC	N/A				102	0	0	0		
TRAVEL						40	63	50	50	CONT	CONT

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0584
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircrew Protective Clothing & Devices

Test and Evaluation Not Applicable

GOVERNMENT FURNISHED PROPERTY Not Applicable

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Support and Management											
Test and Evaluation											

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		11,178	8,692	1,669	3,150	CONT.	CONT.
Subtotal Support and Management		142	63	50	50	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0		
Total Project		11,320	8,775	1,719	3,200	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO591 A/C/ Survivability & Vulnerability & Safety	3,148	2,583	2,505	2,145	2,324	3,030	3,056	3,131	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: WO591, Air Craft Survivability, Vulnerability and Safety. This project 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 a kill if the aircraft is hit (vulnerability). Types of programs funded under this project include signature reduction efforts, subsystem and component hardening and development of fire and explosion suppression techniques for fuel systems. Effective fiscal year 1996 Chemical/Biological efforts were consolidated under OSD program element 0603384D (Chemical/Biological Defense (Advanced Development).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($614) Developed susceptibility reduction design technology for the AH-1W and F/A-18.
- (U) ($150) Initiated the development of the Naval Air Chemical/Biological Defense concept of operations.
- (U) ($540) Initiated and completed F-14 Retested Survivability Enhancement Program.
- (U) ($218) Completed the power modulation software simulation program.
- (U) ($1,336) Developed survivability analysis methodology and updated aircraft assessments.
- (U) ($200) Initiated the development of the Aircraft Survivability Methodology Database.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS (Continued):

- (U) ($90) Initiated/completed vulnerability reduction design technology for actuators and engine bay fire protection.

2. (U) FY 1995 PLAN:

- (U) ($1,750) Complete AH-1W Survivability Enhancement Program.
- (U) ($250) Develop a survivability RDT&E master plan.
- (U) ($433) Develop survivability analysis methodology and update aircraft survivability assessments.
- (U) ($150) Develop survivability database.

3. (U) FY 1996 PLAN:

- (U) ($1,400) Initiate prototype vulnerability/susceptibility reduction design for aircraft.
- (U) ($200) Continue the development of RDT&E master plan.
- (U) ($270) Continue the development of the Aircraft Survivability Methodology Database.
- (U) ($635) Continue the development of Survivability Analysis Methodology and update aircraft survivability assessments.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: WC591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

4. (U) FY 1997 PLAN:

- (U) ($1,345) Develop prototype survivability reduction design for aircraft and weapons systems.
- (U) ($100) Continue the development of RDT&E master plan.
- (U) ($200) Continue the development of Aircraft Survivability Methodology Database.
- (U) ($500) Continue the development of Survivability Analysis Methodology and update aircraft survivability assessments.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,148	2,621	XXX	XXX
(U) FY 1995 Appropriated:	XXX	2,621	XXX	XXX
(U) Adjustments from Approp FY 95 PRESBUDG:	0	-38	XXX	XXX
(U) FY 1996/97 PRESBUDG Budget submit:	3,148	2,583	2,505	2,145

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 95 reductions reflect various Congressional undistributed reductions.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable (Dollars in thousands)

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv.

(U) RELATED RDT&E:

(U) PE: 0605132D (Joint Techincal Coordinating Group on Aircraft Survivability)
0603384D (Chemcial/Biological Defense (Advanced Development))

D. (U) SCHEDULE PROFILE: Not Applicable

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	854	1,730	1,585	1,395
b. Hardware Test	540	370	0	0
c. Software Development	418	0	0	0
d. Quality Assurance	1,286	433	870	700
e. Travel	50	50	50	50
Total	3,148	2,583	2,505	2,145

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Major Efforts:											
Bell Helicopter Fortworth, TX	SS/CPIF	3/95	1,250	1,250			1,250			0	1,250
TBD	C/CPIF	11/95	1,065	1,065				1,065		0	1,065
NAWCWD CH LK	WX					1,583	312	864	1,154	CONT.	CONT.
All Other Efforts:											
Contractor						200			450		
Field Activity	(various)					1,271	821	526	491	CONT.	CONT.
Support and Management											
Travel						50	50	50	50	CONT.	CONT.
Test and Evaluation											
All Other Efforts						44	150	0	0	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0591
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft Surviv. Vulnerability & Safety

GOVERNMENT FURNISHED PROPERTY Not Applicable

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development Support and Management Test and Evaluation											

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		3,054	2,383	2,455	2,095	CONT.	CONT.
Subtotal Support and Management		50	50	50	50	CONT.	CONT.
Subtotal Test and Evaluation		44	150	0	0	CONT.	CONT.
Total Project		3,148	2,583	2,505	2,145	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0592 Aircraft and Ordnance Safety	1,665	1,423	1,148	1,280	1,391	1,833	1,848	1,894	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project transitions Insensitive Munitions (IM) technology from IM Advanced Development (generic technology) to Air Weapon Systems to comply with Chief of Naval Operations 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).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($282) Completed rocket motor IM risk reduction study for Advanced Rocket System (ARS).
- (U) ($180) Initiated evaluation of aircraft rocket unitary lethal warhead IM technology.
- (U) ($ 58) Evaluated High-Velocity Anti-Radition Missile (HARM) SCO performance.
- (U) ($430) Initiated evaluation of new fuze booster, new warhead explosive, and outgassing liner technologies for Joint Direct Attack Munition II (JDAM II) IM application.
- (U) ($590) Completed the IM demonstration project for the BLU-108 anti-heavy armor submunition for Joint Standoff Weapon (JSOW). Initiated evaluation of new fuze booster, new warhead explosive, and outgassing liner technologies for JSOW unitary warhead IM application.
- (U) ($ 80) Supported the IM effort for the development of the Standoff Land Attack Missile (SLAM) penetrator warhead.

- (U) ($ 45) Assessed weapons systems IM technology transition plans.

2. (U) FY 1995 PLAN:

- (U) ($300) Initiate IM evaluation of Sidewinder rocket motor.
- (U) ($373) Initiate 2.75" rocket motor and unitary lethal warhead IM technology demonstration.
- (U) ($200) Demonstrate outgassing liner technology for Standofff Land Attack Missile (SLAM) Hard Target Penetrating (HTP) warhead.
- (U) ($255) Demonstrate outgassing liner technology for JSOW unitary warhead IM.
- (U) ($250) Initiate IM risk reduction effort for Tomahawk HTP warhead.
- (U) ($45) Continue assessing weapons systems IM technology transition phase.

3. (U) FY 1996 PLAN:

- (U) ($393) Initiate IM demonstration of HARM replacement rocket motor.
- (U) ($165) Complete demonstration of 2.75" rocket motor and unitary lethal warhead IM technology.
- (U) ($175) Complete IM risk reduction effort for Tomahawk HTP warhead.
- (U) ($370) Conduct IM evaluation of Sidewinder rocket motor.
- (U) ($ 45) Assess weapons systems IM technology transition plans.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft & Ordnance Safety

4. (U) FY 1997 PLAN:

- (U) ($417) Demonstrate HARM replacement rocket motor IM technology.
- (U) ($352) Initiate evaluation of IM technology for Advanced Medium Range Air-to-Air Missile (AMRAAM)improvement rocket motor and warhead.
- (U) ($466) Demonstrate Sidewinder rocket motor IM technology.
- (U) ($45) Assess weapons systems IM technology transition plans.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Aircraft & Ordnance Safety

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,665	1,428	XXX	XXX
(U) FY 1995 Appropriated:	XXX	1428	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	-5	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	1,665	1,423	1,148	1,280

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The delta in the FY95 funding of $5K from the Appropriated to the FY96/97 PRESBUDG is a result of a reduction for University Research, travel, and SBIR.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILITY PROJECT TITLE: Aircraft & Ordnance Safety

U) RELATED RDT&E:

(U) PE 0603609N (Conventional Munitions)

D. (U) SCHEDULE PROFILE: Not Applicable

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILITY PROJECT TITLE: Aircraft & Ordnance Safety

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. TRAVEL	16	18	20	20
b. Contractor Engineering Support	45	45	45	45
c. Government Engineering Support	345	347	349	351
d. IM Database	72	100	72	72
e. Developmental Test & Evaluation	1,187	913	662	792
TOTAL	1,665	1,423	1,148	1,280

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILILTY PROJECT TITLE: Aircraft & Ordnance Safety

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)
PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAWC, WPN C.Lake	WX	10/95				1,604	1,360	1,083	1,215	CONT.	CONT.
Support and Management											
Travel						16	18	20	20	CONT.	CONT.
D.P. Associates Arlington, VA	CPFF	10/95				45	45	45	45	CONT.	CONT.
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY Not Applicable

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W0592
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILITY PROJECT TITLE: Aircraft & Ordnance Safety

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		1,604	1,360	1,083	1,215	CONT.	CONT.
Subtotal Support and Management		61	63	65	65	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0		
Total Project		1,665	1,423	1,148	1,280	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N
PROGRAM ELEMENT TITLE: Aviation Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1819 Carrier Aircraft Fire Suppression System	1,168	1,307	1,148	1,213	1,234	1,516	1,527	1,566	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: W1819, CV Air Craft Fire Suppression Systems. This project develops improved firefighting system and fire protective measures for aircraft related fires on aircraft carriers including assessment of aircraft fire properties, the development of the P-25 shipboard firefighting vehicle, improvements to firefighting agents and delivery systems and firefighter training improvements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,100) Continued design and manufacture of P-25 prototypes.
- (U) ($10) Completed first prototype of interactive video fighter trainer.
- (U) ($10) Began development of environmentally safe test and training facilities.
- (U) ($14) Continued development of flight deck fire imaging system.
- (U) ($14) Continued development of ordnance cooling requirements.
- (U) ($10) Continued development of flight deck fire simulator.
- (U) ($10) Initiated new firefighting agent tests.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression System

2. (U) FY 1995 PLAN:

- (U) ($1,014) Complete design and manufacture of P-25 prototypes.
- (U) ($100) Continue development of environmentally safe fire test and training facilities.
- (U) ($40) Continue development of flight deck fire imaging system.
- (U) ($40) Continue development of ordnance cooling requirements.
- (U) ($50) Continue advanced flight deck fire simulator.
- (U) ($63) Continue new firefighting agents tests.

3. (U) FY 1996 PLAN:

- (U) ($300) Continue development of ordnance cooling requirements.
- (U) ($343) Continue development of environmentally safe test and training simulator.
- (U) ($330) Begin fire testing of agents, equipment, and aircraft and ordnance materials.
- (U) ($175) Continue development of flight deck imaging system.

4. (U) FY 1997 PLAN:

- (U) ($250) Continue development of ordnance cooling requirements.
- (U) ($528) Continue development of environmentally safe test and training simulator.
- (U) ($230) Continue fire testing of agents, equipment, and aircraft and ordnance materials.
- (U) ($205) Continue development of flight deck imaging system.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET Date: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression System

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,168	1,326	XXX	XXX
(U) FY 1995 Appropriated:	XXX	1,326	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-19	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	1,168	1,307	1,148	1,213

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The delta in the FY 1995 funding of 19K reflects various Congressional undistributed reductions.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not Applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression System

(U) RELATED RDT&E:

(U) PE: 0603514N (Ship Combat Survivability)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones(MS)	Video Trainer Mods 1 & 2 Complete 4Q	Video Trainer Mods 3 & 4 Complete 4Q			CONT
Engineering Milestones					
T&E Milestones					
Contract Milestones		Contract Completion P-25 3Q			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: AVIATION SURVIVABILITY PROJECT TITLE: Carrier Aircraft Fire Suppression System

A. (U) PROJECT COST BREAKDOWN ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Development & Test Evaluation	1,148	1,196	848	853
b. Training Development	10	100	285	345
c. Travel	10	11	15	15
Total	1,168	1,307	1,148	1,213

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression System

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAWC, CHINA LAKE WX		10/95				60	95	440	520	CONT.	CONT.
NAWC,LAKEHURST WX		10/95				438	200	200	0	CONT.	CONT.
THE ENTWISTLE CO. CPFF		10/95	2,540	2,540	1,130	610	800	0	0	0	2,540
N633590C0163 Hudson, MA											
NRL, WASH WX		10/95				50	200	495	680	CONT.	CONT.
Support and Management											
Travel						10	12	13	13		
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY Not Applicable

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603216N PROJECT NUMBER: W1819
PROGRAM ELEMENT TITLE: Aviation Survivability PROJECT TITLE: Carrier Aircraft Fire Suppression System

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		1,158	1,295	1,135	1,200	CONT.	CONT.
Subtotal Support and Management		10	12	13	13		
Subtotal Test and Evaluation		0	0	0	0		
Total Project		1,168	1,307	1,148	1,213	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 04

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0490 Project BEARTRAP	11,940	6,746	6,417	7,463	7,577	9,432	9,624	9,987	CONT.	CONT.
H1292 Advanced ASW Sensors and Processors	15,747	10,586	11,229	11,319	10,628	11,229	8,919	11,800	CONT.	CONT.
V0968 Advanced ASW Target	6,825	12,314	12,556	11,980	11,677	16,595	16,809	17,245	0	119,774
TOTAL	34,512	29,646	30,202	30,762	29,882	37,256	35,352	39,032	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) Primary programs being funded during the period identified are the Shallow Water ASW Localization and Attack System (SWALAS), which is a potential replacement for the Directional Command Active Sonobuoy System in harsh water, the Air Deployed Low Frequency Projector (ADLFP) non-acquisition program which will demonstrate low frequency acoustic projector technology, the development of enhancement for Extended Echo Ranging (EER) software for P-3C platforms, the Advanced Ranging Source (ARS) non-acquisition program demonstration of potential enhancements for EER source technology, and the Advanced Multistatic Signal Processing (AMSP) non-acquisition program demonstration of

The Advanced ASW Receiver Demonstration/Validation phase is also funded in FY 1997 and out.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 04

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: ASW Systems Development

(U) 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 for national security and other in operationally significant environments including shallow and deep water.

(U) The Advanced ASW Sensors and Processors project 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 submarines, represented by the AKULA.

(U) The Advanced ASW Target project develops the next generation fleet Anti-Submarine Warfare (ASW) training 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 199

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0490 Project BEARTRAP	11,940	6,746	6,417	7,463	7,577	9,432	9,624	9,987	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: BEARTRAP develops new prototype Anti-Submarine Warfare (ASW) tool 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 for in operationally significant environments including shallow and deep water. BEARTRAP uses developmental and prototype hardware and software installed in specifically configured P-3C aircraft to collect data and ground facilities to conduct post mission analysis o this information. BEARTRAP develops 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 Nav 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.

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(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

   - (U) ($118) Completed installation of Maganetic Anomaly Detection (MAD) systems.
   - (U) ($2,075) Continued installation and upgrade to APEX systems in BEARTRAP aircraft.
   - (U) ($4,427) Continued acoustic and non-acoustic data collections for , sensor development and modeling efforts.
   - (U) ($4,782) Continued signal processing development efforts to include acoustic transients, active and passive acoustics, non-acoustics, chaos, neural networks, and BEARTRAP mission critical software (Single Acoustics Signal Processor (SASP), CP.2044).
   - (U) ($438) Continued evaluation of new processing algorithms for advanced MAD systems.
   - (U) ($100) Initiated the integration of advanced classification and image processing into APEX for the Synthetic Aperture Radar/Inverse Synthetic Aperture Radar (SAR/ISAR) systems.

2. (U) FY 1995 PLAN:

   - (U) ($ 799) Continue signal processing development efforts to include acoustic transients, active and passive acoustics and non-acoustics.
   - (U) ($1,357) Continue hardware and software development efforts to equip BEARTRAP aircraft with advanced acoustic and non-acoustic sensor capabilities.

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- (U) ($4,340) Continue acoustic and non-acoustic data collections for , sensor development and modeling efforts.

- (U) ($ 250) Continue evaluation of advanced MAD systems and algorithms.

3. (U) FY 1996 PLAN:

- (U) ($1,449) Continue signal processing development efforts to include acoustics transients, active and passive acoustics and non-acoustics.

- (U) ($ 701) Continue hardware and software development efforts to equip BEARTRAP aircraft with advanced acoustic and non-acoustic sensor capabilities.

- (U) ($4,267) Continue acoustic and non-acoustic data collections for national security and other , sensor development and modeling efforts.

4. (U) FY 1997 PLAN:

- (U) ($1,353) Continue signal processing development efforts to include acoustic transients, active and passive acoustics and non-acoustics.

- (U) ($ 736) Continue hardware and software development efforts to equip BEARTRAP aircraft with advanced acoustics and non-acoustic sensor capabilities.

- (U) ($4,425) Continue acoustic and non-acoustic data collections for national security and other , sensor development and modeling effort.

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- (U) ($ 450) Determine the requirements for the integration of SAR/ISAR advanced classification and image processing into Project BEARTRAP aircraft.
- (U) ($ 499) Continue evaluation of advanced MAD systems and algorithms.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	11,940	7,367	XXX	XXX
(U) FY 1995 Appropriated	XXX	7,367	XXX	XXX
(U) Adjustments from Appropriated/FY1995 PRESBUDG:	XXX	-621	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	11,940	6,746	6,417	7,463

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding reduction in FY 1995 reflects various Congressional undistributed reductions.

(U) Schedule: Limited radar, MAD, active acoustics and APEX signal processor development will be extended over FY 1997 through FY 1999.

(U) Technical: Not applicable

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BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H0490
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: BEARTRAP

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable

(U) RELATED RDT&E:

(U) PE 0205620N	(Surface ASW Combat System Integration)
(U) PE 0603553N	(Surface Anti-Submarine Warfare)
(U) PE 0205632N	(MK 48 ADCAP)
(U) PE 0604261N	(Acoustic Search Sensors)
(U) PE 0604221N	(P-3 Modernization Program)
(U) PE 0604212N	(ASW and Other Helicopter Developments)
(U) PE 0603792N	(Advanced Technology Demonstrations)
(U) PE 0603747N	(Advanced Undersea Warfare Technology)

D. (U) SCHEDULE PROFILE: Not applicable.

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FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

PROJECT NUMBER: H0490
PROJECT TITLE: BEARTRAP

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Research Support Equip.	6,014	4,571	4,716	4,987
b. Software Development	4,461	1,268	701	1,376
c. Systems Engineering	1,415	877	950	1,050
d. Travel	50	30	50	50
Total	11,940	6,746	6,417	7,463

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FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H0490
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: BEARTRAP

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Contracts $1M or more											
Gen Sci Corp NAWCAD(PAX)	C/CPFF	12/93	11,334	11,334	1,497	1,045	1,100	1,100	1,100	5,492	11,334
MISC, all other contracts less than $1M(Agregate Total)					4,043	2,260	2,113	2,185	3,095	CONT.	CONT.
Inhouse Support $1M or more											
NAWCAD(PA)	WR	10/95			2,165	3,060	490	450	450	CONT.	CONT.
NSWC	WR	10/95			1,644	1,159	678	573	500	CONT.	CONT.
NAWCAD(PAX)	WR	11/95			1,487	1,374	600	459	450	CONT.	CONT.
NAWCAD(IIN)	WR	11/95			1,858	1,090	700	650	600	CONT.	CONT.
CPWL,Jax	WR	12/95			1,739	1,322	552	500	500	CONT.	CONT.
Inhouse Support less than $1M (Aggregate Total)					1,531	338	206	300	453	CONT.	CONT.
Support and Management											
MISC, all other contracts $1M or less(Aggregate Total)						292	307	200	315	CONT.	CONT.

Test and Evaluation - Not Applicable

GOVERNMENT FURNISHED PROPERTY - Not Applicable

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BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development

PROJECT NUMBER: H0490
PROJECT TITLE: BEARTRAP

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development					15,964	11,648	6,439	6,106	7,148	CONT.	CONT.
Subtotal Support and Management					0	292	307	311	315	CONT.	CONT.
Subtotal Test and Evaluation					0	0	0	0	0	0	0
Total Project					15,964	11,940	6,746	6,417	7,463		

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 04

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: ASW Systems Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1292 Advanced ASW Sensors and Processors	15,747	10,586	11,229	11,319	10,628	11,229	8,919	11,800	CONT.	CONT.

A. (U) This program provides air Anti-submarine Warfare (ASW) 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, Commonwealth of Independent States (CIS) export KILO, and Soviet developed quiet nuclear submarines, represented by the AKULA. Key objectives are platform accommodations of advanced active and passive sensors, improved detection, classification, localization, tracking and increased capacity and flexibility to handle multi-sensor data loads.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

Shallow Water ASW Localization and Attack Sensor (SWALAS)

- (U) ($1,000) Completed MS 0 and initiated alternative tradeoffs, and analysis in support of the Cost and Operational Effectivness Analysis (COEA).
- (U) ($ 312) Provided engineering support and contract services.

Air Deployable Low Frequency Projector (ADLFP)

- (U) ($ 721) Completed procurement package and specifications, in preparation for contract award.
- (U) ($ 456) Completed procurement of test support hardware.
- (U) ($ 780) Conducted test data reduction and test support.
- (U) ($3,903) Provided other engineering support and contractor support services.

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Extended Echo Ranging (EER)

- (U) ($1,044) Completed software modifications for P-3 acoustic trainer.
- (U) ($ 779) Completed Operational Evaluation (OPEVAL) Phase I flight tests. Began Phase II.
- (U) ($ 252) Began evaluation of potential improvements to the EER source design. Obtained approval of Advanced Ranging Source (ARS) Non-Acquisition Program Descriptive Document (NAPDD).
- (U) ($1,430) Completed dual depth Engineering Change Proposals (ECP) specification.
- (U) ($ 817) Continued P-3C/EER acoustic processing software modifications.
- (U) ($ 771) Completed modifications to facilitate software support.
- (U) ($1,653) Completed Man-Machine improvements to P-3C/EER software.
- (U) ($ 948) Completed development of training materials.
- (U) ($ 881) Provided engineering support and contract services.

2. (U) FY 1995 PLAN:

SWALAS

- (U) ($ 240) Complete COEA analysis and MS I.
- (U) ($ 263) Prepare procurement package and specification.
- (U) ($ 350) Conduct acoustic data collection and analysis.
- (U) ($ 747) Provide engineering support and contract services.

ADLFP
- (U) ($2,119) Award Demonstration Model contract.
- (U) ($ 350) Initiate test, evaluation and data reduction.
- (U) ($1,555) Provide engineering support and contract services.

EER
- (U) ($ 462) Complete correction of OPEVAL deficiencies.
- (U) ($ 283) Complete OPEVAL Phase II.
- (U) ($2,483) Complete engineering support and contract services.

Advanced Ranging Source (ARS)
- (U) ($ 388) Complete source requirements definition.
- (U) ($ 325) Initiate test, evaluation and data reduction.
- (U) ($1,021) Provide engineering support and contract services.

3. (U) FY 1996 PLAN:

SWALAS
- (U) ($1,462) Award Advanced Development Model (ADM) contract for Demonstration/Validation (DEM/VAL) testing.
- (U) ($ 851) Provide engineering support and contract services.

ADLFP
- (U) ($2,250) Complete demonstration test, evaluation and data reduction.
- (U) ($1,007) Provide engineering support and contract services.

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ARS
- (U) ($1,409) Complete test, evaluation and data reduction.
- (U) ($1,600) Complete engineering design and specification.
- (U) ($ 650) Provide engineering support and contract services.

Advanced Multi-Static Processing (AMSP)
- (U) ($1,799) Identify optimum bistatic processing algorithms and initiate prototype.
- (U) ($ 201) Provide other engineering support and contractor support services.

4. (U) FY 1997 PLAN:

SWALAS
- (U) ($3,271) Complete detailed design of the ADM hardware. Conduct critical component tests.
- (U) ($1,183) Provide engineering support and contract services.

ADLFP/ARS
- (U) ($1,969) Complete ARS demonstration and cost/performance evaluation to determine technology to transition to Advanced Extended Echo Ranging (AEER) source development.
- (U) ($ 505) Provide engineering support and contract services.

AMSP
- (U) ($2,122) Code and test processing algorithms with multistatic data set.
- (U) ($ 769) Provide engineering support and contract services.

Advanced Receiver (ADV RCV)
- (U) ($1,500) Conduct COEA and prepare ADM solicitation package and specifications.

UNCLASSIFIED

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT NUMBER: H1292 PROJECT TITLE: Adv ASW Sensors & Processors

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	15,582	11,216		
(U) FY 1995 Appropriated:		11,216		
(U) Adjustments from Approp/PRESBUDG:	+165	-630		
(U) FY 1996/97 PRESBUDG Submit:	15,747	10,586	11,229	11,319

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 increase of +$165K reflects end of year execution update. FY 1995 reduction of -$630K reflects the allocation of undistributed adjustments.

(U) Schedule: SWALAS MS-I slipped from 2Q/95 to 4Q/95, ADM contract award from 1Q/96 to 3Q/96. ADLFP contract award slipped from 2Q/94 to 2Q/95 and the Demo from 4Q/95 to 4Q/96. SWALAS slip resulted from an extended COEA analysis. ADLFP slip resulted from a restructuring of contract requirements.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) RELATED RDT&E:

(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0604261N (Acoustic Search Sensors)

RELEASABLE

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	2Q SWALAS MS 0 4Q ARS NAPDD	4Q SWALAS MS-I			1Q FY00 SWALAS MS-II 2Q FY98 ADV RCV MS-I
Engineering Milestones					3Q FY00 ADV RCV CDR
T&E Milestones	4Q EER Phase I OPEVAL	2Q EER Phase II OPEVAL/MS-III	4Q ADLFP DEMO	1Q ARS DEMO	3Q FY01 ADV RCV DT-1 1Q FY98 SWALAS DT-1
Contract Milestones		2Q ADLFP Demo Award	3Q SWALAS ADM Award		1Q FY99 ADV RCV

UNCLASSIFIED

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Hardware Development	0	2,081	3,000	2,600
b. Systems Engineering	834	751	1,076	1,953
c. Government Engineering Support	5,383	3,367	1,191	906
d. Development Test and Evaluation	1,400	1,025	1,669	350
e. Software Development	2,470	162	500	2,122
f. Test Support Equipment	1,227	174	314	200
g. Test Facilities	0	113	850	500
h. Program Management Support	826	534	600	600
i. Contractor Engineering Support	563	1971	2,029	2,088
j. Trainer Development	1,044	125	0	0
k. Training Development	948	0	0	0
l. Operational Test and Evaluation	779	283	0	0
Total	15,474	10,586	11,229	11,319

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT NUMBER: H1292 PROJECT TITLE: Adv ASW Sensors & Processors

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
TBD	C/CPFF	1/95	TBD	7,681	0	0	2,081	3,000	2,600	0	7,681
NAWCAD/AD WAR	WX	10/95	TBD	TBD	3,700	6,981	2,146	1,267	3,881	CONT	CONT
Misc	WX	10/95	TBD	TBD	0	3,028	1,884	1,500	1,100	CONT	CONT
Support and Management											
NAWC/AD WAR	WX	10/95	TBD	TBD	400	826	534	600	600	CONT	CONT
Misc	C/CPFF	10/95	TBD	TBD	0	563	1971	2,029	2,088	CONT	CONT
Test and Evaluation											
NAWC/AD WAR	WX	10/95	TBD	TBD	695	2,677	1,312	2,833	1050	CONT	CONT
Misc	WX	10/95	TBD	TBD	0	1,399	658	0	0	0	2,057

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program

Product Development - Not applicable
Support and Management - Not applicable
Test and Evaluation - Not applicable

UNCLASSIFIED

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 04 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: H1292
PROGRAM ELEMENT TITLE: ASW Systems Development PROJECT TITLE: Adv ASW Sensors & Processors

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	3,700	10,009	6,111	5,767	7,581	CONT	CONT
Subtotal Support and Management	400	1,389	2,505	2,629	2,688	CONT	CONT
Subtotal Test and Evaluation	695	4,076	1,970	2,833	1,050	CONT	CONT
Total Project	4,795	15,474	10,586	11,229	11,319	CONT	CONT

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603254N
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare (ASW) Systems Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
0968 MK-30 Target Development	6,825	12,314	12,556	11,980	11,677	16,595	16,809	17,245	0	119,774

. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops the next generation fleet Anti-Submarine arfare (ASW) Training target. The mission of the MK 30 Mod 2 ASW Training Target System is to provide cost-effective ASW raining for Navy platforms (surface ships, submarines, and aircraft) by using a highly reliable and maintainable unmanned nderseа vehicle to simulate the dynamics, acoustics, and magnetic signatures of submarines and act as a target for the ASW ensors and torpedoes to detect, classify, track, and pursue in a realistic, operational training environment.

(U) The target will be capable of simulating the Russian and Rest of the World (ROW) submarine threats anticipated in the wenty-first century littoral warfare environment with the degree of simulation fidelity required for effective ASW training, specially simulation of the shallow water, slower speed and conventionally powered submarine.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($3,297) Continued Demonstration & Validation (D&V) phase development contract: design of MK 30 Mod 2 vehicle and support and test equipment. Conducted System Requirements Review (SRR), Systems Design Review (SDR), and Software Specification Review (SSR). Conducted risk mitigation and GFE Development (Battery) efforts ($937).

- (U) ($3,528) Continued program and technical management of the MK 30 Mod 2 development.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

2. (U) FY 1995 PLAN:

- (U) ($7,660) Continue D&V phase development contract. Continue designing MK 30 Mod 2 vehicle and support and test equipment, conducted Preliminary Design Review (PDR), conduct Critical Design Review (CDR), initiate prototype fabrication, conduct risk mitigation and GFE development (Battery) efforts ($1,062).
- (U) ($2,532) Continue program and technical management of the MK 30 Mod 2 development.
- (U) ($2,122) Test and evaluation. Initiate DT-I component level testing at government facilities.

3. (U) FY 1996 PLAN:

- (U) ($7,233) Complete D&V phase development contract. Complete design of the MK 30 Mod 2 vehicle and support and test equipment, complete prototype fabrication, complete risk mitigation and GFE development (Battery) efforts ($936).
- (U) ($2,675) Continue program and technical management of the MK 30 Mod 2 development. Initiate preparation of MS II documentation.
- (U) ($2,348) Test and Evaluation (DT-I). Conduct subsystem testing, integration, and system testing, culminating with in-water static tests. Complete D&V phase Developmental Testing.
- (U) ($300) Initiate preparation of MK 30 Mod 2 Engineering & Manufacturing Development (E&MD) phase contract documentation.

4. (U) FY 1997 PLAN:

- (U) ($8,611) Initiate E&MD phase development contract: refine design of MK 30 Mod 2 vehicle and support and test equipment for manufacturability. Conduct design qualification and verification.
- (U) ($2,469) Continue program and technical management of the MK 30 Mod 2 development. Conduct MS II and E&MD source selection evaluation.
- (U) ($900) Initiate E&MD phase test and evaluation.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	6,825	12,930	XXX	XXX
(U) FY 1995 Appropriated:	XXX	12,930	XXX	XXX
(U) Adjustments from Appropriated/ FY1995 PRESBUDG	0	-616	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	6,825	12,314	12,556	11,980

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 decreased by a total of $616K for the following: Congressional undistributed reductions, university research, contracting services, travel, and SBIR assessments.

(U) Schedule: Funding cuts brought about by fiscal constraints has resulted in milestones slips.

(U) Technical: None

C. (U) OTHER PROGRAM FUNDING SUMMARY: WPN, PE 0204271N, LINE ITEM 314100, ANTI-SUBMARINE WARFARE TARGETS

FY 1994 - FY 1999 $0; FY 2000 - $3,200; FY 2001 - $9,700

(U) RELATED RDT&E: Not applicable

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BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

). (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones				1Q MS II	2Q MS III/02 3Q IOC/03 4Q FOC/05
Engineering Milestones	1Q SRR 3Q SDR 4Q SSR	1Q PDR 3Q CDR			
T&E Milestones		1Q START DT-1	4Q COMPLETE DT-I		
Contract Milestones				2Q E&MD Award	4Q LRIP Award/00 2Q FRP Award/02

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	2,360	6,598	6,297	8,611
b. Ancillary Hardware Development (GFE, Battery)	937	1,062	936	0
c. Technical Design Agent	2,593	1,358	1,873	1,759
d. Developmental Test & Evaluation	0	2,122	2,348	900
e. Contractor Engineering Support	500	500	450	500
f. Program Management Support	435	674	652	210
Total	6,825	12,314	12,556	11,980

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FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 19

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Raytheon Co. Portsmouth RI	C/CPFF	09/93	24,800	25,679	9,545	2,360	6,598	6,297	0	0	24,800
Contractor/TBD	C/CPFF	03/97	TBD	57,423	0	0	0	0	8,611	48,812	57,423
NUWC/NPT	WR	11/93	19,571	19,571	2,412	2,593	1,358	1,873	1,759	9,576	19,571
NUWC/NPT	WR	04/94	2,935	2,935	0	937	1,062	936	0	0	2,935
Miscellaneous	various	various	-	-	1,500	500	500	500	500	2,511	6,011
Support and Management											
Misc	SS/CPFF	various	-	-	316	435	674	602	210	927	3,164
Test and Evaluation											
NUWC/NPT	WR	various	6,486	6,486	0	0	2,122	2,348	900	500	5,870

GOVERNMENT FURNISHED PROPERTY - Not applicable

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603254N PROJECT NUMBER: V0968
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Systems Development PROJECT TITLE: MK-30 Target Development

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	13,457	6,390	9,518	9,606	10,870	60,899	110,740
Subtotal Support and Management	316	435	674	602	210	927	3,164
Subtotal Test and Evaluation	0	0	2,122	2,348	900	500	5,870
Total Project	13,773	6,825	12,314	12,556	11,980	62,326	119,774

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603261N
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A2174 Joint Service Imagery Processing System, Navy (JSIPS-N)	3,105	0*	0	0	0	0	0	0	0	20,417
E0534 Tactical Reconnaissance System	29,435	45,840	18,924	17,737	7,249	1,569	0	0	0	207,633
Total	32,540	45,840	18,924	17,737	7,249	1,569	0	0	0	228,050

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Tactical Airborne Reconnaissance Program develops systems to provide timely and accurate 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 (SAR) 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 Reconnaissance capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System with a suite of sensors that will provide near real time data-linked information, overflight and short range stand-off sensors and all weather SAR sensors, both day and night. A Navy shipboard capability, compatible with the JSIPS-N, will be used for imagery processing, analysis, and storage.

*JSIPS transferred to Program Element 0305154D under Defense Airborne Reconnaissance Office (DARO).

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 6 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

(U) Cost (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E0534 Tactical Reconnaissance System	29,435	45,840	18,924	17,737	7,249	1,569	0	0	0	207,633

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Tactical Airborne Reconnaissance Program develops systems to provide timely and accurate 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 (SAR) 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 Reconnaissance capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System with a suite of sensors that will provide near real time data-linked information, overflight and short range stand-off (O&SRS-O) sensors used for imagery processing, analysis, and storage.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($29,435) Conducted flight demonstration of low and medium altitude electro-optic sensors and infrared line scanner in the F/A-18D Reconnaissance Capable(RC). Completed Preliminary Designed Review (PDR) for the recce data link pod. Completed baseline characterization of Reconnaissance Management System (RMS) software version 3.6. Completed industry trade survey (engineering down select) of 240 Mbps digital tape recorder. Initiated tactical reconnaissance study to develop integrated approach for the Navy Advanced Tactical Air Reconnaissance System (ATARS).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

2. (U) FY 1995 PLAN:

- (U) ($36,122) Award ATARS development contract. Complete critical design review (CDR) of data link pod. Fabricate prototype pod to support Development Test and Evaluation (DT&E). Refurbish sensor suites provided from USAF to make compatible with F/A-18D (RC).
- (U) ($2,996) Commence ATARS DT&E. Continue in-house technical support.
- (U) ($6,772) Continue integration, evaluation, and in-house engineering support for tactical reconnaissance systems.

3. (U) FY 1996 PLAN:

- (U) ($15,070) Continue development of ATARS prototype sensor suites. Commence operational assessment for interim fleet capability.
- (U) ($1,045) Complete developmental flight testing. Commence operational flight testing. Conduct Low-Rate Initial Production (LRIP) program review. Provide in-house technical support.
- (U) ($2,809) Continue in-house engineering support.

4. (U) FY 1997 PLAN:

- (U) ($10,555) Continue development of ATARS prototype sensor suites. Conduct ATARS software development testing for incorporation into 13C.
- (U) ($1,166) Complete Marine Corps operational assessment. Integrate Data Link Pod. Continue in-house technical support.
- (U) ($6,016) Continue in-house engineering support of Data Link Pod.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	29,435	59,372	XXX	XXX
(U) FY 1995 Appropriated:	XXX	47,272	XXX	XXX
(U) Adjustments from PRESBUDG:	0	-1,432	XXX	XXX
(U) FY 1996/97 Congressional Budget Submit:	29,435	45,840	18,924	17,737

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1995 reduction of -$1,432K reflects the allocation of undistributed adjustments.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

(U) PROCUREMENT: Included in the F/A-18 E/F funding.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

(U) RELATED RDT&E:

(U) PE 0204136N (F/A-18 Squadrons (Project E2065 F/A-18 Radar Upgrade Phase II)): Adds all weather reconnaissance capability to multi-mission aircraft; adds SAR imagery mode provisions to radar upgrade.

(U) PE 0206625M (Marine Corps Intelligence/Electronic Warfare System): Receives EO/IR/SAR imagery.

(U) SBIR: Common Aperture Multi-Spectral Sensor and Night IR and Day EO in one sensor.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		2Q/CDR FOR DATA LINK POD	4Q/LRIP PROGRAM REVIEW		
Engineering Milestones	4Q/COMPLETE PDR DATA LINK POD		3Q/ATARS OA	2Q/DATA LINK POD INT DEL	2Q/98 COMPLETE SOFTWARE ENHANCEMENTS
T&E Milestones		3Q/COMMENCE ATARS DT&E	3Q/COMPLETE ATARS DT&E 1Q/CFT	3Q/DATA LINK POD DT 4Q/MARINE CORPS OA 2Q/ATARS LRIP	2Q/99 COMPLETE A/C INTEGRATION TESTING
Contract Milestones		3Q/ATARS DEVELOPMENT CONTRACT AWARD		2Q/PRODUCTION CONTRACT AWARD	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Contract	20,749	36,122	15,070	10,555
b. Support Contract	284	296	280	248
c. In-House Support	7,119	6,722	2,809	6,016
d. GFE Other (T&E)	1,283	2,700	765	918
Total	29,435	45,840	18,924	17,737

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Loral Fairchild Syosset, NY	S-CPFF	Sept 92	91,051	91,051	70,302	20,749	0	0	0	0	91,051
McAir St. Louis, MO	S-CPFF	May 95	TBD	65,718	0	0	36,122	15,070	10,555	3,971	65,718
Support and Management Contracts	Var	Var	TBD	1,972	303	284	296	280	248	561	1,972
Field Activities	Var	Dec 95	40,318	40,318	13,981	7,119	6,722	2,809	6,016	3,671	40,318
Test and Evaluation Field Activities	Var	Var	8,574	8,574	2,293	1,283	2,700	765	918	615	8,574

GOVERNMENT FURNISHED PROPERTY: Not Applicable

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: FEBRUARY 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603261N PROJECT NUMBER: E0534
PROGRAM ELEMENT TITLE: Tactical Airborne Reconnaissance PROJECT TITLE: Tact. Recon Sys

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	70,302	20,749	36,122	15,070	10,555	3,971	156,769
Subtotal Support and Management	14,284	7,403	7,018	3,089	6,264	4,232	42,290
Subtotal Test and Evaluation	2,293	1,283	2,700	765	918	615	8,574
Total Project	86,879	29,435	45,840	18,924	17,737	8,818	207,633

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603382N
PROGRAM ELEMENT TITLE: Advanced Combat System Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
K0324 Advanced Combat System Technology	0	3,342	2,803	4,254	5,477	9,299	8,786	15,806	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element is an FY 1995 new start. Developments in distributed computer architecture, advanced display systems, multiple sensor coordination/complex tactical information management, and radar technology 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 subsequent combat systems, and to plan combat system baseline upgrade schedules. AEGIS Fully Distributed Computing Architecture is the first advanced development effort, and implements the results of distributed processing advances to replace the current AEGIS Combat System architecture with an open, distributed architecture, less dependent on Navy standard computers. These advanced technologies are candidate systems for future baseline upgrades.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1995 PLAN:

- (U) ($250) Perform preliminary system engineering to support the AEGIS Combat System computing upgrade plan.
- (U) ($1,000) Start test bed development for evaluation of candidate computing solutions against AEGIS tactical applications.

- (U) ($1,842) Start development of evaluation procedures and tools for open computer architecture systems and evaluate initial HIPER-D (High Performance Distributed Architecture) candidate computing architectures. Continue work with Advanced Research Project Agency supplied technologies.

- (U) ($250) Assess advanced technologies in the areas of radar technology, advanced display systems and multi-sensor coordination for application to future AEGIS baselines.

3. (U) FY 1996 PLAN:

- (U) ($250) Continue system engineering to plan for transition of candidate AEGIS Combat System computing architectures into future production baselines.

- (U) ($723) Start prototyping and re-engineering activities on AEGIS Weapon System computer programs and port into the HIPER-D test bed.

- (U) ($1,580) Start employing functional partitioning of the AEGIS Weapon System using multi-sensor coordination and advanced tactical information management concepts and measured system performance data to develop AEGIS Weapon System architecture and performance models using prototype modeling tools.

- (U) ($250) Assess advanced technologies in the areas of radar technology, advanced display systems and multi-sensor coordination for application to future AEGIS baselines.

4. (U) FY 1997 PLAN:

- (U) ($300) Continue system engineering in support of transition of candidate AEGIS Combat System computing architectures into production baselines.

- (U) ($1,369) Continue prototyping and re-engineering activities on AEGIS Weapon System computer programs.

- (U) ($2,335) Continue development of AEGIS Weapon System architecture and performance models using prototype modeling tools and multi-sensor coordination and advanced information management concepts.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: Advanced Combat System Technology PROJECT TITLE: Adv Combat System Tech

- (U) ($250) Assess advanced technologies in the areas of radar technology, advanced display systems and multi-sensor coordination for application to future AEGIS baselines.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	3,587	XXX	XXX
(U) FY 1995 Appropriated:	XXX	3,587	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-245	XXX	XXX
(U) FY 1996/97 OSD Budget Submit:	0	3,342	2,803	4,254

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding was decreased in FY 1995 for university research and Small Business Innovative Research (SBIR).

(U) Schedule: Not applicable.

(U) Technical: First advanced development effort will concentrate on distributed computer architecture.

C. (U) OTHER PROGRAM FUNDING SUMMARY: To be determined.

(U) RELATED RDT&E:

(U) PE 0604307N (AEGIS Combat System Engineering)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: Advanced Combat System Technology PROJECT TITLE: Adv Combat System Tech

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					CONT.
Engineering Milestones		2Q/4Q Engrg Demo	3Q Engrg Demo	2Q Engrg Demo	CONT.
T&E Milestones		TBD	TBD	TBD	CONT.
Contract Milestones		TBD	TBD	TBD	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering PROJECT TITLE: Adv Combat System Tech

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Engineering	0	1,337	1,808	2,572
b. Gov. Engineering Support	0	2,005	995	1,632
c. Program Management Support	0	0	0	50
Total	0	3,342	2,803	4,254

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603382N PROJECT NUMBER: K0324
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering PROJECT TITLE: Adv Combat System Tech

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Martin Marietta, Moorestown, NJ	SS/CPFF	04/98	24,110	24,110	0	0	0	0	0	24,110	24,110
Applied Physics Lab. (APL), Baltimore, MD	SS/CPFF	02/95	7,000	7,000	0	0	1,000	1,000	1,000	4,000	7,000
Navy Surface Warfare Center, Dahlgren, VA	WR	10/94	11,284	11,284	0	0	2,005	995	1,632	6,652	11,284
Miscellaneous			6,523	6,523	0	0	337	808	1,572	3,806	6,523
Support and Management											
Miscellaneous			850	850	0	0	0	0	50	800	850

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603382N
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K0324
PROJECT TITLE: Adv Combat System Tech

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	3,342	2,803	4,204	38,568	48,917
Subtotal Support and Management	0	0	0	0	50	800	850
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	0	0	3,342	2,803	4,254	39,368	49,767

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feburary 199

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603451N
PROGRAM ELEMENT TITLE: National Imagery Support (NIS)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRA
X1846 Slow Walker/Joint Tactical Ground System (JTAGS)	0	176	0	0	0	0	0	0	0	17
A2055 National Imagery Support (NIS)	0	2,001	1,383	1,326	924	1,130	1,138	1,172	CONT	CON

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops the capability to provide deployed forces with timely day/night warning and surveillance data. In particular, this program supports efforts to provide warning data on tactica ballistic missiles and aircraft vessels, and provides a capability to deliver timely, original quality imagery to afloat tactica users.

(U) The National Imagery Support (NIS) project exploits other service efforts to electronically provide real time and near rea time original resolution imagery to Joint Service Imagery Processing System-Navy (JSIPS-N). The JSIPS-N Digital Imager Workstation Suite Afloat (DIWSA) serves as the national and tactical imagery processing, analysis, and storage system for afloa TOMAHAWK/TACAIR mission planning, mission rehearsal, and C^{3}I systems.

(U) Joint Tactical Ground Stations (JTAGS) is a joint effort with the U.S. Army to develop and field transportable ground station to process space-based Infrared (IR) data in theater to provide vastly improved warning of theater ballistic missiles attack an Slow Walkers. The JTAGS system will provide information that is accurate and timely to enable destruction of the launcher incoming missile, and provide alertment downrange.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrate hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 199

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603451N
PROGRAM ELEMENT TITLE: National Imagery Support(NIS)

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A2055 National Imagery Support (NIS)	0	2,001	1,383	1,326	924	1,130	1,138	1,172	CONT	CONT

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The National Imagery Support (NIS) project is a project to provide real time/near-real time original quality imagery to afloat forces. An outgrowth of CNO project CHALLENGE ATHENA, NIS will provide the interface between national high capacity imagery sources and the Digital Imagery Workstation Suite Afloat (DIWSA/Joint Service Imagery Processing System - Navy (JSIPS-N). This JSIPS-N DIWSA serves as the national and tactical imagery processing, analysis and storage system for afloat TOMAHAWK/TACAIR mission planning, mission rehearsal, and C^{3}I systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

   - (U) Not Applicable

2. (U) FY 1995 PLAN:

   - (U) ($2,001) Commence development of NIS interfaces with DIWSA and shipboard antenna including NIS Prototype hardware. Commence modification of NIS for shipboard application.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: Feburary 199

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603451N
PROGRAM ELEMENT TITLE: National Imagery Support (NIS)

3. (U) FY 1996 PLAN:

(U) ($1,383) Continue development of NIS interfaces with DIWSA and shipboard antenna, implement hardware prototype, fix Initial Operational Test and Evaluation (IOT&E) deficiencies.

4. (U) FY 1997 PLAN:

(U) ($1,326) Finalize development of NIS interfaces with DIWSA, continue development of NIS interface with shipboar antenna, continue IOT&E software fixes.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	XXX	2,041	XXX	XXX
(U) FY 1995 Appropriated:	XXX	2,041	XXX	XXX
(U) Adjustments from PRESBUDG:		-40	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	0	2,001	1,383	1,326

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Reduction of $40K in FY 1995 reflects the allocation of undistributed adjustments.

(U) Schedule: NOT APPLICABLE

(U) Technical: NOT APPLICABLE

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603451N
PROGRAM ELEMENT TITLE: National Imagery Support (NIS)

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN Line 2903	0	0	1,292	4,082	12,527	17,559	19,427	20,010	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603451N
PROGRAM ELEMENT TITLE: National Imagery Support (NIS)

(U) RELATED RDT&E: NOT APPLICABLE

(U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones			2Q LRIP		1Q98 JSIPS-N (NIS) NIS/JSIPS-N MS III
Engineering Milestones					
T&E Milestones			1Q DT/IOT&E	3&4Q NIS (NIS) TECH/OPEVAL	
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603451N PROJECT NUMBER: A2055
PROGRAM ELEMENT TITLE: National Imagery Support (NIS) PROJECT TITLE: NIS

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Hardware/SW Development	0	1,675	0	0
b. Software, Communication, and Interface Dev.	0	326	1,383	1,326
Total	0	2,001	1,383	1,326

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Miscellaneous		Dec 94-Feb 95	TBD	TBD	0	0	2,001	1,383	1,326	Cont.	Cont.
Support and Management		N/A									
Test and Evaluation		N/A									

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603451N PROGRAM ELEMENT TITLE: National Imagery Support PROJECT NUMBER: A2055 PROJECT TITLE: NIS

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	2,001	1,383	1,326	Cont.	Cont.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	0	0	2,001	1,383	1,326	Cont.	Cont.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0260 Minehunt	17,044	225	7,605	4,240	14,073	19,274	18,939	0	0	229,146
Q1233 MCM Improvements	10,604	8,863	7,065	1,911	1,478	0	0	0	0	184,712
Q2131 Shallow Water MCM	13,489	16,812	19,163	20,399	25,449	22,015	25,863	19,127	CONT.	CONT.
V2094 Unmanned Undersea Vehicle	3,604	16,273	20,694	26,874	22,245	26,043	25,328	25,143	CONT.	CONT.
TOTAL	44,741	42,173	54,527	53,424	63,245	67,332	70,130	44,270	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 down to water depths of ; for use in Mine Countermeasure (MCM) MCM-1 Class, Mine Hunter Coastal (MHC) MHC-51 Class, and other surface ships; (2) systems for detection, neutralizing and sweeping mines from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations; (3) near-term and long-term Unmanned Undersea Vehicle (UUV) systems for clandestine mine reconnaissance.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0260 Minehunt	17,044	225	7,605	4,240	14,073	19,274	18,939	0	0	229,146

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: (1) Improvements to AN/SQQ-32 variable depth minehunting sonar for MCM-1 and MHC-51 class ships; and (2) Remote Minehunting: Remotely controlled minehunting systems for non-MCM platforms. The Buried Mine program has been terminated in FY 1994 providing funding to finance project Q0260 through FY 1995.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) AN/SQQ-32:
  - (U) ($690) Completed TECHEVAL and Operational Evaluation (OPEVAL) on MCM-1.
  - (U) ($140) Milestone III.
  - (U) ($1,009) Conducted color console engineering testing.
  - (U) ($1,350) Finalized color console design and real-time CAD/LRC processing design.
  - (U) ($207) Continued AN/UYK-44 Replacement and Man-Machine interface.
- (U) Remote Minehunting:
  - (U) ($854) Prepared documentation for MSI.
  - (U) ($1,977) Completed RMS operational prototype.

2. (U) FY 1995 PLAN:

- (U) FY 1995 efforts are financed using the FY 1994 asset from the terminated Buried Mine subproject.
- (U) AN/SQQ-32:
  - (U) ($1,650) Complete color console design and real-time CAD/LRD processing design (FY94 funds carry-over).
  - (U) ($1,486 - FY94)($225 - FY95) Continue AN/UYK-44 replacement and man-machine interface.
  - (U) ($123) Conduct color console engineering testing (FY94 funds carry-over).

- (U) Remote Minehunting:
  - (U) ($200) Complete MS I documentation (FY94 funds carry-over).
  - (U) ($6,498) Development of ADM (FY94 funds carry-over).
  - (U) ($860) Upgrade RMS operation prototype (FY94 funds carry-over).

3. (U) FY 1996 PLAN:

- (U) AN/SQQ-32:
  - (U) ($1,043) System hardware and software integration and test.
  - (U) ($462) AT-SEA system test.
  - (U) ($990) Documentation & ILS tasks.

- (U) Remote Minehunting:
  - (U) ($5,110) Continue development of ADM.

4. (U) FY 1997 PLAN:

- (U) Remote Minehunting:
  - (U) ($300) Complete documentation for MS II.
  - (U) ($125) Prepare documentation for EDM contract.
  - (U) ($3,815) Complete development of ADM.

UNCLASSIFIED

Unclassified

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: MineHunt

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	17,029	229	XXX	XXX
(U) FY 1995 Appropriated:	XXX	229	XXX	XXX
(U) Adjustments from FY 1995 PRESBUDG:	15	-4	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	17,044	225	7,605	4,240

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Remote Minehunting - AN/SQQ-32 - FY94 (+$15) End-of-Year Execution update. FY95 (-$4) SBIR cut.
(U) Schedule: Remote Minehunting - Changes due to program restructure: MS I from 1Q FY1995 to 3Q FY1995; Award ADM from 3Q FY1995 to 4Q FY1995; AN/SQQ-32 - P3I PDR from 4Q FY1994 to 2Q FY1995; P3I CDR from 3Q FY1995 to 1Q FY1996.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) MCM (SQQ-32 Backfit)										
OPN Line 81	22,516	33,387	0	0	0	0	0	0	0	67,729
(U) MCM (SQQ-32 Towed Body)										
OPN Line 81	6,135	5,012	0	0	0	0	0	0	0	24,957
(U) Remote Minehunting										
OPN	0	0	0	0	0	7,039	8,706	33,320	CONT.	CONT.
(U) (SQQ-32 P3I)										
OPN	0	0	0	9,612	11,916	18,297	7,667	0	0	47,492

UNCLASSIFIED

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: MineHunt

(U) RELATED RDT&E:

(U) PE 0604373N (Airborne Mine Countermeasures)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q SQQ-32 MS III 2Q RM MS 0	3Q RM MS I		4Q RM MS II	2Q/01 RM MS III
Engineering Milestones		2Q SQQ-32(P3I) PDR	1Q SQQ-32 (P3I) CDR		3Q/98 RM PDR 1Q/99 RM CDR
T&E Milestones	1Q SQQ-32 DT-IIG 1Q SQQ-32 OT-IID	2Q SQQ-32 DT-IIIA	4Q SQQ-32 DT-IIIB	3Q SQQ-32 FQT&E 3Q RM DT-I	3Q/00 RM DT-II 1Q/01 RM OT-II
Contract Milestones	3Q SQQ-32 AWARD RFP CONTRACT	4Q RM AWARD ADM CONTRACT			2Q/98 AWARD EDM CONTRACT 4Q/01 RM AWARD FRP CONTRACT

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MineHunt

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Development	8,047	200	3,490	1,300
b. System Testing	1,912	0	462	330
c. System Engineering Development	2,820	0	1,620	1,325
d. SW Support	1,028	0	350	40
e. Logistics Support	715	0	399	250
f. Procurement Support	945	0	314	125
g. Program Management	1,072	0	600	500
h. Travel	30	25	20	20
i. Misc	475	0	350	350
Total	17,044	225	7,605	4,240

UNCLASSIFIED

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MineHunt

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Raytheon,MA	SS/BOA	06/92	2,136	2,136	1,098	988	0	50	0	0	2,136
Rockwell,CA	SS/BOA	02/94	1,600	1,600	0	1,600	0	0	0	0	1,600
TBD	C/PR	06/95	35,348	35,348	0	3,510	0	1,965	1,300	30,573	37,348
ARL/UT(SPAWAR)	SS/PR	06/91	N/A	2,198	1,454	674	0	70	0	0	2,198
NSWC/CSS	WR	10/95	100,641	100,641	80,234	4,679	200	3,288	2,240	10,000	100,641
NSWC/CRANE	WR	10/95	35,963	35,963	31,354	3,209	0	1,400	0	0	35,963
Misc	Various	Various	13,297	13,297	13,297	0	0	0	0	0	13,297
Support and Management											
Sherikon, VA	C/PR	02/93	2,192	2,192	0	442	0	350	350	1,050	2,192
Misc	Various	Various	12,588	12,588	12,463	30	25	20	20	30	12,588
Test and Evaluation											
NSWC/CSS	WR	10/95	21,183	21,183	7,846	1,912	0	462	330	10,633	21,183

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0	0	0
Support and Management				0	0	0	0	0	0	0
Test and Evaluation				0	0	0	0	0	0	0

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q0260
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MineHunt

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	127,437	14,660	200	6,773	3,540	40,573	193,183
Subtotal Support and Management	12,463	472	25	370	370	1,080	14,780
Subtotal Test and Evaluation	7,846	1,912	0	462	330	10,633	21,183
Total Project	147,746	17,044	225	7,605	4,240	52,286	229,146

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BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q1233 MCM Improvements	10,604	8,863	7,065	1,911	1,478	0	0	0	0	184,712

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: (1) AN/SSN-2(V) Precise Integrated Navigation provides precise navigation and tactical displays for the MCM class ships; (2) AN/SLQ-53 Modular mechanical Single Ship Deep Sweep (SSDS) provide mechanical sweep capability for the MHC class ships; (3) AN/SSQ-94 will provide on board Combat System Training for MCM and MHC ships; (4) Closed Loop Degaussing (CLDG) to improve survivability of mine countermeasures ships; (5) Mission Package 3 (MP3) upgrade to the AN/SLQ-48 to provide destruction of moored mines in place.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) AN/SLQ-53: ($1,859) Continued container and winch development.
- (U) AN/SSQ-94:
  - (U) ($1,379) Conduct PDRs AN/SQQ-32 and completed CDR AN/SSN-2.
  - (U) ($2,325) Installed and tested AN/SLQ-48 and scenario controller.
- (U) CLDG:
  - (U) ($800) Preparation for Milestone II.
  - (U) ($1,125) Procurement for DT-IIA.
  - (U) ($936) Ship prep and installation for DT-IIA.
  - (U) ($0) US/FRANCE MOU Amendment approval.

- (U) MP3 for AN/SLQ-48:
  - (U) ($2,015) Development/Prototype.
  - (U) ($165) PDR.

2. (U) FY 1995 PLAN:

- (U) ($536) AN/SLQ-53: Deliver winch and containers.

- (U) MP3:
- (U) ($200) CDR 2Q/95.
- (U) ($1,800) Prototype testing.

- (U) ($3,464) AN/SSQ-94: SQQ-32 CDR 3Q/95, PDR SYQ-13 3Q/95, install and test AN/SSN-2 module.

- (U) CLDG:
  - (U) ($900) Conduct DT-IIA and DT-IIB SHIPEVAL.
  - (U) ($1,100) Advanced Development Model.
  - (U) ($400) Select algorithm for development model.
  - (U) ($250) Procurement for DT-IIC.
  - (U) ($213) Engineering Support (technical documentation, configuration mgmt).
  - (U) ($0) Milestone II.

3. (U) FY 1996 PLAN:

- (U) ($740) AN/SLQ-53: Conduct DT IIA.

- (U) AN/SSQ-94:
  - (U) ($1,200) Install & test SYQ-13 and AN/SQQ-32 modules, CDR SYQ-13 1Q/96.
  - (U) ($1,031) Fleet intro for MCM & MHC.

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3. (U) FY 1996 PLAN: (cont.)

- (U) CLDG:
  - (U) ($1,217) Prepare and Conduct DT-IIC.
  - (U) ($700) EDM.
  - (U) ($135) Engineering Support (technical documentation and configuration mgmt).
  - (U) ($442) Development of engineering development model for MCM-10.

- (U) MP3 for AN/SLQ-48:
  - (U) ($1,380) OPEVAL and TECHEVAL production representative hardware.
  - (U) ($220) Documentation and support OPEVAL and TECHEVAL.

4. (U) FY 1997 PLAN:

- (U) ($1,911) CLDG: TECHEVAL.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	10,604	8,970	XXX	XXX
(U) FY 1995 Appropriated:	XXX	8,970	XXX	XXX
(U) Adjustments from PRESBUDG:	0	-107	XXX	XXX
(U) FY 1996/97 OSD/OMB Budget Submit:	10,604	8,863	7,065	1,911

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: AN/SLQ-53 - FY 95 (-$14) University research, (-$59) Contract Support Services, (-$12) Travel, (-$22) SBIR.
(U) Schedule: AN/SLQ-53: DT-IIA from 3Q/95 to 2Q/96 due to winch delivery slip. AN/SSQ-94: PDR (SYQ-13) from 1Q/95 to 3Q/95. CDR (SYQ-13) from 3Q/95 to 1Q/96, PDR (SQQ-32) from 4Q/94 TO 1Q/95, CDR (SQQ-32) from 2Q/95 TO 3Q/95. MS III delayed from 4Q/94 to 2Q/96 due to delay in completion of documentation. CLDG: DT-IIA from 4Q/94 to 2Q/95 due to ship availability and DT-IIB initial shipboard tests now scheduled from 2Q/95 to 4Q/95 because of ship availability.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN (SSQ-94)										
Line 262200	2,760	4,194	1,276	1,138	603	1080	0	0	0	11,051
(U) OPN (SLQ-53)										
Line 097500	0	0	0	12,723	0	0	0	0	0	12,723
(U) OPN (SSN-2)										
Line 262200	5,046	0	0	0	0	0	0	0	0	5,046

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE:MCM Improvements

(U) RELATED RDT&E:

(U) PE 0604373N (Airborne Mine Countermeasures) is developing the A/N37U-1 controlled depth helicopter sweep which is to be adapted for AN/SLQ-53.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		2Q CLDG MS II	2Q SSQ-94 MS III 3Q SSQ-94 FLEET INTRO(MCM) 4Q SSQ-94 FLEET INTRO(MHC)	1Q MP3 MS IV 3Q SLQ-53 MS-III	1Q/99 CLDG MS III 2Q/00 CLDG IOC
Engineering Milestones	3Q MP3 PDR 1Q SSQ-94 PDR(SSN-2) 2Q SSQ-94 CDR(SSN-2) 4Q CLDG PDR	3Q MP3 CDR 3Q SSQ-94 CDR(SQQ32) 3Q SSQ-94 PDR(SYQ13) 1Q SSQ-94 PDR(SQQ32)	1Q CLDG CDR 1Q SSQ-94 CDR (SYQ13)		
T&E Milestones	3Q SSQ-94 DT-IIA	2Q CLDG DT-IIA 4Q CLDG DT-IIB	2Q SLQ-53 DT-IIA 3Q MP3 DT-IV 2Q SSQ-94 DT-IIB 4Q MP3 OT-IV 3Q SSQ-94 DT-IIIA 4Q SSQ-94 DT-IIIB 3Q CLDG DT-IIC 4Q SSQ-94 DT-IID	1Q SLQ-53 DT-IIB 2Q SLQ-53 OT-II 4Q CLDG TECHEVAL	3Q/98 CLDG OPEVAL
Contract Milestones		2Q CLDG MOU AMENDMENT	3Q CLDG EDM	4Q SLQ-53 FINAL PRODUCTION	1Q/98 MP3 PROD. 3Q/00 CLDG PROD.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MCM Improvements

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Development	2,516	2,090	1,769	1,570
b. System Testing	2,579	2,023	1,855	200
c. System Engineering Development	39	39	29	0
d. SW Support	1,667	1,450	1,155	21
e. Logistics Support	836	679	310	0
f. Procurement Support	1,652	1,605	1,341	0
g. Program Management	629	567	399	0
h. Travel	60	35	30	20
i. Misc	626	375	177	100
Total	10,604	8,863	7,065	1,911

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MCM Improvements

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NSWC/CSS	WR	10/95	66,871	66,871	60,308	3,163	1,916	1,484	0	0	66,871
NSWC/WO	WR	10/95	51,383	51,383	40,213	2,689	2,828	2,494	1,691	1,468	51,383
NSWC/PORT HUE(YT)	WR	10/95	6,419	6,419	4,125	333	1,196	765	0	0	6,419
INDAL	SS/BOA	06/94	184	184	0	184	0	0	0	0	184
NSWC/CRANE	WR	10/93	4,813	4,813	3,913	900	0	0	0	0	4,813
Support and Management											
SHERIKON	C/PR	02/93	669	669	24	237	233	175	0	0	669
NSWC/CSS	WR	10/95	1,953	1,953	1,805	68	50	30	0	0	1,953
NSWC/PORT HUE(YT)	WR	10/95	4,268	4,268	3,413	245	365	245	0	0	4,268
Misc	Various	Various	4,305	4,305	4,005	205	35	30	20	10	4,305
Test and Evaluation											
NSWC/CSS	WR	10/95	43,557	43,557	36,985	2,580	2,190	1,802	0	0	43,557
NSWC/PORT HUE(YT)	WR	10/95	90	90	0	0	50	40	0	0	90
NSWC/WO	WR	10/96	200	200	0	0	0	0	200	0	200

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0		
Support and Management				0	0	0	0	0	0	0
Test and Evaluation				0	0	0	0	0	0	0

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BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q1233
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: MCM Improvements

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	108,559	7,269	5,940	4,743	1,691	1,468	129,670
Subtotal Support and Management	9,247	755	683	480	20	10	11,195
Subtotal Test and Evaluation	36,985	2,580	2,240	1,842	200	0	43,847
Total Project	154,791	10,604	8,863	7,065	1,911	1,478	184,712

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q2131 Shallow Water MCM	13,489	16,812	19,163	20,399	25,449	22,015	25,863	19,127	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 develops systems for mine sweeping, explosive mine clearance and marking of cleared lanes. Included are the High Speed Remote Influence Sweep (HSRIS), Distributed Explosives Technology (DET), Shallow Water Assault Breach System (SABRE) and follow-on P3I efforts, and Obstacle Breaching System (OBS). Beginning FY98, includes transition of ongoing ATDS to acquisition programs.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) HSRIS:
  - (U) ($400) Finalize requirements specification.
  - (U) ($600) Contract for Project Definition Study.
  - (U) ($740) Evaluation of PDS proposals; contract negotiations.

- (U) DET:
  - (U) ($800) Prepare for Milestone I.
  - (U) ($1,256) Conduct DT-I deployment test to analyze flight dynamics of inert prototype net array.
  - (U) ($2,814) Conduct deployment test to assess structural survivability of new configuration.
  - (U) ($1,000) Conduct demonstration/validation phase.

- (U) SABRE:
  - (U) ($800) Milestone I.
  - (U) ($1,260) Fabricate hardware.
  - (U) ($1,453) Conduct flight tests of live full length line charges.
  - (U) ($500) Conduct explosive tests of static line charges.

- (U) OBS:
  - (U) ($321) Completed MK83 Bomb effectiveness tests.
  - (U) ($347) Conduct alternate concepts feasibility studies.

- (U) BLNS:
  - (U) ($400) Navigation Analyses.
  - (U) ($718) Developmental Tests.
  - (U) ($80) Commercial item description.

2. (U) FY 1995 PLAN:

- (U) HSRIS:
  - (U) ($1,864) Complete project definition study and terminate program.

- (U) DET:
  - (U) ($834) Milestone I.
  - (U) ($2,140) Conduct DT-I deployment of inert/live array on land.
  - (U) ($2,342) Conduct preliminary design.
  - (U) ($300) Conduct DT-I explosive tests against mines.
  - (U) ($1,140) Conduct preliminary Multipurpose Craft Air Cushion (MCAC) integration tests.
  - (U) ($1,384) Conduct array stability tests in the surf.

- (U) SABRE:
  - (U) ($3,349) Fabricate test hardware for DT-I.
  - (U) ($1,809) Conduct flight and effectiveness tests.
  - (U) ($250) Conduct platform integration tests.

- (U) OBS:
  - (U) ($513) Subscale explosive subsystem tests.
  - (U) ($687) Conduct alternate concept feasibility studies.

- (U) BLNS:
  - (U) ($105) Conduct DT.
  - (U) ($95) Milestone III.

3. (U) FY 1996 PLAN:

- (U) DET:
  - (U) ($863) Milestone II.
  - (U) ($5,984) Partial fabrication of DT-II hardware.
  - (U) ($1,153) Conduct DT-IIA tests.
  - (U) ($2,600) Procure long lead detonation cord for DT-IIB/OT.

- (U) SABRE:
  - (U) ($3,730) Fabricate test hardware for DT-I.
  - (U) ($1,181) Deployment and DT-I tests.
  - (U) ($734) Milestone II.

- (U) OBS:
  - (U) ($1,600) Fabricate test hardware for DT-I.
  - (U) ($1,018) Preliminary design.
  - (U) ($300) Milestone I.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Shallow Water MCM

4. (U) FY 1997 PLAN:

- (U) DET:
  - (U) ($8,200) Begin partial fabrication of DT-IIB OT-II hardware.
  - (U) ($2,100) Conduct DET/SABRE Landing Craft Air Cushion (LCAC) interoperability tests.
  - (U) ($591) Update documentation package.
  - (U) ($1,500) MCAC integration.

- (U) SABRE:
  - (U) ($2,000) Begin partial fabrication of DT-II hardware.
  - (U) ($1,202) Begin DT-II.
  - (U) ($400) Procure test targets.

- (U) OBS:
  - (U) ($500) Conduct DT/OT.
  - (U) ($500) Milestone II.
  - (U) ($3,406) System design.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	13,504	18,992	XXX	XXX
(U) FY 1995 Appropriated:	XXX	17,106	XXX	XXX
(U) Adjust from Approp/FY95 PRESBUDG:	-15	-294	XXX	XXX
(U) FY 1996/97 PRESBUDG Budget Submit:	13,489	16,812	19,163	20,399

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Shallow Water MCM

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY94 - OBS (-$15) End of year adjustment, FY95 - (-$27) University research,(-$83) Contract Support Services reduction,(-$26) travel, (-$158) SBIR.

(U) Schedule: HSRIS - (FY95) Congressionally directed to terminate at completion of PDS; SABRE - Milestone II from 4Q/94 to 3Q/96 due to OPNAV sponsor redirection to launch SABREs (under limited conditions)from a moving platform vice launching from the beach into the surf zone; DET - Milestone I 4Q/94 to 2Q/95 and milstone II from 4Q/95 to 3Q/96 due to OPNAV sponsor redirection to launch DETs (under limited conditions)from a moving platform vice launching from the beach into the surf zone; OBS - (FY95) Concept exploration phase extended to consider additional alternatives based on revised requirements. Milestones based on assumption that PR 97 issues will be resolved.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN line (2624)	0	0	398	4,273	16,488	23,076	30,043	37,319	Cont.	Cont.

(U) RELATED RDT&E:

(U) PE 0603555N(Sea Control and Littoral Warfare Technology Demostration).
PE 0603640M and 0602131M (Advanced Countermine System (ACS); USMC M58 line charges).

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Shallow Water MCM

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q SABRE MS-I	2Q DET MS-I 4Q BLNS MS-III HSRIS (Terminated)	3Q OBS MS-I 3Q DET MS-II 3Q SABRE MS-II	3Q OBS MS-II	3Q/99 DET MS-III 1Q/99 SABRE MS-III 4Q/99 OBS MS-III 4Q/98 EN MS-I 4Q/98 ALISS MS-I
Engineering Milestones		2Q DET/SABRE SRR	4Q DET CDR 3Q SABRE CDR		2Q/98 OBS CDR
T&E Milestones		4Q DET DT-I	4Q DET DT-IIA 1Q SABRE DT-I	4Q SABRE DT-II 2Q OBS DT/OT-I	4Q/98 DET DT-IIB 2Q/99 DET OT-II 2Q/98 SABRE OT-II 1Q/99 OBS DT-II 3Q/99 OBS OT-II
Contract Milestones	3Q HSRIS PDS	HSRIS PDS COMPLETE	DET long lead hdwr	DET EDM buy	1Q/98 ALISS EDM RFP

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Shallow Water MCM

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Development	4,847	4,958	9,808	8,539
b. System Testing	3,118	4,131	2,967	3,769
c. System Engineering Development	3,594	5,852	4,854	6,271
d. Logistics Support	600	363	310	780
e. Procurement Support	100	202	335	260
f. Technical Management	835	838	655	560
g. Program Management	200	274	174	155
h. Travel	195	194	60	65
Total	13,489	16,812	19,163	20,399

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Shallow Water MCM

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
FMV,Sweden	Allot	Various	1,543	1,543	943	600	482	0	0	0	2,025
NSWC/PC	WR	10/95	Cont.	Cont.	9,042	4,023	3,679	3,778	2,721	Cont.	Cont.
NSWC/IH	WR	10/95	Cont.	Cont.	9,452	6,984	6,914	9,587	10,533	Cont.	Cont.
NSWC/Crane	WR	10/97	Cont.	Cont.	0	0	0	0	1,750	Cont.	Cont.
Misc	Various	Various	150	150	0	150	0	0	0	0	150
Support and Management											
Sherikon,Va	C/PR	02/93	Cont.	Cont.	714	50	233	174	155	Cont.	Cont.
NSWC/Port Hue(YT)	WR	10/94	815	815	320	195	0	0	0	0	515
NCSC/PC	WR	10/95	Cont.	Cont.	100	30	1066	1524	1457	Cont.	Cont.
NCWC/IH	WR	10/95	Cont.	Cont.	0	0	200	213	700	Cont.	Cont.
Travel	Tvl	Various	Cont.	Cont.	223	195	194	60	65	Cont.	Cont.
Misc	Various	Various	333	333	333	0	0	0	0	0	333
Test and Evaluation											
NCSC/PC	WR	10/95	Cont.	Cont.	1,269	612	1,155	1,715	160	Cont.	Cont.
NSWC/IH	WR	10/95	Cont.	Cont.	2,034	650	2,889	2,112	2,376	Cont.	Cont.
NSWC/Crane	WR	10/97	Cont.	Cont.	0	0	0	0	482		
Misc	Various	Various	957	957	957	0	0	0	0	0	957

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: Q2131
PROGRAM ELEMENT TITLE: Surface and Shallow Water MCM PROJECT TITLE: Shallow Water MCM

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0	0	0
Support and Management				0	0	0	0	0	0	0
Test and Evaluation				0	0	0	0	0	0	0

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	19,437	11,757	11,075	13,365	15,004	Cont.	Cont.
Subtotal Support and Management	1,690	470	1,693	1,971	2,377	Cont.	Cont.
Subtotal Test and Evaluation	4,260	1,262	4,044	3,827	3,018	Cont.	Cont.
Total Project	25,387	13,489	16,812	19,163	20,399	Cont.	Cont.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V2094 Unmanned Underwater Vehicle (UUV)	3,604	16,273	20,694	26,874	22,245	26,043	25,328	25,143	Cont.	Cont.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project has been completely restructured beginning in FY 1994 in response to Congressional direction provided in the FY 1994 DOD Appropriations Act. Specifically, the Office of the Secretary of Defense and the Navy were directed to (1) establish priorities among various proposed UUV programs, (2) focus on near-term mine countermeasures issues, and (3) establish affordable, cost-effective programs. The Navy has developed an overall UUV Program Plan, approved by ASN(RD&A), endorsed by USD(A&T) and forwarded to Congress to support FY 95 budget deliberations.

(U) The Plan establishes a clandestine, near-term mine reconnaissance capability as the Navy's top UUV priority; a long-term mine reconnaissance and avoidance system as priority two; the conduct of surveillance, intelligence and tactical oceanography missions as priority three; and exploring advanced UUV designs for the future as priority four. The UUV Program Plan also: (a) reaffirms the need for continued research and development of enabling technologies to support the conduct of the aforementioned priorities and (b) cancels the Submarine Offboard Mine Search System (SOMSS) program, which had been the Navy's UUV focus in previous Descriptive Summaries for this project.

(U) The UUV project funds development of a clandestine Near-Term Mine Reconnaissance System (NMRS) and a Long-Term Mine Reconnaissance and Avoidance System (LMRS), the Navy's two highest UUV priorities. The NMRS will be a minehunting UUV launched and recovered from an SSN-688 class submarine and will be capable of mine detection, classification, and localization. The UUV Program Plan calls for an NMRS Operational Prototype (OP) system delivered to the Fleet within 3-4 years. Since the NMRS is viewed as a stop-gap capability with a life expectancy of approximately 6 years, the LMRS will be developed to provide a robust, long-term, Fleet capability to conduct clandestine minefield reconnaissance and avoidance. The LMRS will replace the NMRS as the NMRS is retired.

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: V2094
PROJECT TITLE: Unmanned Underwater Vehicle

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($3,604) Prior to program cancellation, and in support of a planned Milestone (MS) I, the SOMSS Cost and Operational Effectiveness Analysis (COEA) was completed. Development of all other SOMSS MS documentation was nearing completion when the program was canceled. In FY 1994 the NMRS program was funded by program elements 0603555N ($4,000) and 0603502N ($789) [see PART B - CHANGE SUMMARY EXPLANATION]. The FY 1994 NMRS efforts included award of a contract for development of the NMRS.

2. (U) FY 1995 PLAN:

- (U) ($14,673) Priority 1: Continue management of the NMRS contract.
- (U) ($1,600) Priority 2: For LMRS conduct MS 0 and begin preparation for MS 1.

3. (U) FY 1996 PLAN:

- (U) ($16,394) Priority 1: Continue to execute and manage NMRS contract.
- (U) ($4,300) Priority 2: Complete LMRS Concept Exploration and Definition Phase and conduct MS I. Develop RFP for LMRS Demonstration and Validation (D&V) phase. Conduct contracting activities and award LMRS D&V contract.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: V2094
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Unmanned Underwater Vehicle

4. (U) FY 1997 PLAN:

- (U) ($10,612) Priority 1: Begin at-sea testing of NMRS.
- (U) ($16,262) Priority 2: Continue to execute and manage LMRS D&V contract. Conduct LMRS PDR.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,604	23,688	XXX	XXX
(U) FY 1995 Appropriated:	XXX	17,949	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG	0	-1,676	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	3,604	16,273	20,694	26,874

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: NAVCOMPT reduced FY 1995 by $1,676 as part of a Congressional Undistributed reduction.

(U) Schedule: The SOMSS schedule is no longer applicable due to the program's cancellation. The new UUV schedule based on the UUV Program Plan is shown in (PART - D SCHEDULE PROFILE) in this R-2. Due to the funding constraints in FY95, the NMRS IOC will be delayed approximately 2 quarters.

(U) Technical: Many of the UUV technologies planned for use in the cancelled SOMSS program are applicable to the four priorities set out in the UUV Program Plan. Projected increases in NMRS prime contract costs necessitated an NMRS restructure in early FY 1995. Priority 3 funds were reallocated to Priority 1, governmment technical support drastically cut and the in-water demonstration eliminated.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: V2094
PROJECT TITLE: Unmanned Underwater Vehicle

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable

(U) RELATED RDT&E:

(U) PE 0602314N (ONR UUV Technology Efforts)
(U) PE 0602315N (ONR UUV Technology Efforts)
(U) PE 0603226E/EE39 (ARPA UUV Technology Efforts)
(U) PE 1160402BB/P204 (Mine Reconnaissance Underwater Vehicle ATD)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		3Q LMRS MS 0	3Q LMRS MS I		TBD Q NMRS IOC/98 2Q LMRS MS II/00 TBD Q LMRS MS III/03 TBD Q LMRS IOC/03
Engineering Milestones		*	*	TBD Q LMRS PDR	TBD Q LMRS CDR/99
T&E Milestones				TBD Q NMRS OP DT	TBD Q LMRS DT-1/99 TBD Q LMRS DT-OT/03
Contract Milestones	4Q NMRS AWARD		4Q LMRS D&V AWARD		3Q LMRS E&MD AWARD/00 TBD Q LMRS PROD AWARD/03

* Integrated design reviews consistent with acquisition streamlining intitiatives

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: V2094
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Unmanned Underwater Vehicle

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	789	13,477	17,766	22,604
b. Contractor Engineering Support	1,400	834	1,050	1,511
c. Government Engineering Support	1,085	1,729	1,138	1,664
d. Program Management Support	300	233	334	435
e. Govt. Developmental Test and Evaluation	0	0	406	660
f. Miscellaneous	30	0	0	0
Total	3,604	16,273	20,694	26,874

NOTE: FY 1994 funding shown is for SOMSS through project cancellation ($2,815) and NMRS ($789).

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603502N PROJECT NUMBER: V2094
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures PROJECT TITLE: Unmanned Underwater Vehicle

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
WEC/NMRS	SS/CPAF	08/94	41,799	41,799	0	789	13,477	16,266	6,591	Cont.	Cont.
WEC - Westinghouse Electric Corporation, Electronic Systems Group, Annapolis MD											
TBD/LMRS D&V	C/CPAF	06/96	TBD	TBD	0	0	0	1,500	16,013	Cont.	Cont.
JOHN HOPKINS	SS/CPFF	01/94	Cont.	Cont.	0	1,400	834	1,050	1,511	Cont.	Cont.
NUWC/NPT	WR	12/93	Cont.	Cont.	0	1,085	1,729	1,138	1,664	Cont.	Cont.
Support and Management											
Miscellaneous	various	various	Cont.	Cont.	0	330	233	334	435	Cont.	Cont.
Test and Evaluation											
Miscellaneous	WR	10/95	Cont.	Cont.	0	0	0	406	660	Cont.	Cont.

NOTE:
Reflects program restructure of 1st Quarter FY 1995

GOVERNMENT FURNISHED PROPERTY - Not applicable

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603502N
PROGRAM ELEMENT TITLE: Surface and Shallow Water Mine Countermeasures
PROJECT NUMBER: V2094
PROJECT TITLE: Unmanned Underwater Vehicle

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	3,274	16,040	19,954	25,779	Cont.	Cont.
Subtotal Support and Management	0	330	233	334	435	Cont.	Cont.
Subtotal Test and Evaluation	0	0	0	406	660	Cont.	Cont.
Total Project	0	3,604	16,273	20,694	26,874	Cont.	Cont.

NEW ARCHIVED

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603504N
PROGRAM ELEMENT TITLE: Advanced Submarine Combat System Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0223 Advanced Submarine Combat System Development	22,608	22,990	21,281	20,610	20,690	27,672	27,425	27,630	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This non-acquisition (Non-ACAT) program supports the advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to address the technology challenges that marginalize tactical control in littoral environments during the performance of a variety of missions including peacetime engagement surveillance, deterrence, regional sea denial, precision strike, task group support, and ground warfare support. Prototype hardware and/or software systems are developed under this program to demonstrate technologically promising system concepts in an at-sea submarine environment. Technology areas specific to this program include transducers, hull-mounted and towed arrays, on-board sonar signal processing, target motion analysis (TMA), multiple contact processing and test and evaluation.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION AND VALIDATION because it develops and integrates hardware for experimental test related to specific ship and aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (C) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,700) Advanced Combat Control. Initiated and conducted laboratory testing of multisensor single leg TMA algorithm. Investigated multisource Data Fusion (DF) techniques.
- (U) ($18,858) Advanced Sonar Systems and Processing. Completed land-based testing of Advanced Mine Detection System (AMDS) inboard electronics systems. Completed transition description of Extended Sensor development.

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Initiated trade-off studies and analyses for hull mounted array development. Contined Automated Detection/Automated Classification (AD/AC) algorithm development. Finalized commenced integration of MRADE III ADM. Completed Multi-Line Towed Array (MLTA) Advanced Technology Demonstration (ATD) joint (V0223/ATD) effort. Completed towed array wet-end improvements including heading and depth sensor development, and reduced flow noise array design. Continued technology efforts in the development of fiber optic acoustic sensor systems.

- (U) ($1,050) Test and Evaluation. Conducted sea tests of automated localization and classification algorithms in support of TAP ADM development. Conducted planning for sea tests of dry-end processing improvements, including Mid-Frequency Active Improvement (MFAI). Finalized test planning for FY95 RANGEX. Initiated test planning for RANGEX 3QFY96.

2. (U) FY 1995 PLAN:

- (U) ($3,000) Advanced Combat Control. Integrate automated geographically referenced tactical plots with other ongoing developmental systems including TMAI and NAVSSI, and sea test. Continue multisource data fusion technique improvements and ADM upgrades.

- (U) ($12,290) Advanced Sonar Systems and Processing. Sea test AD/AC algorithms. Initiate improvements to fleet towed arrays based upon technology transitioned from MLTA ATD to improve array gain, shallow water noise discrimination and Complete efforts in Variable Depth Sonar Towed Array (VDSTA) cable development. Continue fiber optic sensor acoustic systems efforts in support of hull array development.

- (U) ($6,400) High Frequency Sonar Plan. Conduct lake test of HFSP sail Receive array.

- (U) ($1,300) Test and Evaluation. Complete post exercise analysis of FY95 RANGEX. Initiate test planning for follow-on FY96 RANGEX. Conduct sea test of wet and dry end towed array improvements including heading and depth sensors, and adaptive beam forming. Conduct sea test of dual array Advanced Fleet towed array system including AD/AC, TMAI, automated bearing ambiguity resolution and automated MRADE. Conduct MFAI sea test.

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3. (U) FY 1996 PLAN:

- (U) ($2,520) Advanced Tactical Control. Complete development of prototype tactical control system and demonstrate during FY96 RANGEX sea test.
- (U) ($11,761) Advanced Sonar Systems and Processing. Continue towed array development to improve array gain, shallow water noise discrimination and Continue fiber optic acoustic sensor systems efforts in support of hull array development.
- (U) ($6,000) High Frequency Sonar Plan. Complete HFSP Sea Test including sail receive array. Transition HF software and tactical passive algorithms and specifications
- (U) ($1,000) Test and Evaluation. Complete post exercise analysis of FY95 RANGEX and documentation of system level measures of effectiveness. Begin planning and installation support effort for follow-on FY98 RANGEX 1QFY98. Finalize planning and conduct FY96 RANGEX. Initiate post exercise analysis.

4. (U) FY 1997 PLAN:

- (U) ($3,500) Advanced Tactical Control. Continue tactical control geographically referenced information management and shallow water TMAI developments.
- (U) ($12,310) Advanced Sonar Systems and Processing. Continue automated tactical passive processing development Continue towed array development to improve array gain, shallow water noise discrimination and Complete RANGEX tactical passive performance analysis and MOE documentation. Conduct hull array acoustic sensor testing including fiber optic acoustic velocity sensor.
- (U) ($3,800) High Frequency Sonar Plan. Continue HFSP efforts including performance analysis of HFSP sea test data, completion of transition documentation

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Adv. Submarine Combat Sys. Dev. PROJECT TITLE: Adv. Sub. Combat Syst. Dev.

- (U) ($1,000) Test and Evaluation. Complete planning for FY98 RANGEX. Complete post exercise analysis of FY96 RANGEX and documentation of system level measures of effectiveness.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	22,608	20,564	XXX	XXX
(U) FY 1995 Appropriated:	XXX	23,864	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-874	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	22,608	22,990	21,281	20,610

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding has been decreased by $874K due to general reductions.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Adv. Submarine Combat Sys. Dev. PROJECT TITLE: Adv. Sub. Combat Sys. Dev.

(U) RELATED RDT&E:

(U) PE0603562N (Submarine Tactical Warfare System)
(U) PE0604524N (Submarine Combat System)
(U) PE0604503N (Submarine System Equipment Development)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones		1Q-Transition Dual Towed Array Alg			
T&E Milestones	1Q-VDSTA Sea Test 4Q-Dual Towed Array Processing Test 4Q-TAP ADM Test 4Q-Multiline Surface Ship Sea Test	1Q-AD/AC Sea Test 1Q-MFAI Sea Test 2Q-MultiSensor SingleLeg Test 2Q-2QFY96 AMDS Chin Sail Xmit Array 4Q-HFSP Receive Sail Array Lake Test 2Q-Automated Multipath Evaluation 4Q-TMAI Sea Test	3Q-RANGEX 2Q-HFSP Sail Array	3Q-Hull Array Sea Test	
Contract Milestones					

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Adv. Submarine Combat Sys. Dev. PROJECT TITLE: Adv. Sub. Combat Sys. Dev.

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Product Development	*20,873	**21,420	19,991	19,310
b. Support & Management	685	270	290	300
c. Test & Evaluation	1,050	1,300	1,000	1,200
Total	*22,608	**22,990	21,281	20,610

* FY94 total includes $3000K NAVCOMPT deferral due to funds appropriated but not authorized.
**FY95 total includes $3300K on NAVCOMPT deferral.

DEPARTMENT OF THE NAVY

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Adv. Submarine Combat Sys. Dev. PROJECT TITLE: Adv. Sub. Combat Sys. Dev.

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
-NUWC/NL	WR	10/94	Cont.	Cont.	29,082	19,222	19,373	17,206	15,650	Cont.	Cont.
-Misc Contracts	CPFF		Cont.	Cont.	1,625	1,651	2,047	2,785	3,660	Cont.	Cont.
Support and Management											
-Contractor(s)	CPFF		Cont.	Cont.	344	635	220	240	250	Cont.	Cont.
-Travel	N/A				65	50	50	50	50	Cont.	Cont.
Test and Evaluation											
-NUWC	WR	10/94	Cont.	Cont.	616	630	650	675	580	Cont.	Cont.
-Contractors	CPFF		Cont.	Cont.	410	420	650	325	420	Cont.	Cont.

GOVERNMENT FURNISHED PROPERTY: Not Applicable

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603504N PROJECT NUMBER: V0223
PROGRAM ELEMENT TITLE: Adv. Submarine Combat Sys. Dev. PROJECT TITLE: Adv. Sub. Combat Sys. Dev.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	30,707	20,873	21,420	19,991	19,310	Cont.	Cont.
Subtotal Support and Management	409	685	270	290	300	Cont.	Cont.
Subtotal Test and Evaluation	1,026	1,050	1,300	1,000	1,000	Cont.	Cont.
Total Project	32,142	22,608	22,990	21,281	20,610	Cont.	Cont.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0225	8,692	0	0	0	0	0	0	0	0	201,173
Surface Ship Torpedo Defense										
V2045	25,218	20,460	10,049	7,758	1,990	1,990	2,188	2,189	CONT.	CONT.
Joint US/UK SSTD										
TOTAL	33,910	20,460	10,049	7,758	1,990	1,990	2,188	2,189	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SSTD program, previously funded under Projects V0225 and V2045, were consolidated into a single program in FY 95.

(U) This Consolidated program combines the best aspects of the SSTD National and SSTD Joint Programs into a phased development/production approach. This approach promotes introduction of equipment and capabilities into the fleet at the earliest opportunity. These initial equipments and capabilities are built upon through the development and production phases culminating in a SSTD System that provides Combatants, Amphibious Assault, Combat Logistic Force, and Aircraft Carriers with the optimum torpedo defense system for their ship class.

(U) The SSTD Programs' phased development approach pursues six areas necessary for effective torpedo defense. The AN/SLR-24 subsystem is being developed to provide ships with no ASW capability the ability to detect incoming torpedoes. This is accomplished using a towed array sensor, a detection unit for beamforming and signal processing, and a display and control unit to provide output data to the user. The Launched Expendable Acoustic Device (LEAD) will provide an effective countermeasure against acoustic homing torpedoes at a greater standoff distance. The SSTD integrated system ensures the best use of countermeasures, tactics, and detection systems are planned and engineered for the best application on each ship class.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N PROJECT NUMBER: V2045
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense PROJECT TITLE: JT US/UK SSTD

The Torpedo Alertment Processor (TAP) will provide a torpedo detection system for ships with an existing ASW capability. This will be accomplished by providing a new signal processing and beamforming electronics cabinet and using the ships existing hull and towed sensors. Improved detection capabilities are being examined and include improved towed array sensors and potentially the use of sonobuoys. An improved expendable countermeasure is also being examined to provide a more robust expendable countermeasure.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,616) Conducted modeling and assessment efforts for Demonstration and Validation (D&V).
- (U) ($2,060) Conducted Countermeasures studies, analysis, and evaluation for D&V.
- (U) ($1,012) Conducted Combat Control (CC) processing and interface upgrade efforts for D&V.
- (U) ($4,970) Conducted Detection Classification Localization (DCL) processing enhancement studies and Risk Mitigation (RM) trials data evaluation for D&V.
- (U) ($760) Continued technical and logistic support efforts.
- (U) ($1,300) Continued Torpedo Alertment Hardware/Software Development.
- (U) ($2,200) Initiated LEAD Development.
- (U) ($875) Continued AN/SLR-24 systems engineering analysis, and hardware/software upgrades.
- (U) ($625) Commenced algorithm update and simulation of software upgrades to verify performance.
- (U) ($8,800) Exercised D&V contract in FY 95 (Dec 94) with FY 94 funds.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N PROJECT NUMBER: V2045
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense PROJECT TITLE: JT US/UK SSTD

2. (U) FY 1995 PLAN:

- (U) ($2,355) Conduct consortium modeling and assessment efforts.
- (U) ($1,230) Conduct consortium processing and interface CC upgrades efforts.
- (U) ($7,322) Conduct consortium countermeasures and DCL processing enhancement studies, analysis, evaluation, and trial evaluations.
- (U) ($2,913) Continue Torpedo Alertment Hardware/Software Development.
- (U) ($3,800) Continue LEAD Development.
- (U) ($630) Complete AN/SLR-24 systems engineering, and hardware/software upgrades.
- (U) ($910) Complete AN/SLR-24 algorithm analysis, software upgrade, and simulation.
- (U) ($1,300) Conduct in-water tests for AN/SLR-24, TECHEVAL, and OPEVAL.

3. (U) FY 1996 PLAN:

- (U) ($4,000) Conduct D&V Phase Subsystem Development and analysis.
- (U) ($1,700) Conduct Test and Evaluation on Torpedo Alertment Processor.
- (U) ($4,349) Complete Torpedo Alertment Processor Combatant Development and Integration.

4. (U) FY 1997 PLAN:

- (U) ($3,700) Complete D&V Phase Subsystem Development.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N PROJECT NUMBER: V2045
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense PROJECT TITLE: JT US/UK SSTD

- (U) ($1,300) Conduct Torpedo Alertment in-water Test and Evaluation on combatants.
- (U) ($2,758) Complete Torpedo Alertment Processor combatant Integration.

5. (U) BUDGET ACTIVITY 4: The program is funded under DEMONSTRATION AND VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N PROJECT NUMBER: V2045
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense PROJECT TITLE: JT US/UK SSTD

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	25,218	30,247	XXX	XXX
(U) FY 1995 Appropriated:	XXX	20,947	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	-487	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	25,218	20,460	10,049	7,758

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 funding was decreased 104K for Small Business Innovative Research and 383K due to undistributed Congressional reductions for university research, travel, and consulting services. These decreases will reduce Torpedo Alertment Processor algorithm development efforts.

(U) Schedule: Torpedo Alertment Processor algorithm development schedule will not be affected.

(U) Technical: Technical efforts have been restructured in accordance with new program plans.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603506N
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

PROJECT NUMBER: V2045
PROJECT TITLE: JT US/UK SSTD

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q LEAD MS II	1Q SSTD Integrated System MS I	1Q AN/SLR-24 MS III 4Q LEAD MS III		1Q 02 SSTD Integration MS II
Engineering Milestones		1Q TAP PDR	3Q TAP ECP for Combatants	3Q TAP ECP for FEUs	1Q 01 SSTD Integration Requirements DEF
T&E Milestones		1Q AN/SLR-24 DT II-A/B 1Q ATT DT 3Q AN/SLR-24 TECHEVAL 4Q AN/SLR-24 OPEVAL 3Q TAP DT	3Q TAP FOT&E for combatants 2Q LEAD DT/OT	3Q TAP FOT&E for FEU's	4Q 07 SSTD Integration DT/OT
Contract Milestones	4Q LEAD Contract Initiation	1Q SSTD Integration D&V Award			1Q 02 SSTD Integration EMD Award

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N PROJECT NUMBER: V2045
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense PROJECT TITLE: JT US/UK SSTD

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Product Development	24,001	18,617	8,524	6,233
b. Program Management Support	1,149	1,300	750	750
c. Developmental Test and Evaluation	0	400	600	600
d. Travel	68	143	175	175
Total	25,218	20,460	10,049	7,758

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603506N
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

PROJECT NUMBER: V2045
PROJECT TITLE: JT US/UK SSTD

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Martin Marietta Syracuse, NY	C/CPFF	3/86	49,371	49,371	47,371	600	1,400	0	0	CONT.	CONT.
Alliant St. Paul, MN	SS/CPAF	4/90	16,801	16,801	13,701	0	0	0	0	CONT.	CONT.
Martin Marietta Syracuse, NY	C/FFP	2/92	3,731	3,731	3,731	0	0	0	0	0	0
Westinghouse Sykesville, MD	C/FFP	2/92	20,676	20,676	3,876	8,800	8,000	0	0	CONT.	CONT.
Torpedo Alert-ment	VAR	VAR						3,100	1,800	3,400	CONT.
NUWCD/NPT/NL/KPT	WR/RCP	VAR			6,018	7,378	2,318	4,199	3,208	CONT.	CONT.
CSS/PC	WR	VAR			9,712	5,052	4,542	1,400	1,400	CONT.	CONT.
NCCOSC/SD	WR	VAR			975	200	200	0	0	CONT.	CONT.
NSWC/WO	WR	VAR			2,354	1,845	1,700	0	0	CONT.	CONT.
Other In-House					225	194	600	0	0	CONT.	CONT.
Support and Management											
Vredenburg	C/CPFF	4/90	4,632	4,632	2,484	1,149	1,000	0	0	CONT.	CONT.
Other Contracts	TBD	TBD			0	0	300	750	750	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603506N
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

PROJECT NUMBER: V2045
PROJECT TITLE: JT US/UK SSTD

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Test and Evaluation											
OPTEVFOR	WR	WR			0	0	400	600	600	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603506N
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense
PROJECT NUMBER: V2045
PROJECT TITLE: JT US/UK SSTD

GOVERNMENT FURNISHED PROPERTY: Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	87,963	24,069	18,760	8,699	6,408	CONT.	CONT.
Subtotal Support and Management	2,484	1,149	1,300	750	750	CONT.	CONT.
Subtotal Test and Evaluation	0	0	400	600	600	CONT.	CONT.
Total Project	90,447	25,218	20,460	10,049	7,758	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0517 CV ASW Module	407	0	0	0	0	0	0	0	0	81,213
S1722* CV Weapons Elevator Improvements	862	1,191	1,033	719	927	1,092	1,099	1,128	CONT.	CONT.
W1723 CV Launch and Recovery Systems	9,792	14,002	3,193	3,427	3,521	4,375	4,384	4,470	CONT.	CONT.
S2208* Future CV R&D	0	0	11,938	11,936	1,990	1,990	1,990	1,990	CONT.	CONT.
TOTAL	11,061	15,193	16,164	16,082	6,438	7,457	7,473	7,588	CONT.	CONT.

* FY94 and prior funded under projects W1722 and W2208

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:

(U) (S0517) Development of computer and equipment improvements to the Aircraft Carrier Antisubmarine Warfare Module.

(U) (S1722) Development of standardized, supportable and maintainable aircraft carrier (CV/CVN) weapons elevators components.

(U) (W1723) Development of all systems required to provide approach and landing guidance and control, recovery, 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.

(U) (S2208) Development of ship hull, mechanical and electrical and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, survivability and operation capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST ($ in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1722* CV Weapons Elevator Improvements	862	1,191	1,033	719	927	1,092	1,099	1,128	CONT.	CONT.

* FY94 and prior funded under project W1722

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevators 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.

(U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($ 79) Conducted hydrostatic tests on improved seal in Elevator Ballistic Watertight Door (EBWTD).
- (U) ($413) Developed and procured prototype Programmable Logic Controller (PLC). Installed PLC on Land Based Engineering Site (LBES).
- (U) ($ 95) Conducted evaluation of wire rope and wire rope end fitting test devices.
- (U) ($ 43) Completed Hydraulic Fluid Compression Ignition Test Machine prototype tests.
- (U) ($232) Completed prototype computerized Magazine Arrangement Planning Aid (MAPA).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

2. (U) FY 1995 PLAN:

- (U) ($ 78) Conduct prototype PLC testing.
- (U) ($350) Conduct shipboard test of MAPA software.
- (U) ($ 91) Complete EBWTD drawings.
- (U) ($124) Complete wire rope test device evaluation.
- (U) ($238) Initiate variable speed AC drive specification development.
- (U) ($234) Complete testing of solid state proximity switches.
- (U) ($ 76) Conduct evaluation of elevator circuit breakers.

3. (U) FY 1996 PLAN:

- (U) ($733) Develop and fabricate prototype variable speed AC drive system.
- (U) ($300) Develop advanced platform position sensor.

4. (U) FY 1997 PLAN:

- (U) ($415) Conduct variable speed AC drive tests on LBES.
- (U) ($304) Fabricate Elevator Ballistic Watertight Hatch (EBWTH) on LBES.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	862	1,183	XXX	XXX
(U) FY 1995 Appropriated:	XXX	1,183	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	+8	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	862	1,191	1,033	719

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 funds were provided under Project W1722. FY 1995 reflects reduction of $2K for university research, a reduction of $1K for travel, a reduction of $4K for SBIR and an increase of $15K from a sweep up of residuals.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	4Q Complete Hyd Ign Test Mach				
Engineering Milestones	4Q MAPA Prototype	2Q Complete BWTD Drawing	1QDevelop AC Drive 2Q Develop Sensor	4Q Install EBWTH	
T&E Milestones	3Q Install PLC 4Q Test Impr EBWTD Seal	2Q Wire Rope Test 4Q Test PLC 4Q Test MAPA			
Contract Milestones	3Q Procure PLC		2Q Procure AC Drive		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

A. (U) PROJECT COST BREAKDOWN: ($ IN THOUSANDS)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	413	238	733	304
b. Ancillary Hardware Development	0	0	300	0
c. Software Development	232	200	0	0
d. Integrated Logistics Support	0	91	0	0
e. Developmental Test & Evaluation	217	662	0	415
TOTAL	862	1,191	1,033	719

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: ($ in thousands)

PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Misc.	Misc.	Misc.	CONT.	CONT.	6,925	862	1,191	1,033	719	CONT.	CONT.
Support and Management	Not applicable.										
Test and Evaluation	Not applicable.										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S1722
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Weapons Elevator Improvements

GOVERNMENT FURNISHED PROPERTY:

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development	Not applicable.									
Support and Management	Not applicable.									
Test and Evaluation	Not applicable.									

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	6,925	862	1,191	1,033	719	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	6,925	862	1,191	1,033	719	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1723 CV Launch & Recovery Systems	9,792	14,002	3,193	3,427	3,521	4,375	4,384	4,470	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Demonstration and Validation (DEMVAL) of advanced systems to meet Navy unique shipboard operational requirements for:

(U) DEMVAL of advanced systems to modernize catapults and arresting gear and shipboard support systems. This area is developing the Electromagnetic Aircraft Launch System (EMALS) including its associated power generation/storage/distribution system and closed loop control system and continuation of previous efforts to integrate the EMALS with a ski-jump.

(U) DEMVAL of advanced optical, electro-optical and laser tracking, approach and landing control and guidance systems and air operations reporting systems for pilots, Landing Signal Officers (LSO) and ship's crew. The Improved Carrier Optical Landing System (ICOLS), which includes the Improved Fresnel Lens Optical Landing System (IFLOLS) and the Long Range Line-up System (LRLS), 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 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. ISIS also includes supporting systems which will optimize the flow and processing of situational management information. The Virtual Imaging System for Approach and Landing (VISUAL) will provide the ship's company and pilots with enhanced images of the aircraft and ship, respectively, in low visibility and night conditions. The Shipboard Wind Measurement System (SWMS) is being developed to provide more accurate wind speed and direction information to the ship's crew so that they can make decisions affecting the safety of air operations onboard ships. The Shipboard Optical Landing System (SOLS) will provide advanced visual landing aids (VLA) for fixed wing, rotary wing and VSTOL aircraft, so that pilots can fly safer and more accurate approaches to all classes of ships.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Launch & Recovery Systems

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,085) Completed fabrication and initiated testing of critical EMALS components. Continued development of integrated EMALS/Ski-Jump.
- (U) ($1,710) Completed design and initiated fabrication of ICOLS IFLOLS Advanced Development Model (ADM).
- (U) ($3,935) Completed fabrication and started shipboard installation of ISIS ADM and continued development of supporting situational management systems.
- (U) ($467) Completed qualification testing of VSTOL OLS ADM and conducted MS III production decision.
- (U) ($1,595) Terminated the Signature Managed Air Traffic Control, Approach and Landing System ADM contract.

2. (U) FY 1995 PLAN:

- (U) ($3,535) Complete Critical Component Demonstration (CCD) of EMALS, including initiation of a full-scale pulse power source demonstration and make decision whether to proceed to design and fabrication of EMALS ADM. Continue development of integrated EMALS/Ski-Jump.
- (U) ($2,293) Complete fabrication and acceptance testing of ICOLS IFLOLS ADM and initiate shipboard installation.
- (U) ($8,174) Complete shipboard evaluation of ISIS ADM and continue development of supporting situational management systems.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Launch & Recovery Systems

3. (U) FY 1996 PLAN:

- (U) ($1,155) Continue engineering support for the EMALS ADM.
- (U) ($2,038) Complete development of ISIS ADM supporting situational management systems and conduct Milestone II decision to proceed to Engineering and Manufacturing Development (E&MD).

4. (U) FY 1997 PLAN:

- (U) ($1,175) Continue engineering support for the EMALS ADM.
- (U) ($2,252) Initiate development of the VISUAL ADM.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	9,792	12,678	XXX	XXX
(U) FY 1995 Appropriated:	XXX	14,178	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-176	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	9,792	14,002	3,193	3,427

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 reflects a reduction of $22K for university research, a reduction of $48K for Contractor Support Services (CSS), a reduction of $18K for travel and a reduction of $88K for SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

PROJECT NUMBER: W1723
PROJECT TITLE: CV Launch & Recovery Systems

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602122N (Aircraft Technology)

(U) PE 0604512N (Shipboard Aviation Systems)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	VSTOL OLS: 2Q MS III	EMALS: 4Q GO/NO GO ICOLS: 2Q MS II ISIS: 3Q MS I	ISIS: 1Q MS II	VISUAL: 1Q MS I	SWMS: 98/4Q MSII EMALS: 99/1Q MSII VISUAL: 01/1Q MSII
Engineering Milestones	ICOLS: 2Q PDR	ISIS: 3Q PDR			VISUAL: 98/1Q PDR SWMS: 991Q PDR
T&E Milestones		EMALS: 3Q CCD ISIS: 3Q DEMVAL			VISUAL: 99/4Q DEMVAL SWMS: 00/4Q DEMVAL
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Launch & Recovery Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	5,875	9,106	1,920	2,040
b. Software Development	1,957	2,535	640	680
c. Integrated Logistics Support	980	1,268	320	340
d. Developmental Test & Evaluation	980	1,093	313	367
Total	9,792	14,002	3,193	3,427

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Launch & Recovery Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ											
NAWCAD-LKE	WR	9/30/94	CONT.	CONT.	27,204	6,620	11,262	3,193	3,427	CONT.	CONT.
E-Systems, Salt Lake City, UT											
E-Systems	CPFF	9/23/92	10,580	10,580	9,173	1,407	0	0	0	0	10,580
Kaman Electromagnetics, Hudson, MA											
Kaman EM	CPFF	12/21/92	4,900	4,900	2,280	780	1,840	0	0	0	4,900
Miscellaneous, Navy											
Misc.	WR	9/30/94	21,832	21,832	19,947	985	900	0	0	0	21,832
Support and Management	Not applicable.										
Test and Evaluation	Not applicable.										

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: W1723
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: CV Launch & Recovery Systems

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	58,604	9,792	14,002	3,193	3,427	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	58,604	9,792	14,002	3,193	3,427	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2208* Future CV R&D	0	0	11,938	11,936	1,990	1,990	1,990	1,990	CONT.	CONT.

* FY94 existed under project W2208

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for the development of aircraft carrier (CV/CVN) specific technologies, the infusion of the surface ship technology base into future aircraft carriers and the potential realization of subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical and electrical (H,M&E) and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1995 PLAN: Not funded.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

3. (U) FY 1996 PLAN:

- (U) ($5,000) Carrier Technology Assessment: Initiate engineering assessment of alternative ship design concepts, improve aircraft carrier design tools and assess aircraft carrier design criteria. Evaluate cost and capabilities of design concepts. Complete development of a comprehensive roadmap for future sea-based tactical aviation platforms. Initiate engineering assessment of new technologies and system architectures.

- (U) ($ 400) Carrier Aviation Support: Continue development of an articulated, variable angle ski-jump. Initiate development of an improved aviation rearming, strikedown, stowage and strikeup system.

- (U) ($2,038) Carrier System Affordability: Initiate development of design concepts of simplified systems for selected candidates from the electrical system, structural system, auxiliary and fluid systems and design concepts for selected standard, modular-packaged subsystems and components. Initiate engineering assessment of candidate subsystems and components that could be made common with other surface and submarine subsystems and components to reduce total Navy logistic support costs and simplify ship installation.

- (U) ($2,000) Carrier System Survivability: Initiate assessment of ship survivability. Continue development and testing of advanced armor systems and components. Initiate development of protection schemes to improve resistance to underwater explosions. Initiate assessment of engineering requirements for signatures control.

- (U) ($1,000) Carrier Machinery Systems: Initiate assessment of electrical distribution system for possible changes in distribution power type, voltage, electrical circuit protection and system architecture. Initiate assessment of alternative propulsion system configurations. Initiate development of selected auxiliary machinery modules to complement simplified distributive system architectures for improved affordability.

- (U) ($1,500) Carrier Combat Support: Initiate development of distributed combat systems architecture. Initiate development of user system interfaces for selected system networks (SYSNETS) of an integrated command information system.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

4. (U) FY 1997 PLAN:

- (U) ($2,000) Carrier Technology Assessment: Complete engineering assessment of new technologies and system architectures and ship design concepts. Continue improvement of aircraft carrier design tools and assessment of aircraft carrier design criteria.

- (U) ($ 500) Carrier Aviation Support: Continue development of an articulated, variable angle ski-jump. Continue development of an improved aviation rearming, strikedown, stowage and strikeup system. Initiate development of improved aircraft support facilities, incorporating modular installations of Aviation Intermediate Maintenance Department and other support spaces.

- (U) ($2,436) Carrier System Affordability: Continue development of design concepts of simplified systems for selected candidates from the electrical system, structural system, auxiliary and fluid systems and design concepts for selected standard, modular-packaged subsystems and components. Continue development of candidate subsystems and components that could be made common with other surface and submarine subsystems and components to reduce total Navy logistic support costs and simplify ship installation.

- (U) ($3,000) Carrier System Survivability: Continue development of advanced armor concepts. Continue development of protection schemes to improve resistance to underwater explosions. Initiate development of signature control features.

- (U) ($2,000) Carrier Machinery Systems: Continue development of electrical distribution system for possible changes in distribution power type, voltage, electrical circuit protection and system architecture. Initiate assessment of alternative propulsion system configurations. Continue development of selected auxiliary machinery modules to complement simplified distributive system architectures for improved affordability.

- (U) ($2,000) Carrier Combat Support: Continue development of distributed combat systems architecture. Initiate assessment of shared aperture radar systems. Continue development of user system interfaces for selected SYSNETS of an integrated command information system.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT NUMBER: S2208 PROJECT TITLE: Future CV R&D

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	2,017	XXX	XXX
(U) FY 1995 Appropriated:	XXX	17	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-17	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	0	0	11,938	11,936

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 reflects a Congressional reduction of $2,000K, a reduction of $2K for travel, and a reduction of $15K as a sweep up of residuals.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM

Not applicable.

(U) RELATED RDT&E:

(U) PE 0604512N Shipboard Aviation Systems - Funds Engineering and Manufacturing Development efforts for aircraft related systems.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones			1Q CV( ) Mission Needs Statement 2Q CV( ) MS 0	2Q CV( ) Operational Reqmts Document 4Q CV( ) Cost & Operational Effectiveness Analysis	
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	0	0	3,500	4,500
b. Ancillary Hardware Development	0	0	0	0
c. Development Support Equipment Acquisition	0	0	0	0
d. Research Support Equipment Acquisition	0	0	0	0
e. Software Development	0	0	1,000	1,000
f. Systems Engineering	0	0	6,823	5,821
g. Development Test and Evaluation	0	0	0	0
h. Program Management Support	0	0	100	100
i. Travel	0	0	15	15
j. Miscellaneous	0	0	500	500
Total	0	0	11,938	11,936

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603512N
PROGRAM ELEMENT TITLE: Carrier Systems Development

PROJECT NUMBER: S2208
PROJECT TITLE: Future CV R&D

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Naval Surface Warfare Center, Carderock Division, Bethesda, MD											
CDNSWC	WR	Dec 94	CONT.	CONT.	0	0	0	5,000	5,000	CONT.	CONT.
Surface Warfare Center, Dahlgren Division, Dahlgren, VA											
DDNSWC	WR	Dec 94	CONT.	CONT.	0	0	0	1,000	1,275	CONT.	CONT.
Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ											
NAWCAD-LKE	WR	Dec 94	CONT.	CONT.	0	0	0	1,000	1,000	CONT.	CONT.
Contractors											
(TBD)	Misc.	Dec 94	CONT.	CONT.	0	0	0	3,423	2,946	CONT.	CONT.
Miscellaneous											
Misc.	Misc.	Dec 94	CONT.	CONT.	0	0	0	1,000	1,200	CONT.	CONT.
US Army Aberdeen Proving Grounds, Aberdeen, MD											
USA/APG	MIPR	Dec 94	CONT.	CONT.	0	0	0	400	400	CONT.	CONT.
Support and Management											
Miscellaneous											
Misc.	Misc.	Dec 94	CONT.	CONT.	0	0	0	115	115	CONT.	CONT.
Test and Evaluation	Not applicable.										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603512N PROJECT NUMBER: S2208
PROGRAM ELEMENT TITLE: Carrier Systems Development PROJECT TITLE: Future CV R&D

GOVERNMENT FURNISHED PROPERTY:

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development	Not applicable.									
Support and Management	Not applicable.									
Test and Evaluation	Not applicable.									

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	11,823	11,821	CONT.	CONT.
Subtotal Support and Management	0	0	0	115	115	CONT.	CONT.
Subtotal Test and Evaluation	0	0	0	0	0	CONT.	CONT.
Total Project	0	0	0	11,938	11,936	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382 - Shipboard Auxiliary Systems Development	22,817	20,780	14,843	11,981	19,633	23,751	21,612	22,437	CONT.	CONT.
S1712 - Hull, Mechanical & Electrical Improvement	4,668	5,150	1,961	1,742	6,235	5,009	6,894	7,284	CONT.	CONT.
TOTAL	27,485	25,930	16,804	13,723	25,868	28,760	28,506	29,721	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 (FO) 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, and local area network installation projects.

(U) The program is closely coordinated with Advanced Surface Machinery Program (ASMP), formerly Integrated Electric Drive. The program does not duplicate any efforts and is independent of ASMP.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under demonstration and validation because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382 - Shipboard Auxiliary Systems Development	22,817	20,780	14,843	11,981	19,633	23,751	21,612	22,437	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project primarily supports ACAT IV projects that develops shipboard fiber optics and auxiliary machinery components and systems to improve affordability, performance, reliability, and maintainability and result in size, weight, and/or acquisition and life cycle cost savings. The auxiliary machinery HME developments include standard commercial based components applying new technology which provide the existing and future fleet affordability through reductions in logistics piece part proliferation including low and high pressure air system, pumps, and advanced water systems to make and disinfect potable water. The project addresses development of machinery and systems architectures to reduce future ship acquisition and operating costs with autonimic machinery, power for pulsed system loads, advanced degaussing, controllers, solid state power electronics and now underway replenishment concepts. FODMS is a highly survivable fiber optic network which provides for the transmission of IC alarms and indicators, damage control information, navigation data, combat system navigation and status data, propulsion, auxiliary machinery, electric plant and ship steering status and control information. FOIVCS is a distributed, and integrated telephone communications system. Fiber Optic Topology provides the criteria and specifications for the design, implementation and installation of the physical cable plant on board ship to support data transmission requirements. Fiber optic sensors measure parameters such as pressure, temperature, speed (revolutions per minute) and physical separation (limit switches). This program area also provides performance specifications for shipboard use. $(IC)^2$ will coordinate and integrate the development of hardware and software to provide a total-ship interior communications system for voice, video, and data based on standard open architecture networks.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($4,952) Continued development of advanced HM&E systems and components that reduce maintenance man hours and life cycle costs. Initiated Labeval of small point-of-use High Pressure (HP) air compressor, fabricated and began qualification of prototype standard composite centrifugal pumps. Initiated qualification of Electrolytic Disinfectant Generator (EDG) Engineering Development Model (EDMs) and fabricated Limited Rate Initial Production (LRIP) EDG units for Techeval. Continued Reverse Osmosis (RO) qualification. Initiated concept development of improved machinery for auxiliary modules. Supported Gaseous Nitrogen Generator (GNG) production and Shipeval units during final deployment.

- (U) ($500) Completed test of Spring Tow Hawser System, completed Propeller Inspection Development, completed development of Underwater Painting Application Systems and initiated Remotely Operated Vehicle Umbilical Splicing System. Completed documentation of Autonomous Underwater Search System (AUSS).

- (U) ($500) Completed hull design for CG class Impressed Current Cathodic Protection System. Developed program plan for application of advanced composites for integrated structures, combat systems and components for future surface ships. Transitioned to project S1712.

- (U) ($16,865) Tailored development of the $(IC)^2$ system including distributed combat systems, HM&E data network, logistics and administrative network for LPD-17 support. Complete draft of $(IC)^2$ contract implementation documentation. Successfully completed FODMS(1) Performance Verification Test Qualifications and Maintainability Demonstration. Started approval process for Limited Rate Initial Production. Began concept study for FODMS(2) and established POA&M. Installed FO Topology Cable Plant on forwardfit and backfit naval ships. Developed needed FO infrastructure to support all FO applications in the Fleet and successfully demonstrated the - first time ever used - Optical Multiplexing of Fabry-Perot Sensors. Completed four FO Sensor specifications and submitted for coordination. FOIVCS EDM node design completed; however, cost growth, schedule slippage and unresolved technical issues jeopardize the ability of this system to fulfill the planned initial operational capability (IOC).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

2. (U) FY 1995 PLAN:

- (U) ($7,585) Transition advanced composite materials, corrosion control techniques and coatings to S1712 and continue development of advanced HM&E auxiliary machinery systems components and shipboard salvage systems. Complete Labeval of commercial point-of-use HP compressor and develop packaging for shipboard environment. Conduct Labeval and initiate Techeval of standard composite centrifugal pumps. Complete Reliability Development Growth Test, install EDG LRIP units, conduct Shipeval/Techeval and receive Milestone III approval. Initiate development of improved machinery for distributed auxiliary modules. Initiate functional analyses to quantify affordability benefits of applying autonomics to HME systems to apply automation and remote monitoring to reduce ship size and costs with reduced manning and develop autonomic machinery plan. HME projects planned to reduce acquisition and operating costs of future combatants include fuel cells, advanced degaussing, solid state power electronic modules, power for pulsed system loads, and controls for HM&E equipment. Define requirements for high pressure membrane dehydrator, nitrogen generation, and positive displacement pump. Complete design and construction of amphibious ship advanced magnetic model. Conduct cost benefit analysis of existing militarized auxiliary machinery (ie EDG, RO, GNG) versus commercial machinery packaged for shipboard service. Complete RO testing and finalize drawings.

- (U) ($500) Continue development of the Remotely Operated Vehicle Umbilical Splicing Systems and initiate development of the Underwater Inspection Sensor System. Commence development of "weak link" for towing unmanned, defueled Nuclear Submarine for deactivation.

- (U) ($12,695) Continue development of the $(IC)^2$ network including distributed combat system, HM&E, engineering, logistics, and administrative networks. Bring distributed $(IC)^2$ engineering and integration developmental facility on-line. Integrate Developmental Combat Control Network and Joint Maritime Command Information System (JMCIS) network with the developmental $(IC)^2$ backbone. Identify critical experiments required and the integrated voice and video requirements and procedures for a shipboard $(IC)^2$. Complete contractual documentation and procedural guidance for implementing $(IC)^2$. Support and implement FODMS (1) Milestone III decision. Complete FODMS(2) concept study. Complete all Naval Weapons Station, Yorktown effort on FOIVCS. Continue development of passive optical sensor specifications and standards. Continue FO Shipboard Cable Topology design with specific application to CVN 76, LPD 17, and CV/CVN backfits. Begin transition strategies from military standards components to Commercial off the Shelf (COTS) equipment. Initiate planning efforts to transition FO Cable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

Plant, sensors, and $(IC)^2$ technology to support the Autonomic Ship Function (ASF). FY 95 R&D funds are required to cover additional R&D costs at NWS, Yorktown on the FOIVCS project, resulting in reduction of scope and delay for the FODMS(2), $(IC)^2$, FO Topology, FO Sensor project. FOIVCS program at NWS, Yorktown will be restructured in accordance with acquisition reform initiatives to obtain a COTS/NDI solution from industry for a FOIVCS for all USN ships targeted for Fleet introduction in the FY 96 shipbuilding program.

3. (U) FY 1996 PLAN:

- (U) ($8,951) Continue development of advanced affordable HM&E auxiliary machinery systems, components and shipboard salvage systems. Develop "packaging" technology for commercial equipment in military environment. Complete Techeval of standard family composite centrifugal pumps and obtain MS III approval. Complete design and begin fabrication of prototype Navy standard positive displacement pumps and high pressure membrane dehydrator. Continue development of autonomic auxiliary machinery and systems to reduce operational costs and manning and improve responsiveness of future surface combatants including new equipment designs, system behavior and control models, diagnostic and prognostic methodologies, advanced controllers, sensors, software and maintenance methods including fuel cells, ship service generator sets, polymer current limiter, and advanced degaussing systems. Continue development of power electronic modules, cable, switchgear and pulse forming network for pulsed power system loads and initiate simulated based design of in-theater replenishment concepts.

- (U) ($5,392) Verify and document (IC)2 interfaces for combat system components, machinery control system components and JMCIS. Develop Life Cycle Management Plan and Configuration Management Plan for shipboard fiber optic networks. Continue development of design guidelines for generic fiber optic Topology including high capacity single mode cable and components and cable plant design for new construction ships and selected backfit ships. Continue qualification of new fiber optic network components. Continue development of passive optical sensors. Complete development and testing of the fiber optic Topology Design Tool. This tool shall be capable of providing a three-dimensional ship model including compartmentation, high risk/sensitive zones and structures, equipment and cable ways. Continue development of FODMS(2). Begin transition of FODMS(2) to Data Network Systems (DNS). Continue transitioning $(IC)^2$ technology to support ASF implementation.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

- (U) ($500) Complete development of Remotely Operated Vehicle Umbilical Splicing System, continue development of Underwater Inspection Sensors, initiate development of Improved Diver Tools and complete the Remotely Operated Vehicle (ROV) Power System Study.

4. (U) FY 1997 PLAN:

- (U) ($9,130) Continue development of autonomic machinery for HM&E systems to reduce operational, manning, and maintenance costs. LABEVAL/TECHEVAL prototype high pressure membrane dehydrator and standard positive displacement pump. Finalize autonomic auxiliary machinery and system designs and complete demonstration of autonomic equipment maintenance methods. Begin development of autonomic machinery/system integration software. Continue development of cable, grounding, EMI, EMC and thermal management of power systems for high voltage pulsed loads. Continue development of power electronic modules, fuel cells, ship service generator sets, and advanced degaussing systems and packaged commercial equipment for military use.

- (U) ($2,351) Continue evaluation of new fiber optic components. Complete engineering, integration and validation of the combat system, HM&E, engineering, logistics, and administrative networks. Maintain distributed $(IC)^2$ engineering and integration developmental facility. Support design of potential user system utilizing the developmental $(IC)^2$ backbone. Investigate shipboard application of Asynchronous Transfer Mode technology. Complete development of design guidelines for generic fiber optic topology and cable plant. Develop installation, connectorization, and test tools/methods for high density fiber optic cables. Investigate shipboard applications of photonics and single mode fiber. Complete specifications for passive biological sensors. Support shipboard $(IC)^2$ demonstrations of ASF functional elements.

- (U) ($500) Complete development of Underwater Inspection Sensors, continue development of Improved Diver Tools, and commence development of Remotely Operated Vehicle (ROV) Power Systems.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	22,838	21,046	xxx	xxx
(U) FY 1995 Appropriated:	xxx	21,046	xxx	xxx
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG	-21	-266	xxx	xxx
(U) FY 1996/97 PRESBUDG Submit:	22,817	20,780	14,843	11,981

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The $0.021M decrease in FY94 funding was required for past contract costs. The $0.266M decrease in FY95 funding is due to Congressional undistributed reductions and will result in down scoping of advanced auxiliary machinery, fiber optic high performance networks and sensors for the next generation surface combatant.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

(U) RELATED RDT&E:

(U) PE0602121N, Surface Ship Technology
(U) PE0603555N, Undersea Superiority Technical Demonstration
(U) PE0603573N, Advanced Surface Machinery Program (ASMP)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q EDG MSIII 2Q FODMS(1) LRIP	2Q Comp Pump MSIII	2Q HPAC MSIII 3Q (IC)[2]	Various
Engineering Milestones	Composite Pump Design & Propeller Inspection Completed	4Q FO TOPOL 1Q AUTON Mach Plan	4Q ROV Umbilical Splicing Sys. 4Q PD Pump Des.	2Q FO STDS 4Q AUTON Mach Des.	
T&E Milestones	Spring Tow Hawser Testing	Complete RO Testing		3Q HP Membrane TECHEVAL 4Q PD Pump TECHEVAL	
Contract Milestones	EDG LRIP Award		2Q PD Pump 2Q HP Membrane		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Fiber Optic	16,865	12,695	5,392	2,351
b. Auxiliary Machinery	4,952	7,585	8,951	9,130
c. Salvage	500	500	500	500
d. Materials	500	0	0	0
e. VLS Rearming	0	0	0	0
Total	22,817	20,780	14,843	11,981

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Ingersoll- Dresser Pump Philipsburg, NJ	C/CPFF	3/92			1,400	2,000	550	0	0	0	3,950
ElTech International Cleveland, OH	C/CPFF	12/88			1,380	1,020	734	0	0	0	3,134
Rockwell International Anaheim, CA	SS/CPFF	7/92			3,941	3,541	0	0	0	0	7,482
TBD	C/CPFF	Various			0	0	1,423	2,050	0	0	3,473
Misc Contracts	Various	Various			1,485	2,400	4,450	5,212	5,000	CONT.	CONT.
NSWC, Dahlgren	WR	Various			2,600	2,591	1,000	0	0	0	6,191
NWS, Yorktown	WR	Various			3,932	3,716	0	0	0	0	7,648
NUWC, Norfolk	WR	Various			1,000	0	0	0	0	0	1,000
NSWC, Annapolis	WR	Various			2,830	2,038	3,300	3,000	2,468	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S0382 PROJECT TITLE: Shipboard Auxiliary Systems Development

Misc Govt Labs	WR	Various	11,378	5,511	9,323	4,581	4,513	CONT.	CONT.
Support and Management Miscellaneous	C/CPFF	Various	159	0	0	0	0	0	0

Test and Evaluation Not applicable.

Government Furnished Property Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S0382
PROJECT TITLE: Shipboard Auxiliary Systems Development

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	29,946	22,817	20,780	14,843	11,981	CONT.	CONT.
Subtotal Support and Management	159	0	0	0	0	0	0
Subtotal Test and Evaluation							
Total Project	30,105	22,817	20,780	14,843	11,981	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1712 - Hull, Mechanical & Electrical Improvement	4,668	5,150	1,961	1,742	6,235	5,009	6,894	7,284	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project is non-ACAT and 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 the existing and future fleet.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($4,668) Continued development of improved, standard affordable HM&E equipment including standard PD pump family, high and low pressure membrane dehydrators, Glass Reinforced Plastic (GRP) fire and shock hardened piping, valves, and machinery, advanced HM&E system architectures, machinery for modules, engine starting technology, hull and deck machinery, advanced degaussing systems, fuel cells, TAG power quality, power cables, electrical auxiliaries, and 60 Hz power systems analysis. Identified alternative high pressure air system and air starting system for diesel powered ships. Initiated autonomic shipboard feasibility analysis and formulation of autonomic machinery development plan. LABEVAL potential PD pump technology and completed logistics analysis. Developed specification for 3000 psi membrane air dehydrator and initiated procurement process. Continued Shipeval of low pressure membrane dehydrators and drafted specification for packaging. Continued development of survivability characteristics of zonal firemain concept. Extended TAG power system model to 24 pulse system and completed cost analysis of polymer current limiter (PCL) on 60 Hz power coordination. Initiated trade-off study for commercial-off-the-shelf replacement for ship service generator sets (SS Gen Set). Completed design of standard helo hangar door for DDG-51, IIA and open loop degaussing test and analysis of combatant ship advanced magnetic model. Initiated design and fabrication of amphibious shipmagnetic model and degaussing power supply. Completed feasibility analysis of potential standard solid state time delay relay and initiated analysis of variable speed driven auxiliaries and systems. Procured commercial state-of-the-art Solid State Variable Speed Drives(VSD) and (PCL) for evaluation.

2. (U) FY 1995 PLAN:

- (U) ($2,237) Labeval/Shipeval prototype standard GRP valves. Complete zonal firemain, advanced ship service air system survivability analyses and designs for future combatants, auxiliaries, and amphibious ships. Demonstrate proof of concept alternate engine starting system. Labeval/Shipeval ship service prototype low pressure membrane dehydrators. Complete phase I trade-off analysis for replacement for ships service generator sets. Evaluate advanced power cables and auxiliary electrical system components. Simulation based Labeval standard helo hangar door for DDG-51 IIA. Continue development of hull & deck lightweight ladders, remote hatch closure, synthetic batter boards/decking and wire rope sockets. Continue development of fluid, mechanical, electrical components, and weather deck machinery components, for reduced signatures, manning, and improved maintenance. Transition PD pump and HP membrane dehydrator to S0382. Complete TAG 60 trial and validate math model. Complete polymer current limiter feasibility studies and initiate prototype procurement. Evaluate available variable speed motor controllers and variable capacity auxiliary systems and components. Complete fabrication of amphibious ship physical model and validate magnetic signature predictions. Continue degaussing power supply development.

- (U) ($2,913) Transition, from S0382. Design and fabricate load bearing deckhouse components with integrated fiber reinforced composites and combat systems sensor technology. The components will be fabricated to allow laboratory and field evaluations for structural efficiency, sensor effectiveness, and environmental durability. The use of composite materials for this integrated deckhouse concept allows geometric and material tailorability to reduce signature of the deckhouse structure. Integration of sensor system into the load bearing structure also contributes to signature reduction through the elimination of traditionally independent systems that are dominant scatterers in an unintegrated design. Assess performance and shipboard requirements that define the use of composite materials technology for future surface ship topside design, and develop a program plan for the integration of composite materials into topside designs. Support installation of and initiate SHIPEVAL of composite ventilation ducting on CG73. Identify corrosion control technologies. Initiate development of commercially based Navy composite ventilation ducting to meet shipboard technical requirements. Develop second generation, PC based composite materials properties database.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development

PROJECT NUMBER: S1712
PROJECT TITLE: HM&E Improvement

3. (U) FY 1996 PLAN:

- (U) ($1,409) Continue development of advanced affordable, mechanical, electrical, and hull and deck auxiliary machinery including variable capacity auxiliary system architectures, motors, controls, and components including alternative piping specs and standards. Shipeval alternative diesel engine starting system. Continue Labeval, Shipeval prototype standard GRP ball valves and finalize specifications and standards. Complete low pressure membrane dehydrator evaluations, design and specifications. Conduct shock test on synthetic decking and develop hull and deck machinery components. Complete cost benefit analysis for variable speed auxiliaries and systems. Evaluate Polymer Current Limiter.

- (U) ($552) Continue testing and evaluation of advanced composite integrated deckhouse components and machinery components. Evaluate corrosion control technologies

4. (U) FY 1997 PLAN:

- (U) ($1,006) Continue development of affordable mechanical, electrical and hull and deck machinery. Labeval variable capacity mechanical and electrical system components. Develop titanium piping welding, fatigue and application standards, complete synthetic decking and deck machinery development. Complete development of Navy Standard Composite Ball Valves.

- (U) ($736) Complete testing and evaluation of advanced composite integrated deckhouse components and machinery components. Continue corrosion control technology development.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	4,668	5,202	xxx	xxx
(U) FY 1995 Appropriated:	xxx	5,202	xxx	xxx
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	-52	xxx	xxx
(U) FY 1996/97 PRESBUDG Submit:	4,668	5,150	1,961	1,742

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The $.052 decrease in FY95 funding is due to Congressional undistributed reductions and will result in down scoping of advanced machinery development.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE0602121N, Surface Ship Technology
(U) PE0603573N, Advanced Surface Machinery Program (ASMP)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	SS Gen Set Plan	4Q Aux Sys Architecture Analysis 4Q Long Term Composite Plan			Various
Engineering Milestones		3Q Eval VSDs 4Q Mag Model Val 2Q SS Gen Set Anal 4Q Composite Valve Req. 4Q Composite Reqs.	2Q PCL Std 1Q Composite Struct Design	4Q Composite Valve Std	
T&E Milestones		4Q PCL Eval 2Q TAG 60 Trial	4Q Engine Starting 1Q Composite Em/ Struct Eval.	4Q Composite Structure	
Contract Milestones	4Q PCL & VSD Award	4Q Composite Struct Award 2Q Engine Starting System			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603513N
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development
PROJECT NUMBER: S1712
PROJECT TITLE: HM&E Improvement

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Auxiliary Machinery	4,668	2,237	1,409	1,006
b. Advanced Composite Materials	0	2,913	552	736
Total	4,668	5,150	1,961	1,742

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT NUMBER: S1712 PROJECT TITLE: HM&E Improvement

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle		Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development												
NSWC, Carderock	WR		Various			2,550	2,500	2,298	769	894	CONT.	CONT.
Misc Govt Labs						922	820	1,352	378	200	CONT.	CONT.
Misc Contracts	C/Various		TBD			163	1,348	1,500	814	648	CONT.	CONT.

Support and Management Not applicable.

Test and Evaluation Not applicable.

Government Furnished Property Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603513N PROJECT NUMBER: S1712
PROGRAM ELEMENT TITLE: Shipboard Systems Component Development PROJECT TITLE: HM&E Improvement

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	3,635	4,668	5,150	1961	1,742	CONT.	CONT.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	3,635	4,668	5,150	1,961	1,742	CONT.	CONT.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384 Combat Survivability Design	2,468	3,269	3,066	2,486	2,173	2,250	2,252	2,313	CONT.	CONT.
S1121 Personnel Protection	3,315	2,872	2,499	2,322	2,233	2,633	2,649	2,726	CONT.	CONT.
S1565 Fire Protection/Damage Control Systems	8,641	6,340	6,084	5,219	5,261	5,955	5,984	6,154	CONT.	CONT.
S2053 CBR Defense	2,697	1,962	0	0	0	0	0	0	CONT.	CONT.
TOTAL	17,121	14,443	11,649	10,027	9,667	10,838	10,885	11,193	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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.

(U) PBD 259 directs, starting FY 1996, that services' for P.E. 0603514N/S2053 budget for nuclear, biological, and chemical (NBC) defense programs be consolidated in OSD accounts. P.E. 0603884D/S205 applies to this project and budget activity.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384 Combat Survivability Design	2,468	3,269	3,066	2,486	2,173	2,250	2,252	2,313	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the development of naval protection concepts, specifications and standards to meet objectives of OPNAVINST 9070.1, "Survivability Policy for Surface Ships of the U.S. Navy", dtd 23 Sep 1988. Specifically, that combatants be able to deal with the degrading effects of damage from anti-ship missiles (ASMs), torpedoes, and mines. Additionally, the lessons learned from the 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) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($350) Developed blast hardened door design requirements to minimize longitudinal propagation of internal blast, smoke, and fire from ASM threats.
- (U) ($1,118) Conducted static strength tests of UNDEX hardened hull girder models. Finalized UNDEX resistant hull girder design options and began construction of scaled whipping (dynamic) verification test models.
- (U) ($700) Completed option definition for rapid fault clearing system which isolates multiple, simultaneous faults caused by ASM threats providing for uninterruptible power; initiated advanced development of selected option.
- (U) ($300) Participated with the U.K. Navy in assessing the vulnerability of a small waterplane area twin hull (SWATH) to UNDEX. Conducted low level UNDEX whipping and shock test.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

2. (U) FY 1995 PLAN:

- (U) ($1,961) Conduct scaled whipping (dynamic) verification tests of UNDEX resistant hull girder hardening designs. Initiate preparation of design guidance manual.
- (U) ($410) Initiate development of Advanced UNDEX Isolation (AUI) methods for equipment/systems which provide protection against the combined effects of UNDEX shock and whipping, and reduce total ship acquisition costs by permitting use of low cost commercial grade equipment.
- (U) ($598) Complete advanced development of rapid fault clearing system. Conduct demonstration/validation test. (Transition to PE 0604516N, S1828 (Combat Readiness & Sustainability)).
- (U) ($300) Complete UNDEX whipping and shock SWATH tests.

3. (U) FY 1996 PLAN:

- (U) ($795) Complete dynamic verification testing of UNDEX resistant hull girder designs. Finalize design guidance manual.
- (U) ($700) Initiate development of a missile magazine protection system (MMPS) which integrates advanced structural and armor concepts with the energy absorbing benefits of water. MMPS will be designed to prevent ship loss by: 1) defeating penetration, blast, and fragmentation effects of medium-sized ASMs at the boundaries of the magazine, and 2) limiting the extent of major structural damage as a result of a large ASM penetrating the magazine and detonating stowed ordnance.
- (U) ($1,571) Design and begin construction of AUI shock mounts which permit UNDEX isolating all equipment within a typical mission critical compartment on a "floating raft" platform.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S0384 PROJECT TITLE: Combat Survivability Design

4. (U) FY 1997 PLAN:

- (U) ($950) Conduct full-scale testing of MMPS concepts to determine quantity of water required to absorb the detonation of multiple stowed warheads.
- (U) ($1,536) Complete construction of prototype AUI shock mounts; design and fabricate full-scale prototypes of isolated floating rafts with commercial grade equipment installed. Initiate total ship systems integration and producibility studies to define system outfitting and structural construction procedures.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,468	3,284	XXX	XXX
(U) FY 1995 Appropriated:	XXX	3,284	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-15	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:(PRESBUDG CONTROLS)	2,468	3,269	3,066	2,486

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Various FY 95 Reductions, including PBD 701 University Research, PBD 663 Travel, and 1995 SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

(U) RELATED RDT&E:

(U) PE 0604516N, Project S1828 (Combat Readiness & Sustainability).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S0384
PROJECT TITLE: Combat Survivability Design

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones	4Q UNDEX Hull Girder Design Options	1Q UNDEX Hull Girder Whipping Test Plan (Dynamic)	4Q UNDEX Hull Girder Design Manual		
	4Q Rapid Fault Clearing Design Options	3Q Rapid Fault Clearing System Prototype			
	4Q Blast Hardened Door Design				
		4Q AUI Shock Mount Design Options		4Q AUI Shock Mount Prototype/AUI Integration/ Producibility Studies	
			4Q MMPS Design Options	4Q MMPS Integration Assessment	
T&E Milestones	4Q UNDEX SWATH Low Level Whipping and Shock Tests	1Q UNDEX SWATH High Level Whipping and Shock Tests			
	3Q UNDEX Hull Girder Static Tests	4Q UNDEX Whipping Tests	2Q UNDEX Whipping Tests		

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Contract Milestones	Not applicable	4Q Rapid Fault Clearing Test Not applicable	4Q MMPS Full-Scale Tests Not applicable	Not applicable	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S0384 PROJECT TITLE: Combat Survivability Design

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Engineering Assessments/ Design Studies	486	698	561	300
b. Test and Evaluation	1,465	2,161	1,800	1,676
c. Specifications/Design Standard Preparation	62	100	395	0
d. Hardware Development	445	300	300	500
e. Software Development	0	0	0	0
f. Travel	10	10	10	10
Total	2,468	3,269	3,066	2,486

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S0384
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Combat Survivability Design

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVSURFWARCEN WR Carderock Division Bethesda, MD		10/94	Cont.	Cont.		2,235	2,941	2,751	2,217	CONT.	CONT.
Miscellaneous Competitive		Various				233	328	315	269	CONT.	CONT.
Support and Management						0	0	0	0	CONT.	CONT.
Test and Evaluation						0	0	0	0	CONT.	CONT.

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S0384 PROJECT TITLE: Combat Survivability Design

GOVERNMENT FURNISHED PROPERTY Not applicable.

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		2,468	3,269	3,066	2,486	CONT.	CONT.
Subtotal Support and Management		0	0	0	0	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0	CONT.	CONT.
Total Project		2,468	3,269	3,066	2,486	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1121 Personnel Protection	3,315	2,872	2,499	2,322	2,233	2,633	2,649	2,726	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for design/development of shipboard personnel clothing and equipment to protect ship's complement from the effects of hostile actions and peacetime accidents.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($125) Evaluated alternatives to Fire Fighter's Breathing Apparatus (FFBA). Took delivery of five Littpak IIs and one FR-60.
- (U) ($1,992) Preparation for Technical Evaluation (TECHEVAL) of FFBA. Took delivery of 100 FFBA Service Test modules and 1500 FFBA Expendable Packages. Conducted Manned Fire Tests and measured breathing gas temperatures of Oxygen Breathing Apparatus (OBA) and Littpak II.
- (U) ($250) Determined requirements to obtain National Institute of Occupational Safety and Health (NIOSH) approval for FFBA and made necessary modifications to FFBA hardware options.
- (U) ($40) Completed Auto-Inflator failure analysis.
- (U) ($10) Submitted procurement package to NAVSEA for Fire Fighter's Helmet.
- (U) ($230) Initiated Abandon Ship Life Preserver redesign/repackaging effort.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1121
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Personnel Protection

- (U) ($10) Developed modification for Auto-Inflator Utility Life Preserver (AIULP) to improve buoyancy and distributed modification kits to fleet.
- (U) ($10) Initiated effort to identify a low cost/Reusable Life Preserver Auto-Inflator, to identify a more durable work vest Personal Floatation Device (PFD), to identify a Universal Distress Marker Light for all life preservers, and to identify a Low Cost/Low Maintenance Photoluminescent Marking system.
- (U) ($100) Initiated life preserver documentation update.
- (U) ($20) Initiated fleet evaluation of improved MK-1 life preserver cover.
- (U) ($23) Initiated procurement to outfit fleet with Rescue Swimmer Dry Suits.
- (U) ($30) Developed draft use and rescue procedures for Immediately Dangerous to Life and Health (IDLH) Equipment.
- (U) ($10) Ran tests on USS MT WHITNEY to verify draft IDLH use and rescue procedures.
- (U) ($10) Initiated procurements to outfit fleet with IDLH Equipment.
- (U) ($100) Identified alternatives to Emergency Escape Breathing Device (EEBD).
- (U) ($10) Initiated fleet evaluation of LASER Eye Protection Equipment.
- (U) ($245) Initiated efforts to develop improved fireman's gloves/boots, to develop fire retardant khakis/coveralls, and flight deck jerseys, to develop an improved Naval Battle Helmet (NBH) and Navy Flak Vest (NFV).
- (U) ($100) Initiated efforts to identify work/rest guidelines for Protective Overgarments and to identify performance of Anti-Exposure Suits.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1121
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Personnel Protection

2. (U) FY 1995 PLAN:

- (U) ($905) Conduct FFBA Post Qualification Testing & OBA Alternatives evaluation.
- (U) ($200) Conduct evaluation of open circuit breathing devices and shipboard compressors.
- (U) ($ 60) Identify LASER Eye Protection Fleet introduction requirements.
- (U) ($256) Evaluate/test improved Fire Fighter's Clothing.
- (U) ($400) Initiate evaluation of improved EEBD documentation support.
- (U) ($100) Conduct testing of final design of IDLH equipment.
- (U) ($ 92) Complete Abandon Ship Life Preserver redesign/repackaging effort.
- (U) ($100) Complete evaluation of a low cost/reusable Auto-Inflator.
- (U) ($ 92) Conduct MK-1 life preserver improvement/documentation update Investigations.
- (U) ($ 80) Redesign Auto-Inflatable Utility Life Preserver (AIULP).
- (U) ($247) Evaluate candidate more durable work vest PFD, universal distress marker light for all life preservers, photoluminescent film to replace paint.
- (U) ($200) Conduct ballistic evaluation of Naval Battle Helmet (NBH) and Navy Flak Vest (NFV).
- (U) ($100) Conduct evaluations of modified existing Fire Fighting Ensemble.
- (U) ($ 40) Conduct evaluations of cold weather jacket.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1121 PROJECT TITLE: Personnel Protection

3. (U) FY 1996 PLAN:

- (U) ($590) Develop OBA replacement process instruction and provide documentation support.
- (U) ($333) Continue to test/evaluate improved Fire Fighter's Clothing.
- (U) ($500) Conduct EEBD TECHEVAL/OPEVAL.
- (U) ($250) Conduct Life Preserver Improvement Program investigations.
- (U) ($100) Complete update of IDLH/SAR logistical documentation.
- (U) ($226) Conduct Emergent Safety Equipment investigations.
- (U) ($200) Conduct ballistic evaluations of Phone Talker's Helmet (PTH).
- (U) ($200) Develop Integrated Fire Fighter's Protective Ensemble.
- (U) ($100) Evaluate commercial fall protection equipment for use with firefighters.

4. (U) FY 1997 PLAN:

- (U) ($400) Provide OBA replacement documentation support.
- (U) ($523) Provide procurement specifications for improved Fire Fighter's Clothing.
- (U) ($300) Provide EEBD documentation support.
- (U) ($350) Conduct Life Preserver Improvement investigations.
- (U) ($189) Conduct Emergent Safety Equipment investigations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1121 PROJECT TITLE: Personnel Protection

- (U) ($60) Develop fire retardant Anti-Exposure Suit.
- (U) ($500) Develop integrated Fire Fighter's Protective Ensemble.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,315	2,908	XXX	XXX
(U) FY 1995 Appropriated:	XXX	2,908	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-36	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit: (PRESBUDG CONTROLS)	3,315	2,872	2,499	2,322

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Various FY 95 Reductions, including PBD 701 University Research, PBD 663 Travel, and 1995 SBIR.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 902091									
11,197	8,246	4,591	16,331	20,333	20,111	12,331	12,331	CONT.	CONT.

(U) RELATED RDT&E: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1121
PROJECT TITLE: Personnel Protection

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		FFBA MS III		2Q Production Contract Award	
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROJECT NUMBER: S1121
PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT TITLE: Personnel Protection

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Developmental Support Equipment Acquisition	993	1,957	1,409	2,322
b. Developmental Test and Evaluation	2,322	895	590	0
c. Operational Test & Evaluation	0	20	500	0
Total	3,315	2,872	2,499	2,322

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Miscellaneous Various	Various	CONT.	CONT.		11,058	793	1,917	1,299	2,122	CONT.	CONT.
Support and Management											
Miscellaneous Various	Various	CONT.	CONT.		1,000	200	200	200	200	CONT.	CONT.
Test and Evaluation											
Miscellaneous Various	Various	CONT.	CONT.		2,000	2,322	755	1,000	0	CONT.	CONT.

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1121 PROJECT TITLE: Personnel Protection

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0	0	0
Support and Management				0	0	0	0	0	0	0
Test and Evaluation				0	0	0	0	0	0	0

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	11,058	793	1,917	1,299	2,122	CONT.	CONT.
Subtotal Support and Management	1,000	200	200	200	200	CONT.	CONT.
Subtotal Test and Evaluation	2,000	2,322	755	1,000	0	CONT.	CONT.
Total Project	14,058	3,315	2,872	2,499	2,322	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1565 Fire Protection/Damage Control Systems	8,641	6,340	6,084	5,219	5,261	5,955	5,984	6,154	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Persian Gulf war lessons-learned have highlighted the significant threat to the ship's mission capability and crew caused by the near immediate spread of fire, smoke, and flooding following an attack, and the need to execute damage control (DC) actions with a more organized and effective response. Additionally, the inability to rapidly restore vital hull, mechanical, and electrical (HM&E) systems following damage was also highlighted.

(U) In response to the Persian Gulf lessons-learned, including peacetime lessons-learned, this project supports the development and evaluation of systems which will enable the ship and crew to contain damage to the primary damage zone, and rapidly restore vital HM&E systems providing for recovery of mission capability. System development areas include: 1) computerized information management (IM) systems which collect, analyze, and display, in real-time, key information on the damage status of the ship and HM&E systems, and provide recommended DC actions for containing damage and restoring vital HM&E services, 2) active and passive fire protection systems, and 3) advanced DC training systems which account for all aspects of combat induced damage, decision making in high stress environments, and recovery/restoration.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,050) Conducted full-scale fire hazard test of typical shipboard storerooms to characterize fuel load and assessed need for improved fire tolerant shipboard materials.
- (U) ($700) Conducted large-scale tests of fixed fine water mist extinguishing system; initiated preparation of specifications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

- (U) ($900) Initiated development of a DC survivability model which supports assessing DC design options, including passive fire protection, personnel routing, and DC system architecture. Began incorporation of time-dependent architecture into the Ship Vulnerability Model (SVM) to account for the effects of fire/smoke, fire fighting, crew casualties, and structural integrity.

- (U) ($700) Developed fleet training software for selected ships which identifies inactivated equipment and damaged or flooded compartments, as a function of threat.

- (U) ($250) Initiated evaluation of continuous reading, NDI flooding sensors and data network to provide real-time stability status (RTSS) via interface to the Flooding Casualty Control Software (FCCS) to support rapid identification of stability corrective actions and development of liquid load management plans.

- (U) ($1,118) Initiated development of DC system architecture design requirements to ensure, in a combat threat environment, damage can be contained to the primary damage zone and vital HM&E systems can be rapidly restored. System architecture requirements to be developed include arrangement/configuration, power continuity, and software. Conducted baseline vulnerability analysis of shipboard data communication system network and sensors, and initiated weapon effects test and evaluation (T&E).

- (U) ($1,800) Initiated development of structural assessment software module for the Damage Control System (DCS) which defines hull girder integrity after attack, and recommended dewatering and structural reinforcement locations.

- (U) ($2,123) Developed specification for post-flashover insulation to protect against missile-induced fires; conducted scaled tests to assess shipboard fire threat from fuel tanks penetrated by anti-ship missile (ASM) threats; conducted demonstration of advanced shock-mitigating concepts aboard ex-USS RALEIGH (LPD-1).

2. (U) FY 1995 PLAN:

- (U) ($707) Conduct full-scale fire test of selected shipboard compartments.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

- (U) ($450) Conduct water mist shipboard qualification tests and prepare preliminary specification for fixed fine water mist fire extinguishing system.
- (U) ($550) Continue incorporation of time-dependent architecture into the SVM. Incorporated dynamic electrical model.
- (U) ($450) Complete evaluation of RTSS NDI flooding sensors and data network interface.
- (U) ($350) Continue development of structural assessment software module for DCS.
- (U) ($450) Complete development of fleet training software for selected ships.
- (U) ($700) Conduct full-scale DC tests aboard ex-USS SHADWELL to evaluate the effectiveness of a single repair party with current equipment/systems in responding to realistic casualties focusing on improving communications and equipment use procedures.
- (U) ($400) Initiate development of an interactive computer-based DC training system which will accurately simulate combat scenarios and support, (1) training the Damage Control Assistant (DCA) to effectively use advanced DC systems and make decisions under high stress, and (2) interdepartmental coordination for restoration of HM&E services vital to combat systems.
- (U) ($600) Continue development of DC system architecture requirements.
- (U) ($1,683) Conduct various tasks, including; perform comparative full scale fire test of fire resistant uniforms, conduct shipboard evaluation of NDI self contained breathing apparatus, evaluate firefighting training aids, and identify deficiencies in equipment shock hardening.

3. (U) FY 1996 PLAN:

- (U) ($525) Complete full-scale fire tests of selected shipboard compartments and prepare material performance specification.

- (U) ($650) Incorporate the impact of damage control recovery/restoration operations on ship survivability into the time-dependent SVM.
- (U) ($100) Prepare final specification for fixed fine water mist fire extinguishing system.
- (U) ($750) Complete RTSS interface modifications and specification for FCCS. Conduct shipboard T&E.
- (U) ($1,256) Conduct T&E on shipboard data communications network to ensure uninterrupted transmission of damage status data to all surviving damage control work stations. Develop a prototype survivable fire and smoke sensor architecture design which identifies the primary damage zone and tracks damage progression in real time; conduct full scale demonstration on board ex-USS SHADWELL. Identify design options for vital HM&E systems(i.e., firemain, chilled water) which support rapid restoration following damage.
- (U) ($479) Continue structural assessment software module for DCS.
- (U) ($849) Continue development of an interactive DC training system.
- (U) ($425) Initiate assessment of current magazine sprinkler systems to provide sufficient cooling to prevent mass deflagration under combat threat conditions. Specifically, investigate external fire threats raising the magazine air temperature above a critical level, and penetrating threats which initiate propellant burning.
- (U) ($1,050) Continue full-scale DC tests on board the ex-USS SHADWELL; evaluate the ability of multiple repair parties to effectively control a complex scenario involving fire and smoke.

4. (U) FY 1997 PLAN:

- (U) ($500) Complete incorporation of damage control recovery/restoration operations into the SVM.
- (U) ($1,235) Initiate development of prototype system control designs for the firemain and chilled water systems to support rapid restoration following damage.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

- (U) ($850) Continue development of an interactive DC training system.
- (U) ($1,100) Conduct full-scale DC tests on board the ex-USS SHADWELL to evaluate the ability of repair parties to effectively restore HM&E systems following damage.
- (U) ($1,134) Complete assessment of current magazine sprinkler systems. Develop performance based specification.
- (U) ($400) Complete structural assessment software module for DCS.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	8,641	6,409	XXX	XXX
(U) FY 1995 Appropriated:	XXX	6,409	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-69	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:(PRESBUDG CONTROLS)	8,641	6,340	6,084	5,219

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Various FY 95 Reductions, including PBD 701 University Research, PBD 663 Travel, and 1995 SBIR.
(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

(U) RELATED RDT&E:

(U) PE 0604516N, Project S2054 (Integrated Fire Protection/Damage Control).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones	4Q Data Communication/ Sensor Vulnerability Assessment	4Q DC System Architecture Requirements	4Q Prototype Fire/ Smoke Sensor Design/HM&E System Restoration Assessment		Continued
	4Q Post-Flashover Insulation Specification				
	2Q Water Mist Test Plan		4Q Water Mist Specification		
	4Q Time-Dependent SVM Options	4Q Time-Dependent SVM Dynamic Electrical Model	4Q Time-Dependent SVM DC Recovery/ Restoration Impact Assessment	4Q Time-Dependent SVM DC Recovery/ Restoration Model	

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

D. (U) SCHEDULE PROFILE: (Cont.)

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Engineering Milestones (Cont)	4Q RTSS Interface Options	4Q RTSS/FCCS Software Integration	4Q RTSS Specification		
	4Q ISMS Structural Assessment Requirements	1Q DCS Structural Assessment Software Options	4Q DCS Structural Assessment Software Module		
		4Q Interactive DC Training System Requirements/ Options	4Q Interactive DC Training System Module	4Q Interactive DC Training System	Continued
			4Q Magazine Combat Threat Assessment	4Q Magazine Sprinkler System Vulnerability Assessment and Specification	Continued
	4Q Shipboard Storeroom Material Fuel Load Assessment	4Q Shipboard Compartment Material Fuel Load Assessment	4Q Fire Hazard Material Performance Specification		

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

D. (U) SCHEDULE PROFILE: (Cont.)

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
T&E Milestones	2Q Shipboard Storeroom Materials Fire Hazard Tests	3Q Shipboard Compartment Material Fire Hazard Tests			
	4Q Large Scale Water Mist Test	3Q Water Mist Qualification Tests			
		3Q RTSS Flooding Demonstration	3Q RTSS Shipboard Evaluation		
		4Q Single Repair Locker Full Scale DC Communication and Equipment Procedure Tests	4Q Multiple Repair Lockers Full Scale DC Fire/ Smoke Tests	4Q Multiple Repair Lockers Full Scale DC System Restoration Tests	Continued
			3Q Data Communication Survivability Tests/ Fire/Smoke Sensor Demonstration		
Contract Milestones	Not Applicable	Not Applicable	Not Applicable	Not Applicable	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Engineering Assessments/ Design Studies	1,384	450	650	600
b. Test and Evaluation	4,825	3,240	2,631	3,494
c. Specifications/Design Standard Preparation	637	800	400	200
d. Hardware Development	0	0	200	0
e. Software Development	1,765	1,820	2,178	900
f. Travel	30	30	25	25
Total	8,641	6,340	6,084	5,219

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N PROGRAM ELEMENT TITLE: Ship Combat Survivability PROJECT NUMBER: S1565 PROJECT TITLE: Fire Protection/Damage Control Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVSURFWARCEN WR Carderock Division Bethesda, MD		10/94	Cont.	Cont.		5,561	1,715	3,200	2,780	CONT.	CONT.
NRL Washington, DC						1,296	1,605	1,125	650	CONT.	CONT.
Miscellaneous Competitive	Various					1,784	3,020	1,759	1,789	CONT.	CONT.
Support and Management						0	0	0	0	CONT.	CONT.
Test and Evaluation						0	0	0	0	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603514N
PROGRAM ELEMENT TITLE: Ship Combat Survivability
PROJECT NUMBER: S1565
PROJECT TITLE: Fire Protection/Damage Control Systems

GOVERNMENT FURNISHED PROPERTY Not applicable.

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development		8,641	6,340	6,084	5,219	CONT.	CONT.
Subtotal Support and Management		0	0	0	0	CONT.	CONT.
Subtotal Test and Evaluation		0	0	0	0	CONT.	CONT.
Total Project		8,641	6,340	6,084	5,219	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1825 Radiological Controls	74	88	0	0	0	0	0	0	0	162
S1830 RADIAC Development	3,180	3,354	3,202	3,060	3,096	3,781	3,807	3,916	CONT.	CONT.
TOTAL	3,254	3,442	3,202	3,060	3,096	3,781	3,807	3,916	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) 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 exposure 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.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control

(U) Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices in direct support of the Navy Nuclear Propulsion Program and other users by providing accurate, reliable Health Physics instrumentation at the lowest possible life-cycle cost. Reliable radiation monitoring instruments are needed to ensure the radiological safety of Navy personnel. 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 new 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% by replacing over 60 different models of obsolete equipment. This project has a 5 to 1 payback ratio. New requirements for the measurement of lower 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT:0603542N
PROGRAM ELEMENT TITLE: Radiological Control

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1830 RADIAC Development	3,180	3,354	3,202	3,060	3,096	3,781	3,807	3,916	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices in direct support of the Navy Nuclear Propulsion Program and other users by providing accurate, reliable Health Physics instrumentation at the lowest possible life-cycle cost. Reliable radiation monitoring instruments are needed to ensure the radiological safety of Navy personnel. All OR's issued 25 Aug 1987.

Multifunction RADIAC (MFR), OR #176-04-86
Laser Heated Thermoluminescent Dosimetry (LHTLD) System, OR #180-04-87
Neutron Dosimetry System, OR #179-04-87
Automated RADIAC Calibration and Diagnostics System, OR #175-04-86
Underwater RADIAC System, OR #178-04-88
Wide Range Survey Meter, OR #177-04-87
Tritium Monitors, OR #182-04-89
EOD Personal Dosimeter, OR #181-04-87

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($588) Built 113 field test models of basic Multifunction RADIAC (MFR) System.
- (U) ($600) Built field test models of MFR probes (Beta, Radiography, Neutron, Transuranic (X-ray)).
- (U) ($1,992) Continued Engineering and Manufacturing Development (EMD) Phase III for LHTLD System.

2. (U) FY 1995 PLAN:

- (U) ($2,134) Develop a Proton Recoil Neutron Dosimeter and a Beta Dosimeter for LHTLD System.
- (U) ($1,015) Develop interfaces for Plastic Scintillation Probe, Alpha Probe, Gooseneck Gamma Probe, and Beta Probe for MFR System.
- (U) ($155) Resume development of Explosive Ordnance Disposal (EOD) Personal Dosimeter and Casualty Dosimeter.
- (U) ($50) Resume development of Tritium Monitor and Underwater RADIAC.

3. (U) FY 1996 PLAN:

- (U) ($1,370) Continue development of dosimeters for LHTLD System.
- (U) ($1,287) Continue development of probes for MFR System.
- (U) ($245) Continue development of EOD, Neutron, and Casualty Dosimeters.
- (U) ($300) Continue development of Tritium Monitor and Underwater RADIAC.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1830
PROJECT TITLE: RADIAC Development

4. (U) FY 1997 PLAN:

- (U) ($708) Continue development of LHTLD Dosimeters.
- (U) ($1,497) Continue development of MFR probes.
- (U) ($435) Continue development of EOD, Neutron, and Casualty Dosimeters.
- (U) ($420) Continue development of Tritium Monitor and Underwater RADIAC.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,180	3,404	XXX	XXX
(U) FY 1995 Appropriated:	XXX	3,404	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-50	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	3,180	3,354	3,202	3,060

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 reductions are $5K for University Research, $4K for Travel and $41K for SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 292000										
	2,850	4,963	3,880	4,057	4,102	4,790	4,659	4,807	21,802	55,910

(U) RELATED RDT&E: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

D. (U) SCHEDULE PROFILE:

Multifunction RADIAC	(MFR)
Laser Heated TLD	(LHTLD)
EOD Dosimeter	(EODD)
Neutron Dosimetry	(ND)
Underwater RADIAC	(UW)
Tritium Monitor	(TM)
Casualty Dosimeter	(CD)
Gamma Camera	(GC)
Distant Radiation Detector	(DRD)

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	4Q MFR MS III	2Q EODD MS III 4Q CD MS II	2Q MFR IOC 1Q LHTLD MS III 4Q CD MS III 4Q UW MS II 1Q EODD IOC	3Q LHTLD IOC 4Q CD IOC 4Q TM MS I 4Q ND MS II	MFR FY 07 MS IV LHTLD FY 02 MS IV EODD FY 98 MS IV ND FY 00 MS IV TM FY 04 MS IV UW FY 04 MS IV CD FY 00 MS IV GC FY 03 MS IV DRD FY 05 MS IV
Engineering Milestones	2Q LHTLD Critical Design Review (CDR)	2Q MFR CDR (Production)		1Q LHTLD CDR (PROD)	

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603542N PROJECT NUMBER: S1830
PROGRAM ELEMENT TITLE: Radiological Control PROJECT TITLE: RADIAC Development

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
T&E Milestones			2Q MFR First Article (F.A.)	2Q LHTLD F.A.	
Contract Milestones		2Q MFR PROD 4Q EODD PROD	1Q LHTLD PROD 4Q CD PROD		1Q FY 98 ND PROD 1Q FY 99 TM PROD 1Q FY 99 UW PROD

Note: The above milestones are shown only for the major projects (MFR and LHTLD). Milestones for other projects depend on testing of non-development items (NDI).

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1830
PROJECT TITLE: RADIAC Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development (contractor)	2,058	1,252	595	75
b. Technical Support (government)	671	1,120	2,046	2,244
c. Test and Evaluation (government)	230	788	340	520
d. Integrated Logistics Support (government)	221	194	221	221
e. Total	3,180	3,354	3,202	3,060

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1830
PROJECT TITLE: RADIAC Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development (Contractors)											
International Sensor Technology (LHTLD) Pullman, WA	CPFF	9/90	7,161	7,161	4,386	1,275	1,000	500	0	0	7,161
Miscellaneous Support and Management (Government)	Various	Various	4,301	4,301	2,586	783	252	95	75	510	4,301
Naval Surface Warfare Center, White Oak Det.	WR				2,792	668	864	1,130	1,200	Cont.	Cont.
Miscellaneous Test and Evaluation (Government)	Various				440	224	450	1,137	1,265	Cont.	Cont.
Miscellaneous	WR				720	230	788	340	520	Cont.	Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603542N
PROGRAM ELEMENT TITLE: Radiological Control
PROJECT NUMBER: S1830
PROJECT TITLE: RADIAC Development

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
GOVERNMENT FURNISHED PROPERTY										
Product Development - Not Applicable.										
Support and Management - Not applicable.										
Test and Evaluation - Not applicable.										
Subtotal Product Development				6,972	2,058	1,252	595	75	Cont.	Cont.
Subtotal Support and Management				3,232	892	1,314	2,267	2,465	Cont.	Cont.
Subtotal Test and Evaluation				720	230	788	340	520	Cont.	Cont.
Total Project				10,924	3,180	3,354	3,202	3,060	Cont.	Cont.

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BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603553N
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0229 Surface Ship Silencing	0	0	809	1,401	2,230	621	561	560	CONT.	CONT.
V1704 ASW Advanced Development	0	6,572	5,846	4,571	5,930	8,399	11,099	11,043	CONT.	CONT.
TOTAL	0	6,572	6,655	5,972	8,160	9,020	11,660	11,603	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops surface anti-submarine warfare (ASW) combat system and acoustic silencing technology. The ASW Advanced Development Project provides the advanced development demonstration and validation of technology for potential surface sonar and combat system application. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond threat with emphasis on shallow water/littoral area ASW. The surface ship acoustic quieting develops surface countermine acoustic silencing technology. In light of the sea mine threat, the surface ship acoustic quieting provides for the development and at-sea demonstration of quieting techniques to reduce surface ship active and passive sonar self-noise, ship radiated noise, and shipboard machnine-generated airborne noise. Subprojects 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603553N
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0229 Surface Ship Silencing	0	0	809	1,401	2,230	621	561	560	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: It is critical for improved warfighting capability that ship acoustic signatures be reduced to avoid ship damage and improve sonar performance for mine hunting. Control of acoustic signatures is vital to maintaining warfighting capability for surface mine countermeasures ships since it is directly tied to ship self-defense and survivability in littoral operations.

(U) The U.S. Navy is already lagging both foreign military and foreign commercial knowledge base in transitioning technologies which reduce both cost and surface ship underwater acoustic signatures. Tasks in this project will be highly leveraged against the substantial investments in submarine acoustic silencing and will apply resources to adapt the technologies to surface ships. This is the only surface ship acoustic silencing R&D project beyond exploratory development and provides critical technology for new design and backfit applications.

(U) The hull coating task represents

It outperforms masker, requires no alignment or mechanical adjustments, and reduces maintenance. In FY 1993, candidate surface combatants had been successfully evaluated in this R&D project utilizing test patches and at-sea evaluation on operating units. A prototype demonstration on a mine countermeasure ship remains to be performed before approval for fleet-wide application is recommended. The development of other products for quiet propeller enhancements, sonar/acoustic system tactical aids, and machine-generated noise control that support emerging fleet needs will also be completed.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1995 PLAN: Not Applicable.

3. (U) FY 1996 PLAN:

- (U) ($509) Diagnose/evaluate emerging fleet problems. Conduct research and development (R&D) that will fix the problems. Develop affordable solutions for machinery, propeller, and sonar self-noise problems.
- (U) ($300) Develop installation package/planning for full-scale mine countermeasures ship hull coating demonstration.

4. (U) FY 1997 PLAN:

- (U) ($1,000) Initiate procurement/fabrication of affordable acoustic hull coating materials for full-scale installation/demonstration.
- (U) ($401) Diagnose/evaluate emerging fleet problems. Conduct R&D that will fix the problems. Develop affordable solutions for machinery, propeller, and sonar self-noise problems.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget	0	0	XXX	XXX
(U) FY 1995 Appropriated:	XXX	0	XXX	XXX
(U) Adjustments from Appropriated/ FY1995 PRESBUDG:	0	0	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	0	0	809	1,401

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Not applicable.

(U) Schedule: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: S0229
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: Surface Ship Silencing

(U) Technical: Technical resources previously available will be selectively utilized to diagnose problems, develop and evaluate solutions. The hull coating had been developed to the point it was ready for demonstration/evaluation which will be accomplished here on a mine countermeasures ship.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E:

(U) PE 0602121N (Surface Ship & Submarine HM&E Technology). The acoustics tasks of the Underwater Signature Reduction project conducts exploratory development of technology concepts transitioned to Project S0229 for advanced development.

(U) PE 0603561N (Advanced Submarine System Development). Project S0229 is leveraged by acoustic silencing technologies developed by submarine programs.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones					3Q/98 Install Hull Coating
T&E Milestones					4Q/98 Evaluate Hull Coating
Contract Milestones					

UNCLASSIFIED

FY 1996 RDT&E, PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT NUMBER: S0229 PROJECT TITLE: Surface Ship Silencing

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	0	0	494	851
b. Systems Engineering	0	0	265	400
c. Developmental Test & Evaluation	0	0	50	150
Total	0	0	809	1,401

BUDGET ACTIVITY:4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: S0229
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: Surface Ship Silencing

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVSURFWARCEN CARDEROCK DIV Bethesda, MD	WR	VARIOUS	32,100	32,100	29,000	0	0	381	751	1,772	31,904
NAVUNSEAWARCEN DET New London, CT	WR	VARIOUS	4,800	4,800	4,500	0	0	50	50	200	4,800
Penn State Univ/ Applied Research Lab State College, PA	SS	VARIOUS	2,700	2,700	2,400	0	0	0	50	250	2,700
MISCELLANEOUS	C	VARIOUS	1,798	1,798	1,098	0	0	128	100	400	1,726
Support and Management											
NAVSURFWARCEN CARDEROCK DIV Bethesda, MD	WR	VARIOUS	2,900	2,900	2,500	0	0	50	50	200	2,800
NAVUNSEAWARCEN DET New London, CT	WR	VARIOUS	1,450	1,450	1,450	0	0	0	0	0	1,450
MISCELLANEOUS	C	10/26/90	449	449	149	0	0	50	50	200	449
Test and Evaluation											
NAVSURFWARCEN CARDEROCK DIV Bethesda, MD	WR	VARIOUS	15,356	15,356	14,356	0	0	100	250	650	15,356
NAVUNSEAWARCEN DET New London, CT	WR	VARIOUS	4,100	4,100	3,800	0	0	0	50	100	3,950
MISCELLANEOUS	C	10/26/90	1,047	1,047	747	0	0	50	50	200	1,047

GOVERNMENT FURNISHED PROPERTY: Not Applicable

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603553N
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

PROJECT NUMBER: S0229
PROJECT TITLR: Surface Ship Silencing

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	36,998	0	0	559	951	2,622	41,130
Subtotal Support and Management	4,099	0	0	100	100	400	4,699
Subtotal Test and Evaluation	18,903	0	0	150	350	950	20,353
Total Project	60,000	0	0	809	1,401	3,972	66,182

C. (U) FUNDING PROFILE: Not applicable.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603553N
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1704 ASW Advanced Development	0	6,572	5,846	4,571	5,930	8,399	11,099	11,043	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides the advanced development demonstration and validation of technology for potential surface sonar and combat system applications. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond submarine threat with emphasis on shallow water/littoral area ASW. Key technology areas being investigated include active sonar transmissions, signal and information processing, active sonar classification, towed arrays and transducer technology, multi-static sonar, and multi-sensor data fusion. The major near-term effort is development of a mid-frequency towed array test bed (TARS) which will function as a deep receiver adjunct for the SQS-53 transmitter, thereby providing significantly enhanced submarine detection performance against deep submarine targets.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1995 PLAN:

   - (U) ($6,572) Continue contact management improvements in preparation for at-sea evaluation. Continue development of mid-frequency receive array test bed (TARS) including procurement of telemetry subsystem, competitive selection of a towed array contractor, and design of a shallow water towing subsystem. Perform warfare payoff, performance modeling, and operational evaluations.

3. (U) FY 1996 PLAN:

   - (U) ($5,846) Demonstrate contact management improvement at-sea. Continue TARS towed array development, validate telemetry design, tow cable and handling system modifications, and conduct towed array critical design review (CDR). Perform warfare payoff, performance modeling, and operational evaluations.

4. (U) FY 1997 PLAN:

- (U) ($4,571) Validate improved data fusion algorithms for integration into ADM-4. Complete development of mid-frequency receive array test bed components (array, towing system, receiver, beamformer) and begin TARS integration. Perform warfare payoff, performance modeling, and operational evaluations.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	6,659	XXX	XXX
(U) FY 1995 Appropriated:	XXX	6,659	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-87	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	0	6,572	5,846	4,571

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding has been decreased by $87K due to the general reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones		4Q ADM-4 Tac Cont CDR	3Q TARS CDR 4Q ADM-4 Test Readiness Review (TRR)	4Q TARS TRR	
T&E Milestones					
Contract Milestones		3Q TARS Contracts			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Product Development	0	6,382	5,671	4,176
b. Support and Management	0	190	175	145
c. Test and Evaluation	0	0	0	250
Total	0	6,572	5,846	4,571

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVUNSEAWARCEN DET New London, CT	WR	10/94	CONT.	CONT.	29,698	0	1,780	1,750	1,682	CONT.	CONT.
NAVSURFWARCENDIV Dahlgren, VA	WR	10/94	CONT.	CONT.	5,875	0	419	465	450	CONT.	CONT.
Misc Contractors	C/CPFF	4/95	TBD	CONT.	0	0	2,963	2,256	1,544	CONT.	CONT.
Miscellaneous	WR				4,821						
Support and Management											
Misc Contractors	C/CPFF	3/95	TBD	CONT.	288	0	190	175	145	CONT.	CONT.
Test and Evaluation											
NAVUNSEAWARCEN DET New London, CT	WR	10/94	CONT.	CONT.	0	0	0	0	250	CONT.	CONT.
Misc Contractors	C/CPFF	2/97	TBD	CONT.	0	0	0	0	0	CONT.	CONT.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603553N PROJECT NUMBER: V1704
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare PROJECT TITLE: ASW Advanced Development

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Towed Array Telemetry	C/FP	4/95	12/96	540	0	700	705	400	CONT.	CONT.
Towed Array Receiver/ Test Set	C/FP	4/95	2/96	0	0	520	495	100	CONT.	CONT.
Support and Management										
Test and Evaluation										

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	40,934	0	6,382	5,671	4,176	CONT.	CONT.
Subtotal Support and Management	288	0	190	175	145	CONT.	CONT.
Subtotal Test and Evaluation	0	0	0	0	250	CONT.	CONT.
Total Project	41,222	0	6,572	5,846	4,571	CONT.	CONT.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2033 Advanced Submarine Systems Development	77,847	61,718	30,860	28,972	27,385	34,384	33,642	33,195	CONT.	CONT.
F2034 R&D Submarine	27,797	3,876	2,378	0	0	0	0	0	0	104,665
F2177 New Design HM&E	34,780	15,800	2,510	2,630	0	0	0	0	0	144,848
TOTAL	140,424	81,394	35,748	31,602	27,385	34,384	33,642	33,195	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports innovative research and development in submarine technologies and their evaluation and demonstration on a submarine platform. It will increase 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 project transitions technologies developed by Navy technology bases, the private sector, and the Advanced Research Projects Agency (ARPA) Maritime Systems Technology Office. Advanced systems developed under this program have potential for backfit into existing classes of submarines and 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. The project also conducts an SSN Security Program (SSP) to develop techniques and devices that decrease the detection vulnerability of attack submarines specifically operating in littoral environments; supports an Information Exchange Program with the United Kingdom (UK) on submarine electromagnetic silencing; operates the Large Scale Vehicle (LSV) to provide at-sea test capability for propulsor, hydrodynamic control, target strength, and hull coating Research and Development (R&D); operates the Hydrodynamic/Hydroacoustic Technology Center (H/HTC) to enhance our ability to accurately, computationally predict hydrodynamic and hydroacoustic performance of submerged bodies; and provides life cycle support for the R&D Submarine.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) 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 is dedicated to the New Attack Submarine (New SSN). The primary goal of the project is 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2033 Advanced Submarine Systems Development	77,847	61,718	30,860	28,972	27,385	34,384	33,642	33,195	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project F2033 identifies the most promising and emerging technologies and transitions them into specific advanced development efforts. The project transitions technologies developed by Navy technology bases, the private sector, and the ARPA Maritime Systems Technology Office. Advanced systems developed under this project have potential for backfit into existing classes of submarines and to support emerging requirements and systems technology insertions into new submarine design. The emphasis is directed toward affordability, acoustic and non-acoustic signature control technology (stealth) and/or safety alternatives for attack submarines. The project also conducts SSP to develop techniques and devices that decrease the detection vulnerability of attack submarines specifically operating in littoral environments; supports an Information Exchange Program with the UK on submarine electromagnetic silencing; operates the LSV to provide at-sea test capability for propulsor, hydrodynamic control, target strength, and hull coating R&D; operates the H/HTC to enhance our ability to accurately, computationally predicts hydrodynamic and hydroacoustic performance of submerged bodies; and provides life cycle support for the R&D Submarine.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,314) Initiated development of modeling and simulation procedures to address hydrodynamic issues integral to submarine modernization and future ship designs (e.g., code certifications and design tool integration).
- (U) ($2,941) Conducted concept integration studies (e.g., stealth sail and integrated stern).
- (U) ($8,873) Continued LSV use and support (testing candidate propulsors for New SSN, acoustic/non-acoustic detectability, and SEAWOLF propulsor performance validation); conducted procurement for replacement of LSV

main propulsion battery; conducted first restricted availability to include shaft changeout; commenced replacement of ship control computer (SCC).

- (U) ($2,100) Under the Electric Drive program, began critical component life and performance testings. Initiated feasibility study for candidate electric drive systems.

- (U) ($4,200) Fabricated low frequency countermeasure Deployable Active Test Device (DATD). Participated in the development of the low frequency active acoustic Submarine Bistatic Processor (SBP). Conducted test of DATD and SBP in Magellan II sea test. Provided tactical warfare readiness support to Submarine Development Squadron 12. Transferred program management responsibility to Program Executive Officer for Undersea Warfare.

- (U) ($1,772) Continued use and support for the H/HTC.

- (U) ($20,002) Initiated advanced development of acoustic coatings and evaluation of elastomeric ejection system. Initiated evaluation of ARPA radiated noise project P. Initiated development of propulsor systems.

- (U) ($30,978) Continued development of arc fault prevention and non-chlorofluorocarbon (CFC) air conditioning and refrigeration plant. Continued evaluation of pressure hull design criteria, electromagnetic silencing program, and optimized weld joint design. Continued development of a prototype composite main propulsion shaft. Continued validation of analytical modeling techniques for hull dynamic strength. Continued development of shock and acoustic isolation devices and ARPA radiated noise project F.

- (U) ($3,397) Completed evaluation of no forward planes. Completed development of external system shock protection. Completed development of an advanced hybrid propulsor. Completed use of the H/HTC to develop improvements to current and future submarine designs (enhancing emergency recovery and maneuverability or reducing hydrodynamic attributed signatures). Removed the non-penetrating periscope and restored ship to original configuration. Transitioned the enhanced tube condensers to the surface ship fleet.

2. (U) FY 1995 PLAN:

- (U) ($2,400) Continue concept integration studies (e.g., magnetic bearings and shipboard gray-water treatment).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

- (U) ($6,300) Continue use and support for the LSV; conduct restricted availability for installation of new main propulsion battery; complete SCC replacement.
- (U) ($1,270) FY94 money used to forward fund FY95 SUPRELITE new aft item replacement efforts and initiate efforts to identify the cause of the related SUPREJET cavitation problem noted after the 1992 failure of the ARPA SUPRELITE component on the operational fleet test platform.
- (U) ($150) Terminate SUPRELITE fatigue testing (Phase II) pending resolution of the SUPREJET cavitation problem.
- (U) ($4,782) Complete identification of the cause of SUPREJET cavitation problems then perform necessary work on the operational fleet unit to allow full speed and depth capability without cavitation.
- (U) ($1,600) Continue use and support for the H/HTC.
- (U) ($1,600) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to submarine modernization and future ship designs (e.g., code certifications and design tool integration).
- (U) ($3,800) Develop and demonstrate a Situation Awarness System (SAS) for SSN's operating in shallow water littoral regions. Modify DATD countermeasures to work against extended echo ranging (EER) type signals. Assume responsibility for Tactical Decision Aids for Submarine Security (TDASS) module development.
- (U) ($2,530) Complete the critical component life and performance testing in the electric drive program.
- (U) ($21,715) Continue evaluation of the electromagnetic silencing program. Continue joint US/UK deepwater electromagnetic silencing test. Continue development and testing of a prototype composite main propulsion shaft. Continue ARPA radiated noise project P. Continue development of propulsor systems, arc fault prevention, and ARPA radiated noise project F. Continue development of shock and acoustic isolation devices.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

- (U) ($13,975) Complete evaluation of pressure hull design criteria and optimized weld joint design. Complete validation of analytical modeling techniques for hull dynamic strength. Complete development of non-CFC air conditioning and refrigeration plants and acoustic coatings. Complete evaluation of elastomeric ejection system. Transition projects to PE 0604558N.

3. (U) FY 1996 PLAN:

- (U) ($2,400) Continue concept integration studies.
- (U) ($6,300) Continue use and support for the LSV. Advance planning for the major LSV modification and initiate long lead time material procurement (LLTM).
- (U) ($1,200) Continue use and support for the H/HTC.
- (U) ($1,600) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to submarine modernization and future ship designs (e.g., code certifications and design tool integration).
- (U) ($934) Continue the development of SSN operational characterization and initiate SSN Security assessments in a littoral environment.
- (U) ($2,866) FY96 SSN Security effort forward funded with FY95 dollars. Continue with the development of littoral SSN Security projects (e.g. Situational Awareness, Tactical Operations, Assessments, and TDASS modules). Develop DATD EER tactics.
- (U) ($1,269) Initiate plans for development of a scaled model of the integrated stern components.
- (U) ($11,659) Continue development and testing of prototype composite main propulsion shaft. Continue ARPA radiated noise project P. Continue development of propulsor systems and arc fault prevention. Continue development and testing of shock and acoustic isolation devices.

- (U) ($5,498) Complete development of ARPA radiated noise project F. Complete evaluation of the electromagnetic silencing program.

4. (U) FY 1997 PLAN:

- (U) ($2,541) Continue concept integration studies.
- (U) ($6,300) Continue advanced planning for the major LSV modification and LLTM procurement. Continue use and support for the LSV.
- (U) ($1,200) Continue use and support for the H/HTC.
- (U) ($1,600) Continue development of modeling and simulation procedures to address hydrodynamic issues integral to submarine modernization and future ship designs (e.g., code certifications and design tool integration).
- (U) ($3,900) Conduct SAS demonstration and sea test. Coordinate Regional Self Defense Advanced Technology Demonstration and ARPA Program efforts in this area.
- (U) ($1,500) Initiate use and support for the Intermediate Scale Measurement Test Range.
- (U) ($1,400) Transition life cycle support for the R&D Submarine from PE 0603561N/F2034.
- (U) ($2,790) Commence hardware development for the scaled model of the integrated stern components.
- (U) ($1,900) Continue development and testing of prototype composite main propulsion shaft.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

- (U) ($5,841) Complete development and testing of shock and acoustic isolation devices. Complete development of propulsor systems and arc fault prevention. Transition programs to PE 0604558N. Complete ARPA radiated noise project P.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	23,470	28,886	XXX	XXX
(U) FY 1995 Appropriated:	XXX	28,886	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	54,377	32,832	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	77,847	61,718	30,860	28,972

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: A decision to clarify New SSN hull, mechanical, and electrical (HM&E) funding resulted in realignment of a portion of Project F2177 funds to Project F2033 (FY94 +$54,377K; FY95 +$35,690K). FY95 funding reductions are University Research (-$2,416K), CSS Reduction (-$127K), FFRDC Reduction (-$2K), Travel Reduction (-$37K), and SBIR (-$276K).

(U) Schedule: Not applicable.

(U) Technical: The SUPRELITE New Aft Item and Fatigue Testing programs have been halted pending resolution of SUPREJET cavitation problem.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0101224N (SSBN Security & Survivability Program)
(U) PE 0603555N (Sea Control and Littoral Warfare Technology Demonstration)
(U) PE 0603569E (ARPA Advanced Submarine Technology Program)
(U) PE 0603792N (Advanced Technology Transition)
(U) PE 0604558N (New Design SSN Development)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q Candidate Decision in Electric Drive		1Q Transition of R&D Sub Life Cycle Support from F2034	
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2033 PROJECT TITLE: Advanced Submarine Systems Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Hardware Development	60,897	41,661	16,517	20,774
b. Software Development	5,690	3,900	3,678	3,690
c. Developmental T&E	11,260	16,157	10,665	4,508
Total	77,847	61,718	30,860	28,972

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
TRACOR Austin, Texas	C/CPFF	12/87	CONT.	CONT.	4,301	1,600	1,603	1,368	1,569	CONT.	CONT.
PSU/ARL State College, PA	S/CPFF	10/89	CONT.	CONT.	2,477	4,578	4,233	500	500	CONT.	CONT.
Newport News Shipbuilding, Norfolk, Virginia	S/CPFF	03/90	CONT.	CONT.	8,147	6,907	1,845	1,909	1,939	CONT.	CONT.
General Dynamics /EB Div., Groton, CT	S/CPFF	03/92	CONT.	CONT.	7,699	11,532	7,316	1,991	3,823	CONT.	CONT.
GNB Chicago, Illinois	C/CPFF	06/93	2,835	2,835	165	1,420	0	0	0	1,250	2,835
JHU/APL Laurel, Maryland	S/CPFF	10/89	CONT.	CONT.	10,820	4,420	6,866	1,583	3,786	CONT.	CONT.
TEXAS INST. Dallas, TX	C/CPFF	09/93	3,348	3,348	825	2,523	0	0	0	0	3,348
AT&T Whippany, New Jersey	C/CPFF	10/94	3,555	3,555	0	1,405	950	500	700	0	3,555
NAVSURFWARCEN Bethesda & Annapolis, Maryland; Bayview, Idaho; Portsmouth, Virginia	WR	Var	CONT.	CONT.	31,644	19,756	12,723	6,496	6,189	CONT.	CONT.
PNSY Portsmouth, NH	WR	Var	2,000	2,000	0	0	0	0	1,000	CONT.	CONT.
Miscellaneous		Var	CONT.	CONT.	43,447	13,546	8,398	4,220	2,764	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2033
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: Advanced Submarine Systems Development

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management											
Miscellaneous		Var	CONT.	CONT.	1,415	1,130	1,467	1,860	1,794	CONT.	CONT.
Test and Evaluation											
NAVSURFWARCEN Bethesda and Annapolis, MD; Bayview, Idaho;	WR	Var	CONT.	CONT.	800	4,740	8,107	4,535	892	CONT.	CONT.
ABERDEEN PROVING GROUND, Aberdeen, MD	MIPR	Var	1,788	1,788	0	116	610	1,062	0	0	1,788
AT&T Whippany, NJ	C/CPFF	10/94	3,300	3,300	0	0	1,000	850	1,450	0	3,300
GD/EBDIV Groton, CT	C/CPFF	03/92	7,666	7,666	0	1,960	3,746	1,960	0	0	7,666
Miscellaneous		Var	CONT.	CONT.	1,600	2,214	2,854	2,026	2,566	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	109,525	67,687	43,934	18,567	22,270	CONT.	CONT.
Subtotal Support and Management	1,415	1,130	1,467	1,860	1,794	CONT.	CONT.
Subtotal Test and Evaluation	2,400	9,030	16,317	10,433	4,908	CONT.	CONT.
Total Project	113,340	77,847	61,718	30,860	28,972	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2034 R&D Submarine	27,797	3,876	2,378	0	0	0	0	0	0	104,665

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides resources to convert USS MEMPHIS (SSN 691) to a dedicated R&D platform without loss of mission capability. This will provide for a dedicated at-sea platform for test and evaluation of advanced submarine systems technologies applicable to existing and the next generation SSNs. Developments from Navy, ARPA, and industry are accommodated. The program completes the design and prefabrication of several modifications (i.e., instrumentation system, a test center, support services, penetrations, weapons launch control system, turtleback structure, and stern planes structure). These modifications are intended to enhance the ability of the R&D Submarine to rapidly and more affordably prototype multiple, high payoff technologies. The instrumentation system, test center, weapon launch control system, support services, and penetrations will be installed during the FY 1994 overhaul. Installation of several other modifications has been deferred until required to support major projects. This project also funds R&D project support. The USS MEMPHIS will maintain its warfighting capability in addition to a principal mission of supporting submarine R&D.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($20,655) Commenced (overhaul) installation of the instrumentation system, test center, weapons launch control system, support services, and penetrations.
- (U) ($1,415) Commenced engineering support for the installation.
- (U) ($4,152) Continued design, material procurement, and prefabrication of all modifications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2034
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: R&D Submarine

- (U) ($1,100) Continued technical review of design documentation and commenced technical review of test documentation.
- (U) ($427) Coordinated at-sea R&D project evaluations.
- (U) ($48) Development of instructional material.

2. (U) FY 1995 PLAN:

- (U) ($490) Complete design, material procurement, and prefabrication of all modifications.
- (U) ($1,149) Continue installation of the instrumentation system, test center, weapons launch control system, support services, and penetrations.
- (U) ($75) Continue engineering support for the installation.
- (U) ($270) Certify installation of weapons launch system modification.
- (U) ($1,011) Continue technical review of test documentation.
- (U) ($500) Commence life cycle support of R&D modifications.
- (U) ($344) Coordinate at-sea R&D project evaluations.
- (U) ($37) Development of instructional material.

3. (U) FY 1996 PLAN:

- (U) ($275) Complete (overhaul) installation of the instrumentation system, test center, weapons launch control system, support services, and penetrations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2034 PROJECT TITLE: R&D Submarine

- (U) ($400) Complete engineering support for the installation.
- (U) ($402) Complete technical review of test documentation.
- (U) ($200) Complete certification of weapons launch system modification.
- (U) ($500) Continue life cycle support of R&D modifications. Life cycle support will transition to PE 0603561N/F2033 beginning in FY 1997.
- (U) ($601) Coordinate at-sea R&D project evaluations.

4. (U) FY 1997 PLAN: Not applicable.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	27,797	3,944	XXX	XXX
(U) FY 1995 Appropriated:	XXX	3,944	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	XXX	-68	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	27,797	3,876	2,378	0

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding for F2034 is eliminated commencing in first quarter FY 1997 after the overhaul is completed. The continuing life cycle costs of the R&D Submarine modifications are transferred to F2033. FY95 reductions for University Research (-$6K), Travel (-$5K), and SBIR (-$57K).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

PROJECT NUMBER: F2034
PROJECT TITLE: R&D Submarine

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0603504N (Advanced Submarine Combat Systems Development)
(U) PE 0603562N (Submarine Tactical Warfare Systems)
(U) PE 0603569E (ARPA Advanced Submarine Technology Program)
(U) PE 0603570N (Advanced Nuclear Power Systems)
(U) PE 0604503N (Submarine System Equipment Development)
(U) PE 0604558N (New Design SSN Development)
(U) PE 0604561N (SSN-21 Development)
(U) PE 0604562N (Submarine Tactical Warfare System)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	2Q Commence Overhaul		2Q Complete Overhaul		
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

PROJECT NUMBER: F2034
PROJECT TITLE: R&D Submarine

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Hardware Development	26,852	3,750	2,378	0
b. Software Development	945	126	0	0
c. Developmental T&E	0	0	0	0
Total	27,797	3,876	2,378	0

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2034 PROJECT TITLE: R&D Submarine

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
General DynamicsC/CPAF /EB Div., Groton, CT		05/90	62,733	62,733	55,381	5,887	747	718	0	0	62,733
PNSY Portsmouth, NH	WR	Var	31,223	31,223	8,477	20,655	1,816	275	0	0	31,223
Miscellaneous		Var	9,533	9,533	5,645	1,240	1,288	1,360	0	0	9,533
Support and Management											
Miscellaneous		Var	1,176	1,176	1,111	15	25	25	0	0	1,176
Test and Evaluation		0	0	0	0	0	0	0	0	0	0

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2034
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: R&D Submarine

GOVERNMENT FURNISHED PROPERTY Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	69,503	27,782	3,851	2,353	0	0	103,489
Subtotal Support and Management	1,111	15	25	25	0	0	1,176
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	70,614	27,797	3,876	2,378	0	0	104,665

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F2177 New Design HM&E	34,780	15,800	2,510	2,630	0	0	0	0	0	144,848

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project identifies, evaluates, and selectively develops critical technologies for the New SSN design to enable an affordable, capable submarine. Efforts are directed at maturing promising technology alternatives into existing submarine systems to permit transition to Engineering Development (6.5). These efforts are highly integrated with industry, shipbuilder, and related Department of Defense R&D programs to provide technical confidence in HM&E technologies being selected during the New SSN design process.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($34,780) Completed concept development of large isolated deck structures. Continued development of components such as propulsor and propulsion equipment to support MS I decision. Completed assessment of welding process and structural design alternatives. Completed breadboard testing of reverse osmosis desalination. Initiated modifications to underwater shock analysis computer codes and shock testing machines for minimization of shock qualification program costs. Evaluated non-acoustic stealth performance. Transition completed programs to PE 0604558N.

2. (U) FY 1995 PLAN:

- (U) ($15,800) Complete advanced development of propulsor and propulsion equipment to support MS II decision. Continue modifications to underwater shock analysis computer codes and shock testing machines for minimization of shock qualification program costs. Level of effort contract to be awarded. Transition completed programs to PE 0604558N.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT NUMBER: F2177 PROJECT TITLE: New Design HM&E

3. (U) FY 1996 PLAN:

- (U) ($2,510) Continue modification to underwater shock analysis computer codes and shock testing machines for minimization of shock qualification program costs. Integrate shock analysis codes with computer aided design codes.

4. (U) FY 1997 PLAN:

- (U) ($2,630) Complete modification to underwater shock analysis codes and development of shock testing machines and transition to PE 0604558N.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	89,157	53,175	XXX	XXX
(U) FY 1995 Appropriated:	XXX	53,175	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	-54,377	-37,375	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	34,780	15,800	2,510	2,630

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: A decision to clarify New SSN HM&E funding resulted in realignment of a portion of Project F2177 funds to Project F2033 (FY94 -$54,377K; FY95 -$35,690K). General reductions in FY95 are University Research (-$1,156), Travel (-$74K), and SBIR (-$455K).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

PROJECT NUMBER: F2177
PROJECT TITLE: New Design HM&E

(U) Schedule: Not applicable.

(U) Technical: All New SSN related technologies have been transferred to Project F2033.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) SCN Line 201300	0	0	704,498	299,758	2,879,317	578,899	1,828,844	1,058,521	CONT.	CONT.

(U) RELATED RDT&E:

(U) PE 0602323N (Submarine Technology)
(U) PE 0603570N (Advanced Nuclear Power Systems)
(U) PE 0604558N (New Design SSN Development)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603561N
PROGRAM ELEMENT TITLE: Advanced Submarine System Development

PROJECT NUMBER: F2177
PROJECT TITLE: New Design HM&E

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	4Q MS I	3Q MS II			
Engineering Milestones					
T&E Milestones					
Contract Milestones		2Q LOE			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: Febraury 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2177
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: New Design HM&E

A.(U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. NSSN Advanced Development Propulsor/Shock	34,710	15,728	2,436	2,554
b. Program Management Support	70	72	74	76
Total	34,780	15,800	2,510	2,630

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2177
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: New Design HM&E

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
PSU/ARL State College, PA	S/CPFF	12/92	7,862	7,862	1,450	2,757	3,655	0	0	0	7,862
General Dynamics /EB Div, Groton, CT	S/CPFF	10/89	45,239	45,239	26,739	16,855	1,645	0	0	0	45,239
EG&G Rockville, MD	S/CPIF	06/90	1,607	1,607	1,607	0	0	0	0	0	1,607
NAVSURFWARCEN Bethesda and Annapolis, MD	WR	VAR	51,663	51,663	23,862	13,559	9,725	2,192	2,325	0	51,663
Newport News Shipbuilding, Norfolk, VA	S/CPFF	03/90	9,851	9,851	9,471	380	0	0	0	0	9,851
NAVUNSEAWARCENDIV Newport, RI	RC	VAR	1,256	1,256	1,256	0	0	0	0	0	1,256
NAVUNSEAWARCENDIV Newport, RI	WR	VAR	15,987	15,987	15,987	0	0	0	0	0	15,987
Miscellaneous		VAR	8,109	8,109	5,482	1,229	775	318	305	0	8,109

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603561N PROJECT NUMBER: F2177
PROGRAM ELEMENT TITLE: Advanced Submarine System Development PROJECT TITLE: New Design HM&E

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management											
Miscellaneous		VAR	3,274	3,274	3,274	0	0	0	0	0	3,274
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY: Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	85,854	34,780	15,800	2,510	2,630	0	141,574
Subtotal Support and Management	3,274	0	0	0	0	0	3,274
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	89,128	34,780	15,800	2,510	2,630	0	144,848

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F0770 Advanced Submarine Support Equipment Program (ASSEP)	3,476	933	2,409	2,588	3,875	4,744	4,585	4,661	CONT.	CONT.
V1739 Submarine Special Operations Support Development	2,838	6,388	2,661	1,798	2,162	2,575	3,012	3,705	CONT.	CONT.
TOTAL	6,314	7,321	5,070	4,386	6,037	7,319	7,597	8,366	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Submarine Tactical Warfare Systems program element is comprised of the Advanced Submarine Support Equipment Program and the Submarine Special Operations Support Development 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 Warfare Support Measures (ESM) technologies. The Submarine Tactical Warfare Systems program responds to the increased threat of Naval activity in the Littorals and the continuing threat of submarine and surface ship activity in regions of the world through the development of advanced submarine R&D technology to provide improved operational capability in shallow water regions. Particular emphasis is placed in the areas of sonar operability and maintainability, Littoral operations, mine warfare, tactical surveillance, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of Arctic shallow water specific improvements for existing sonars, development of class specific Arctic operational guidelines and the testing of ice-capable submarine support structures. This program also provides the framework for various R&D programs to conduct Test and Evaluation in shallow water and Arctic regions. The goal of the Advanced Submarine Support Equipment Program (ASSEP) is to increase submarine operational effectiveness through improvements in electronic warfare (i.e., threat warning, over-the-horizon targeting, and expanded tactical reconnaissance). A continuing need exists to improve submarine capabilities in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under Demonstration and Validation because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F0770 Advanced Submarine Support Equipment Program	3,476	933	2,409	2,588	3,875	4,744	4,585	4,661	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops submarine Electronic Warfare Support Measures equipment technology. A continuing need exists to improve submarine capabilities in these areas 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. Improvements are necessary for submarine ESM to be effective in conducting the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection and Joint Strike. Specific efforts include development of: Radar Cross Section Reduction (RCSR) Techniques, Periscope Monopulse Direction Finding (MDF) System, Sensor Technology Insertion Program (STIP), and ESM Technology Insertion Program (ESMTIP) that develop submarine unique improvements to mast, periscope and hull mounted ESM electromagnetic and electro-optic sensors based on emerging technologies that are available from DOD Exploratory Development Programs, industry Independent Research and Development, and other sources. Feasibility Development Models (FDMs) will be developed to provide a realistic method of evaluating the improvements. Some of the FDMs may be deployed on submarines for part of their testing. Improvements are required in the areas of: frequency extension to keep up with threat developments, system sensitivity to extend the effective range of coverage, spread spectrum and other low probability of intercept techniques to keep up with threat developments. Starting in FY 95 all programs funded in this project are non-acquisition category programs.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: F0770
PROJECT TITLE: Advanced Submarine Support Equipment Program

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,075) Continued generation of Advanced Submarine Tactical (ESM) Combat System (ASTECS) acquisition documentation, obtained Milestone I/II approval and began Engineering and Manufacturing Development phase.
- (U) ($290) Continued investigation of innovative RCSR techniques and materials.
- (U) ($1,111) Continued advanced development of Periscope MDF FDM.

2. (U) FY 1995 PLAN:

- (U) ($186) Initiate STIP.
- (U) ($58) Continue RCSR techniques and materials investigation.
- (U) ($689) Continue advanced development of Periscope MDF FDM.

3. (U) 1996 PLAN:

- (U) ($220) Continue RCSR techniques and materials investigation.
- (U) ($552) Complete Periscope MDF FDM development.
- (U) ($1,637) Continue STIP.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support Equipment Program

4. (U) FY 1997 PLAN:

- (U) ($245) Continue RCSR techniques and materials investigation.
- (U) ($1,936) Continue STIP.
- (U) ($407) Initiate ESMTIP.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,476	1,013	XXX	XXX
(U) FY 1995 Appropriated:	XXX	1,013	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-80	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	3,476	933	2,409	2,588

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 95 decrease of $80K is due to undistributed reductions.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands): Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603562N PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support Equipment Program

(U) RELATED RDT&E:

(U) PE 0604503N (Submarine System Equipment Development)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones					
T&E Milestones					
Contract Milestones	1Q MDF FDM contract award		1Q STIP FDM contracts award		1Q/98 ESMTIP FDM contracts award

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1739 Submarine Special Operations Support Development	2,838	6,388	2,661	1,798	2,162	2,575	3,012	3,705	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program responds to the increased threat of Naval activity in the Littoral and the continuing threat of submarine and surface ship activity in all regions of the world through the development of advanced submarine capabilities and concepts. It places particular emphasis in the areas of sonar operability, Littoral operations, mine warfare, tactical surveillance, and other submarine support missions. Efforts include assessment of combat system effectiveness, development of shallow water (high frequency) improvements for existing sonars for use in Littoral and Arctic regions, testing of ice-capable submarine structures, and development of class specific Arctic shallow water operational guidelines. This program also provides the framework for various Research and Development (R&D) programs to conduct Test and Evaluation in the shallow water and Arctic regions.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($738) Commenced transition of EXUS technology to next generation High Frequency (HF) sonar development efforts.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

- (U) ($2,100) Conducted ICEX 1-94 and support Arctic Science Exercise.

2. (U) FY 1995 PLAN:

- (U) ($947) Complete hull structure data analysis. Provide update of Naval Warfare Publication concerning routine and emergency under-ice surfacing operations.
- (U) ($2,900) Complete transition of EXUS technology to the High Frequency Sonar Program (HFSP) Development.
- (U) ($2,541) Support Arctic Science Exercise and ICEX 1-96 planning.

3. (U) FY 1996 PLAN:

- (U) ($2,661) Support Arctic Science Exercise and ICEX 1-96.

4. (U) FY 1997 PLAN:

- (U) ($1,798) Support Arctic Science Exercise and ICEX 1-98 planning.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,838	7,010	XXX	XXX
(U) FY 1995 Appropriated:	XXX	7,010	XXX	XXX
(U) Adjustments from Appropriated/FY1995 PRESBUDG:	0	-622	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	2,838	6,388	2,661	1,798

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding has been decreased by ($622K) due to general reductions.

(U) Schedule: The High Frequency Large Area Sail Array transition will be delayed.

(U) Technical: The Advanced Mine Detection System (AMDS) will be evaluated at-sea on a SSN in May 1995. The reduction in effort will mean that technical support and operator training for ARL/UT equipment will not be available during the sea-test. Under-ice hull structure data analysis will not be completed.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602323N Submarine Technology provides technologies for advanced development efforts.
(U) PE 0602435N Ocean and Atmospheric Technology provides technologies for advanced development efforts.
(U) PE 0603504N Advanced Submarine Combat Systems Development
(U) PE 0604524N Submarine Combat System incorporates Arctic-specific improvements

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q ICEX 1-94	3Q Arctic Science Exercise	3Q ICEX 1-96	3Q Arctic Science Exercise	CONT.
Engineering Milestones		4Q Complete Transition EXUS Technology to HFSP Development 4Q Complete Hull Structure Analysis			CONT.
T&E Milestones	3Q ICEX 1-94	3Q Arctic Science Exercise	3Q ICEX 1-96	3Q Arctic Science Exercise	CONT.
Contract Milestones	Not Applicable	Not Applicable	Not Applicable	Not Applicable	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: F0770
PROJECT TITLE: Advanced Submarine Support Equipment Program

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Advanced Development Models	1,111	672	2,216	2,019
b. Requirements Development	2,075	205	0	362
c. Miscellaneous	290	56	193	207
Total	3,476	933	2,409	2,588

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: F0770
PROJECT TITLE: Advanced Submarine Support Equipment Program

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Periscope MDF FDM											
Condor San Jose, CA.	C/CPIF	12/93	1,890	1,890	1,668	222	0	0	0	Cont.	Cont.
Sensor Technology Insertion FDM contracts											
TBD	C/CPIF	12/95	6,193	6,193	0	0	0	1,118	1,343	Cont.	Cont.
ESM Technology Insertion FDM contracts											
TBD	C/CPIF	12/97	8,472	8,472	0	0	0	0	0	Cont.	Cont.
Miscellaneous					10,516	2,472	804	1,016	945	Cont.	Cont.
Support and Management											
Miscellaneous					1,321	782	129	275	300	Cont.	Cont.
Test and Evaluation					0	0	0	0	0	Cont.	Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: F0770
PROJECT TITLE: Advanced Submarine Support Equipment Program

GOVERNMENT FURNISHED PROPERTY Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	12,184	2,694	804	2,134	2,288	Cont.	Cont.
Subtotal Support and Management	1,321	782	129	275	300	Cont.	Cont.
Subtotal Test and Evaluation	0	0	0	0	0	Cont.	Cont.
Total Project	13,505	3,476	933	2,409	2,588	Cont.	Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Development Support Equipment Acquisition	0	250	0	0
b. Systems Engineering	165	945	0	0
c. Technical Data & Analysis	470	2,945	0	0
d. Developmental Test & Evaluation	1,592	1,718	2,141	1,278
e. Contractor Engineering Support	441	350	350	350
f. Program Management Support	150	160	150	150
g. Travel	20	20	20	20
Total	2,838	6,388	2,661	1,798

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total* FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NUWC Division Newport, RI	WR	3/93	CONT.	CONT.	1,067	0	0	0	0	CONT.	CONT.
David Taylor Research Carderock, MD	WR	3/93	CONT.	CONT.	525	165	945	0	0	CONT.	CONT.
ARL/UT University of Texas	PD	3/93	CONT.	CONT.	1,750	470	1,883	0	0	CONT.	CONT.
Miscellaneous	N/A	N/A	CONT.	CONT.	200	0	1,312	0	0	CONT.	CONT.
Support and Management											
Miscellaneous	N/A	N/A	CONT.	CONT.	656	611	530	520	520	CONT.	CONT.
Test and Evaluation											
NUWC Division Keyport, WA	WR	5/93	CONT.	CONT.	2,493	1,592	1,718	2,141	1,278	CONT.	CONT.
Miscellaneous	N/A	N/A	CONT.	CONT.	316	0	0	0	0	CONT.	CONT.

* V1739 is a continuing program. Only FY93 dollars are shown.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603562N
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems

PROJECT NUMBER: V1739
PROJECT TITLE: Submarine Special Operations Support Development

(U) GOVERNMENT FURNISHED PROPERTY: Not applicable.

	Total* FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	3,542	635	4,140	0	0	CONT.	CONT.
Subtotal Support and Management	656	611	530	520	520	CONT.	CONT.
Subtotal Test and Evaluation	2,809	1,592	1,718	2,141	1,278	CONT.	CONT.
Total Project	7,007	2,838	6,388	2,661	1,798	CONT.	CONT.

* V1739 is a continuing program. Only FY93 dollars are shown.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603563N
PROGRAM ELEMENT TITLE: Ship Concept Advanced Design

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2196 Design Tools, Plans and Concepts	14,243	28,806	16,736	15,511	25,558	33,018	32,336	32,913	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The efforts within this PE enhance the Navy's ability to design more affordable ships with reduced manning, increased producibility, and allow greater utilization of the latest technology. The program focuses on supporting the Navy Shipbuilding Plan with state-of-the-art design tools and methods, for ship studies and developing the ship design concept studies for the new ships in that plan. The program provides the foundation for affordable surface ship design, construction, and life cycle support required as a first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems. A key affordability concept of future designs is a use of common modules, comprised of standard components and/or standard interfaces. These modules will be used across ship types and will be integral with equipment standardization and distributed system architectures that support generic build strategies. Increased commonality will reduce the total cost of ownership and is the cornerstone of an affordable fleet. Efforts under Project S2196 transfer directly to early stage ship design in PE 0603564N, Ship Preliminary Design and Feasibility Studies.

(U) This project accomplishes the following: (1) identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (2) investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (3) provides design methods and automated design tools to develop and evaluate ship concepts, support early ship design, and solve pressing fleet engineering problems; (4) develops design criteria and common standards to improve affordability; (5) improves the quality of the product in the design phases, to reduce or eliminate the costs of fixing problems after ships reach the fleet; (6) develops investment strategies for new concepts and technologies; (7) and supports development of Mission Need Statements (MNS) for future ships.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($544) Integrated new technologies in total ship concepts. Developed ship concepts for potential ships 5-7 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Prepared report on survey of models for potential integration into a Fleet Synthesis Model in support of future surface combatants. Conducted Battle Force architecture studies. Prepared Program Review (PR) 97 wedge studies for the following: LHD 7, T-AGOS 25, LCC 19/20 replacement, and relocatable aviation, logistics and prepositioning bases technology survey. Performed validation studies using the auxiliary/amphibious assault ship ship synthesis model for use on early stage concept studies of Combat Logistics Force (CLF) ships, including FY00 ADC(X). Continued development of performance-driven life cycle cost model for surface combatants.

- (U) ($2,297) Continued development and improvement of design methods, criteria, standards, and data bases. Continued improvements to auxiliary/amphibious assault ship and surface combatant ship synthesis models. Included capabilities to use more advanced ship performance analysis methods and increased capabilities to determine ship size impacts of new technologies. Continued improvements to ship cost estimating models. Supported development of advanced computer aided design methods and tools for early stage ship design including simulation based design techniques. Identified, characterized and assessed new and emergent technologies.

- (U) ($1,900) Continued development of reliability based structural design methods/criteria including improvement of prediction methods for seaway hydrodynamic loads, building and testing grillage strength and slamming strength models, and initial implementation of state-of-the-art reliability analysis methods used in other engineering disciplines. Started to analyze the results of towing tank hydrodynamic load testing on LHD 1. Began preparation for cooperative seaway load testing on the Canadian patrol frigate model. Started analysis of the effect of fabrication variations on primary hull girder strength. Began LHD 1 long term loads trial measurements. Supported Ship Structures Committee (SSC) research work on ship structures.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

- (U) ($1,986) Electromagnetic (EM) Engineering (ENG) tool and database improvements were implemented for topside and below decks for both single and multiple electromagnetic interference (EMI) sources and extended frequency ranges. A first generation transition frequency analysis capability was developed. Design and implementation of the initial lessons learned database was carried out. Initial open architecture design investigations were begun. Transition of baseline I capabilities to the ship design CAD II UNIX environment was completed. Applications to emerging amphibious ship designs were investigated. Predictive tool validation with laboratory and shipboard measurement data was carried out.

- (U) ($7,516) Continued identification of commonality among ships to improve affordability and producibility. Started systems engineering efforts to identify the family of modules which will be the building blocks for future Navy surface ships. Built prototype crew sanitary space, started fabrication of Navy fire pump and reverse osmosis (RO) unit modules. Continued development of generic and engineered build strategies for naval ships that foster product oriented ship construction processes and incorporated alternative distributed ship systems architectures and common modules. The near-term focus of this effort is on the LPD 17 new amphibious assault ship with the ultimate focus to provide the building blocks to assist in the development of a new low cost surface combatant.

2. (U) FY 1995 PLANS:

- (U) ($983) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious assault, mine countermeasure support, and future surface combatant ships. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

- (U) ($2,602) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to auxiliary/amphibious assault ship and surface combat ship synthesis and assessment models. Add capability to address minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Include the lessons learned from ship modularity, production, and commonality of H,M&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design, including simulation based design techniques. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($2,526) Continue development of reliability based structural design methods/criteria including predicting seaway hydrodynamic loads, testing of grillage and stiffener strength, fatigue specimens and slamming strength models, construction of large scale fatigue strength models, and begin development of reliability analysis method for surface ships. Continue long-term measurements and start short term full scale trials of seaway loads on the LHD 1. Complete analysis of data from the seaway loads model tests on LHD 1. Conduct seaway loads testing on the Canadian patrol frigate model. Support SSC research work. Continue to assess emerging class problems with new technologies/tools as a means of "benchmarking" these new design methods/criteria.

- (U) ($3,441) Develop the EM Engineering models toward Baseline II. Expand and integrate a transition frequency analysis tool into the EMENG architecture. Expand the microwave EM environment predictive techniques to provide a total ship volumetric EM data set. Resume complete electro-optics and millimeter wave analytical capabilities development. Bring on line a scientific visualized package to assist in data interpretation, data culling and inference and trend analysis. Begin the expansion of high frequency (HF) analytics to predict scaled "brass model" parameters. Continue open system architecture design and the possible converging to a parallel processing environment. Develop requirements for the integration of frequency and time domain tools. Bring on line an expert system (rule based) below decks predictive (magnetic field, cable coupling) capability integrated into the EM Engineering architecture. Develop requirements for EMENG updates to address non-metallic materials (composites, frequency selective surfaces). Develop on-line access to lessons learned databases, design guidelines and other user aiding techniques.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

- (U) ($19,254) Develop prototype common modules to demonstrate design, fabrication, shipbuilding process and operational utility. Complete RO and Navy fire pump modules. Build prototype modules identified as building blocks during FY 94 work, including steering gear, and officer/crew sanitary space modules. Install aboard a DD 963 class ship a prototype sanitary space using modular panels as used in officer and crew sanitary space modules. Examine commercial technologies to provide more affordable shipboard lighting in spaces. Develop module/common concepts for future Naval ship food service (galley) spaces. Where possible utilize commercial food service equipment and technologies including those used aboard commercial ships such as ferries and cruise ships. Evaluate commercial technologies for modular track/hold down systems for use in mounting standardized and modular equipment aboard ships in C4I and other types of spaces. Build prototypes to demonstrate these track hold down systems. Prepare for evaluation and testing of a modular 5 inch gun system. Develop alternative heating, ventilation, and cooling (HVAC) distributed system architectures. Develop ventilation, chilled water and other module designs to support HVAC architecture. Begin development of specifications and standards for the common modules/standard interfaces. Continue work to identify areas/methods of commonality among ships to improve affordability and producibility. Continue development of the requirements and systems engineering including logistics support methods to achieve more cost effective equipment standardization for Naval ships. Continue to identify/develop the family of modules which will be the building blocks for future navy surface ships, including configuration control requirements. Assess the cost/benefit trade-offs of associated commonality. Assess the return on investment associated with development of each of these modules. Complete development of a prototype product-oriented design and construction (PODAC) cost model using as a basis activity based costing methods from other similar industries. 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. Identify changes to naval ship configurations, ship systems, and equipment designs to enable the use of commercial shipbuilding processes for the construction of future naval ships. Increased FY 1995 funding provides investment in future affordable ship architectures and develops prototype modules to demonstrate design, fabrication, shipbuilding process, and operational utility. Efforts are focused on application of and implementation of commonality to LPD 17 design.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

3. (U) FY 1996 PLAN:

- (U) ($787) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious, mine countermeasure support, and future surface combatant ships. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies.

- (U) ($1,687) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to auxiliary/amphibious assault ship and surface combatant ship synthesis and assessment models. Add capability to address minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Include the lessons learned from ship modularity, production, and commonality of H,M&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design, including simulation based design techniques. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($1,638) Continue obtaining long-term data collection of full-scale seaway hydrodynamic loads. Initiate development of slam pressure algorithms and associated strength considerations. Finalize stiffener strength variable definition and distribution development to augment reliability assessments. Continue component fatigue strength evaluations and initiate fracture toughness characterization. Begin validation studies. Support SSC Research.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

- (U) ($1,804) Develop additional elements of the EM Engineering Baseline II system. Complete microwave EM, environment predictive techniques, and continue transition frequency prediction development. Develop and install modules to address composite and frequency selective surfaces. Continue Baseline II electro-optics and millimeter wave analysis development. Bring on-line a prototype Baseline II high frequency (HF) EM environment workstation that operates in parallel with scaled "brass model" tests. Finalize the architectural design for the Baseline II version of the EM Engineering system.

- (U) ($10,820) Continue to identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Continue development of common ship architectures for hull, mechanical and electrical (HM&E) systems, and related command, control, communications, computers and information (C4I) systems, and combat systems (C/S) as well as development of associated common module prototypes and designs to demonstrate more cost-effective design, fabrication, shipbuilding processes and operational utility. Emphasis will be on development of ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Continue development of officer/chief petty officer (CPO) common berthing modules, damage control locker modules, food service (galley) module, and radio communications modules. Shock test the modular 5-inch gun system. Commence development of modules identified as architectural building blocks during FY 95 efforts, including ship auxiliary system modules, and aircraft (helo) support system modules. Continue development of specifications and standards for implementing use of common modules, standard components and standard interfaces. Continue efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Continue systems engineering analysis (including life cycle cost analysis) to identify/develop the families of modules as the building blocks of the future surface Navy, including configuration control requirements. Continue development of alternative distributed systems architectures for HVAC, air systems and fluid transfer systems that foster improved ship production and total life cycle ship affordability. Validate the prototype PODAC cost model for one type of naval ship. Continue development of generic and engineered build strategies for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures and modules. Efforts are focused on application of commonality to the combat logistics force (CLF) ships, the 21st century surface combatant (SC 21), and other ships in the SCN plan.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

4. (U) FY 1997 PLAN:

- (U) ($855) Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-10 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone 0 ship concept studies for combat logistics force, amphibious, mine countermeasure support, and future surface combatant ships. Analyze the cost/benefit of new concepts and technologies. Develop R&D investment strategies which provide cost/benefit comparisons for new concepts and technologies.

- (U) ($1,651) Continue development and improvement of design methods, criteria, standards and data bases. Continue improvements to auxiliary/amphibious assault ship and surface combatant ship synthesis and assessment models. Add capability to address minimum required shipboard manning, reduced construction cost, and increased capabilities to determine ship size impacts of new technologies. Include the lessons learned from ship modularity, production, and commonality of HM&E systems studies done in previous FYs. Continue improvements to ship cost estimating models. Continue supporting development of advanced computer aided design methods and tools for early stage ship design, including simulation based design techniques. Identify, characterize and assess new and emergent technologies and update the HM&E technology database.

- (U) ($ 1,394) Continue collection of long-term hydrodynamic loads data and update algorithms for longitudinal and transverse bending as well as torsion loads. Continue grillage strength tests and assessments developing tri-directional strength relationships. Continue fracture tests and assessments. Update reliability inputs and assessment techniques; continue validation of processes and utilize technologies/improved design methods on existing ships. Support SSC Research.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

- (U) ($1,449) Continue implementation of analytical modules of EM Engineering Baseline II. Implement the Baseline II transition frequency model. Complete the prototype electro-optics and millimeter wave analytical models. Continue development of analytical capabilities for EMI on electro-mechanical/electronic control systems. Begin implementation of the rule base expert system executive and auto-extraction of EM engineering requirements for specifications.

- (U) ($10,162) Continue to identify and develop areas/methods for increased commonality for naval ships and ship systems to improved life cycle affordability. Continue development of common ship architectures for HM&E systems, related C4I systems, and combat systems. Continue development of ship configurations and systems architectures that can utilize commercial processes and/or commercial-off-the-shelf (COTS) equipment and materials. Continue development of food service (galley) modules, low pressure air compressor modules, and various ships' self defense system modules. Commence development of modules identified as architectural building blocks during FY 96 efforts, including shipboard office space modules, and shipboard auxiliary system modules. Update and maintain specifications and standards for implementing use of common modules, standard components and standard interfaces. Continue efforts on more cost effective methods and practices to standardize shipboard equipment for life cycle cost savings. Continue systems engineering analysis (including life cycle cost analysis) to identify/develop the families of modules as the building blocks of the future surface Navy, including configuration control requirements. Revise the prototype PODAC cost model based on results of ship production and equipment manufacturing cost data analysis and the validation of the model for naval ship types. Continue development of alternative distributed systems architectures that foster improved ship production and total life cycle ship affordability. Continue development of generic and engineered build strategies for naval ships that foster product-oriented ship design and construction, and incorporate common system architectures and modules. Efforts are focused on application of commonality to the combat logistics force (CLF) ships, the 21st century surface combatant (SC 21) and other ships in the SCN plan.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship and fleet wide applications.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	13,853	29,302	XXX	XXX
(U) FY 1995 Appropriated:	XXX	29,302	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	390	-496	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	14,243	28,806	16,736	15,511

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1994 increase reflects an addition of $390K Below Threshold Reprogramming Action for additional design tool development efforts. The FY 1995 reduction of $496K is from 1995 SBIR cut, and Congressional university research and travel cuts.
(U) Schedule: Not applicable.
(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603513N (Shipboard System Component Development)
(U) PE 0603514N (Ship Combat Survivability)
(U) PE 0603564N (Ship Preliminary Design and Feasibility Studies)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)
(U) PE 0603573N (Advanced Surface Machinery Systems)
(U) PE 0605130D (Foreign Comparative Test Program)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT NUMBER: S2196 PROJECT TITLE: Design Tools, Plans/Concepts

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	(Not applicable - Non-Acquisition Program)				
Engineering Milestones	Structures (LHD) Model Test	Structures (Frigate)	Low Pressure Air Module	Fracture Tests of Shipyard Fabrication Specimens	B/L II 1Q 00 EM ENG
	Completed 3Q	Model Tests Complete 3Q	Complete 4Q	Grillage Tests of Shipyard Fabrication Specimens	
	Base/Line I EM ENG 4Q	Sanitary Module Complete 3Q	5 inch Modular Gun System Complete 4Q		
		R.O. Module Complete 3Q	Complete Prototype Production Oriented Design & Construction Cost Model (estimating tool) 4Q		
		Fire Pump Module Complete 3Q			
T&E Milestones	(Not applicable)				
Contract Milestones	(Not applicable)				

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT NUMBER: S2196 PROJECT TITLE: Design Tools, Plans/Concepts

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Ship Concepts	544	983	787	855
b. Design Methods/Criteria	2,297	2,602	1,687	1,651
c. Reliability Based Structures	1,900	2,526	1,638	1,394
d. EM Engineering	1,986	3,441	1,804	1,449
e. Affordability Thru Commonality	7,516	19,254	10,820	10,162
Total	14,243	28,806	16,736	15,511

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle		Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development												
Rockwell International Arlington, VA	C/CPAF		11-91	14,265	14,265	5,560	1,251	1,946	985	854	3,669	14,265
Advanced Marine Enterprises (AME) Arlington,VA	C/CPFF		2-88	CONT.	CONT.	217	1,712	2,410	*1,650	*1,770 *New Contract Planned	CONT.	CONT.
NKF Engineering Arlington, VA	C/CPFF		4-86	3,049	3,049	173	1,676	1,200	0	0	0	3,049
Gibbs&Cox, Inc. Arlington, VA & New York, NY (This contract is a team contract supporting the Affordability Thru Commonality Task. Other contract team members are: Advanced Engineering & Research Associates, Arlington, VA; AME, Arlington, VA; Avondale Industries, New Orleans, LA; Bath Irons Works, Bath, ME; Dayton T. Brown, Islip, NY; Hopeman Brothers, Waynesboro, VA; Ingalls Shipbuilding, Pascagoula, MS; M. Rosenblatt & Son, Arlington, VA; NKF Engin., Arlington, VA; PDI Corp., Annapolis, MD; Thomas Enterprises, Alexandria, VA; United Defense LP (FMC), Minneapolis, MN; and UNISYS Corp., Arlington, VA.)	C/CPFF		9-94	CONT.	CONT.	N/A	90	8,970	5,700	5,240	CONT.	CONT.
Other Contractors			Various	CONT.	CONT.		3,451	5,700	2,101	1,667	CONT.	CONT.
NSWC/Carderock Division	WR		Various	CONT.	CONT.		5,064	7,010	4,700	4,260	CONT.	CONT.
Other. Gov.	WR		Various	CONT.	CONT.		999	1,570	1,600	1,720	CONT.	CONT.
Total Project							14,243	28,806	16,736	15,511	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603563N PROJECT NUMBER: S2196
PROGRAM ELEMENT TITLE: Ship Concept Adv. Design PROJECT TITLE: Design Tools, Plans/Concepts

Support and Management - Not applicable.
Test and Evaluation - Not applicable.

GOVERNMENT FURNISHED PROPERTY - Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	5,950	14,243	28,806	16,736	15,511	CONT.	CONT.
Subtotal Support and Management							
Subtotal Test and Evaluation							
Total Project	5,950	14,243	28,806	16,736	15,511	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT:0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0408 Ship Development (Advanced)	6,439	7,604	9,708	8,313	0	1,594	10,551	2,040	CONT.	CONT.
S2087 Strategic Sealift Technology Development Program	0	18,790	0	0	0	0	0	0	CONT.	18,790
F2200 New Design SSN	52,094	4,725	0	0	0	0	0	0	CONT.	56,819
TOTAL	58,533	31,119	9,708	8,313	0	1,594	10,551	2,040	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The primary objective of Ship Preliminary Design & Feasibility Studies is to design more capable warships at reduced cost, with reduced manning and increased producibility, utilizing the latest technologies. Modern day ship design and acquisition processes do not separate Preliminary and Contract Design. These are seamless design actions conducted between MS I and II. Therefore after FY 1996, design activities formerly conducted in this Program Element (P.E.) as Preliminary Design are combined under P.E. 0604567N, Ship Contract Design/Live Fire Test and Evaluation. After FY 1996, the program will be renamed "Ship Feasibility Studies". This program directly supports the Navy Shipbuilding 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 Analysis (COEA). This project develops the primary supporting documentation for Milestone I decisions.

(U) Project S2087 - This project supports the development of new concepts and technologies which can be applied to future sealift ships and merchant ships to enhance their operational capability and efficiency, while simultaneously reducing the life cycle cost, particularly acquisition cost, of ships capable of performing the sealift mission.

(U) Project F2200 - This project supports the Preliminary Design development for the New Attack SSN.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT:0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT:0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0408 Ship Development (Advanced)	6,439	7,604	9,708	8,313	0	1,594	10,551	2,040	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 Analysis (COEA) for new surface ships in the Navy Shipbuilding Plan; 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 Document (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 Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, 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.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603564N

PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies

PROJECT NUMBER: S0408

PROJECT TITLE: Ship Development (Advanced)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($6,439) Conducted Ship Feasibility Studies and COEA studies and supported ORD preparation for ships in the Navy Shipbuilding Plan which reach MS 0. There were no surface ship MS 0 Decisions in FY 94 and no surface ships in the Feasibility Studies design phase. Feasibility analyses to support the Department of the Navy's "From the Sea" policies and Joint Operational Requirements were conducted to investigate the feasibility of improved inter-ship capabilities, the interfaces required and the impact of the warfare systems on advanced ship designs.

2. (U) FY 1995 PLAN:

- (U) ($6,512) Conduct Ship Feasibility Studies and COEA studies and support ORD preparation for ships in the SCN plan which reach MS 0. CLF requirements have identified a need for additional ships to transport various cargoes. New ship designs as well as conversions are potential solutions that will be evaluated during the COEA process, following MS 0 approval. Feasibility Studies for the Future Surface Combatant (SC-21) will begin, following MS 0 approval. $1,092K forward funds FY 1996 efforts.

3. (U) FY 1996 PLAN:

- (U) ($10,800) Conduct Ship Feasibility Studies and COEA studies and support ORD preparation for ships in the SCN plan which reach MS 0. CLF requirements have identified a need for additional ships to transport various cargoes. New ship designs as well as conversions are potential solutions that will be evaluated during the continiung COEA process. Feasibility Studies for the Future Surface Combatant will continue. $1,092K of this effort will be forward funded using FY 1995 funds.

4. (U) FY 1997 PLAN:

- (U) ($8,313) Conduct Ship Feasibility Studies and COEA studies and support ORD preparation for ships in the SCN plan which reach MS 0. CLF requirements have identified a need for additional ships to transport various cargoes.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603564N PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT NUMBER: S0408 PROJECT TITLE: Ship Development (Advanced)

New ships and conversions are potential solutions that will be evaluated during the continuing COEA process. Feasibility Studies for the Future Surface Combatant will continue.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	5,953	7,771	XXX	XXX
(U) FY 1995 Appropriated:	XXX	7,771	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	+486	-167	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	6,439	7,604	9,708	8,313

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 increase was based on an end-of-year execution update.

(U) Funding: FY 1995 reductions are based on SBIR, Travel, CSS and University Research cuts during the fiscal year. $1,092K of FY 1995 funds will forward fund FY 1996 efforts due to a schedule slip in the Future Surface Combatant (SC21) MS 0 decision.

(U) Schedule: Schedules have changed to reflect the latest shipbuilding schedule. Specifically, the MS 0 decision for both the Future Surface Combatant and the CLF have slipped approximately 9 months from the planning date used in the preparation of the FY 95 budget. The new Command Ship and the new design Carrier have been deleted from the schedule.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603564N PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT NUMBER: S0408 PROJECT TITLE: Ship Development (Advanced)

(U) RELATED RDT&E:

(U) PE 0603563N (Ship Concept Advanced Design)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)
(U) PE 0603508N (Ship Propulsion System)
(U) PE 0603513N (Shipboard Systems Component Development)
(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603573N (Advanced Surface Machinery Systems)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	See individual ship acquisition program documentation.				
Engineering Milestones	TBD - Milestone schedule is established at MS I.				
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT:0603564N
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies
PROJECT NUMBER: S0408
PROJECT TITLE: Ship Development (Advanced)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Ship Design Feasibility Studies	2,503	7,574	9,678	8,283
b. Travel	0	30	30	30
c. Other	3,936	0	0	0
Total	6,439	7,604	9,708	8,313

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Naval Surface Warfare Center Carderock	WR				181	876	2,660	3,407	2,900	CONT.	CONT.
Various	Competitive	Various			55	5,525	4,857	6,129	5,305	CONT.	CONT.
Support and Management											
Various	Competitive	Various			17	38	87	172	108	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0603564N PROJECT NUMBER: S0408
PROGRAM ELEMENT TITLE: Ship Preliminary Design and Feasibility Studies PROJECT TITLE: Ship Development (Advanced)

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	236	6,401	7,517	9,536	8,205	CONT.	CONT.
Subtotal Support and Management	17	38	87	172	108	CONT.	CONT.
Subtotal Test and Evaluation Not applicable							
Total Project	253	6,439	7,604	9,708	8,313	CONT.	CONT

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1258 Nuclear Technology Development	46,200	45,268	46,097	41,783	40,710	39,340	39,649	39,494	CONT.	CONT.
S1914 S6W Nuclear Propulsion Plant	24,350	8,237	0	0	0	0	0	0	0	433,766
S2158 S9G Nuclear Propulsion Plant Development	65,987	72,680	95,738	94,221	86,970	84,509	41,373	32,424	70,031	643,933
TOTAL	136,537	126,185	141,835	136,004	127,680	123,849	81,022	71,918	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 propulsion plant arrangements, components, and materials, plant analysis for future fleet application, as well as development of a nuclear propulsion plant for a New Attack Submarine.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1258 Nuclear Technology Development	46,200	45,268	46,097	41,783	40,710	39,340	39,649	39,494	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The purpose is to develop safe, reliable, high-performance, long-life nuclear propulsion plant systems and components. Work is directed towards developing and applying the technology, methods, and materials necessary for designing, developing and testing new and improved components, systems and controls for use in nuclear propulsion plants.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($13,000) Continued to explore new technology instrumentation and control component designs which include state-of-the-art electronics Constructed a Developed conceptual designs of selected instrumentation and control (I&C) equipment Began designing I&C equipment with

- (U) ($14,200) Continued to develop advanced technology electrical distribution component designs incorporating state-of-the-art, technology to improve power system efficiency, reliability, safety, Began developing the conceptual design for suitable for Began constructing developmental models Designed major features of a system required for controlling and

- (U) ($6,300) Further developed and qualified advanced analysis methods for evaluating the effectiveness of new propulsion plant component and system designs and applicable materials. Continued to develop methods and tools for analyzing the effects of shock, vibration, high temperature and pressure on plant and component designs and incorporating findings into designs to enhance safe, efficient, and reliable plant operation. Conducted acceptability testing to determine feasibility in Developed accurate and flexible models of plant systems and components to facilitate efficient, cost-effective and successful design efforts.

- (U) ($4,600) Developed propulsion plant fluid system and component designs having improved reliability and providing better operational than was previously possible. Developed electrical and hydraulic designs for a new main coolant pump.

- (U) ($8,100) Continued to develop heat transfer technology and new designs applicable to expected to have better operating efficiency, lower life-cycle costs, and a more compact size than possible with current designs and technology. Examined ; materials to determine their ability to withstand irradiation, corrosion, high temperatures, and shock. conducted long-term corrosion, and thermal/hydraulic testing to confirm design concepts.

2. (U) FY 1995 PLAN:

- (U) ($16,609) Develop new technology instrumentation and control component designs which incorporate Develop system designs based on circuit cards] to facilitate easy and economical upgrades abreast of technological advances,

U

- (U) ($10,059) Continue to develop advanced technology electrical distribution component designs incorporating to improve power system efficiency, reliability, safety, and Continue designing an Continue to construct and evaluate models of !

- (U) ($5,150) Continue to develop and qualify advanced analysis methods for evaluating the effectiveness of new propulsion plant component and system designs and the applicable materials. Develop computer models to analyze and find ways to reduce the adverse effects of shock, vibration, high temperature and pressure and incorporate results into designs to enhance safe, efficient, and reliable operation.

- (U) ($4,050) Continue to develop propulsion plant fluid system and component designs to improve reliability and provide better performance.

- (U) ($9,400) Continue to develop technology and new designs envisioned to have better efficiency, diminished life-cycle costs, and a more compact size. Evaluate materials through tests to gain a better understanding of behavior. Conduct Develop manufacturing technologies enabling design and qualification of

3. (U) FY 1996 PLAN:

- (U) ($16,835) Develop new technology instrumentation and control designs for military grade I&C equipment to reduce costs and improve reliability. Develop and test new, less complicated designs for instrumentation and control displays to improve operator response times. Develop and compatibility test new power electronic conversion, conditioning and control equipment, propulsion plant equipment control systems, and a

- (U) ($7,100) Develop advanced technology electrical distribution component designs embodying to improve power system efficiency, reliability, safety, Develop and test designs for power conversion equipment. Develop the design for

- (U) ($5,762) Develop and qualify advanced analysis methods for evaluating the effectiveness of new propulsion plant component and system designs and applicable materials. Develop and test applications for Design and test new fluid system and component designs to determine their susceptibility to the adverse effects of vibration, high temperature, pressure, and irradiation, such as Develop methods for shock-testing new plant arrangements and mounting techniques, and evaluating subsequent data.

- (U) ($5,400) Develop propulsion plant fluid system and component designs having greater endurance, improved reliability, lower life-cycle costs, and better acoustic and operational performance.

- (U) ($11.000) Develop new designs and technology intended to result in more compact having better operating efficiency and lower life-cycle cost. Conduct long-term corrosion and thermal/hydraulic testing to confirm

Evaluate materials through stress-corrosion, corrosion-fatigue and fracture toughness tests to validate required properties.

4. (U) FY 1997 PLAN:

- (U) ($15,400) Continue to develop new technology instrumentation and control designs. Develop and compatibility test advanced instrumentation and control components designed Test designs of military grade circuit cards. Continue development of

- 'U ($6,400) Continue to develop advanced technology electrical distribution component designs. Conduct extensive testing of '

- U' ($5,883) Continue to develop and qualify advanced analysis methods. Test and qualify designs of fluid system components constructed from Continue to test and evaluate the susceptibility of new fluid system and component designs to the adverse effects of shock, vibration, high temperature, pressure, and irradiation.

- U ($4,200) Continue to develop propulsion plant fluid system and component designs.

- U) ($9,900) Continue to develop technology. Perform structural analysis of Conduct long-term thermal/hydraulic and corrosion testing to confirm Test materials through stress-corrosion, corrosion-fatigue, and fracture-toughness tests to demonstrate structural material properties.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	$46,200	$48,509	XXX	XXX
(U) FY 1995 Appropriated:	XXX	$45,409	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG	0	-141	XXX	XXX
(U) FY 1996/97 OSD Budget Submit:	$46,200	$45,268	$46,097	$41,783

UNCLASSIFIED

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258
PROJECT TITLE: Nuclear Technology Development

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1995 adjustment is due to a $141 across the board reduction for university research and travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0205675N (Operational Nuclear Power Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Instrumentation and Control Technology	13,000	16,609	16,835	15,400
b. Power Distribution Technology	14,200	10,059	7,100	6,400
c. Component/System Performance Measurement, Analysis, and Advancement	6,300	5,150	5,762	5,883
d. Fluid Systems Technology/Noise Reduction	4,600	4,050	5,400	4,200
e. Heat Transfer Technology	8,100	9,400	11,000	9,900
Total	46,200	45,268	46,097	41,783

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2158 S9G Nuclear Propulsion Plant Development										
	65,987	72,680	95,738	94,221	86,970	84,509	41,373	32,424	70,031	643,933

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($19,986) Conducted propulsion plant arrangement design efforts; began design and fabrication of plant configuration mockups to ensure feasibility of construction and to validate acoustic features. Conducted propulsion plant mounting raft design efforts.

  Carried out efforts to develop simplified radiation shielding while maintaining standards of containment.

- (U) ($5,995) Began design of a

  Conducted development efforts for an advanced steam separator in order to optimize steam generator output. Developed improved heat transfer components such as the propulsion plant freshwater/seawater heat exchanger.

- (U) ($23,025) Began development of fluid transfer and control equipment; conducted reference design work for 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

- (U) ($6,995) Began design of propulsion plant instrumentation and control equipment and associated software, such as primary nuclear instrumentation and propulsion plant control panels,

- (U) ($9,986) Conducted power generation/distribution equipment and systems development, including power supply and conversion modules and circuit breakers, to take advantage of ongoing electrical developments to improve power system efficiency, reliability, safety,

2. (U) FY 1995 PLAN:

- (U) ($19,106) Further develop propulsion plant arrangements and design of foundations; design and build mockups of plant configurations to ensure feasibility of construction and validate acoustic features. Design and develop raft structures which will support components, facilitate ship construction, and improve acoustic and shock characteristics.

  Design simplified shielding with reduced weight.

- (U) ($8,857) Continue design of Carry out performance and structural analyses to confirm
  Fabricate mock-ups and

- (U) ($29,203) Develop and qualify fluid transfer and control equipment; design simplified propulsion plant fluid and steam systems and components, such as an advanced main coolant pump, coolant loops, main seawater pump, main condenser, and valves. Fabricate test hardware for the more developmental components

- (U) ($7,736) Further develop reference designs of propulsion plant instrumentation and control equipment and associated software, such as control panels and nuclear instrumentation. Develop instrumentation and control engineering models for qualification testing.

- (U) ($7,778) Continue development of power generation/distribution components and systems, such as power converter/inverter modules and circuit breakers. Fabricate component test units and start qualification testing.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

3. (U) FY 1996 PLAN:

- (U) ($26,996) Develop plant arrangements and foundations, using raft structures to support components, facilitate ship construction, and improve acoustic and shock characteristics. Conduct testing to ensure design meets goals Build mock-ups of plant configurations to ensure feasibility of overall plant arrangement. Provide shielding design analysis.

- (U) ($15,985) Develop which conduct performance, structural, testing necessary to confirm design performance, and qualify component designs.

- (U) ($27,645) Continue development and qualification of fluid transfer and control equipment; design simplified propulsion plant fluid and steam systems and components, such as an advanced main coolant pump, coolant loops, main seawater pump, main condenser, and valves. Fabricate test units and begin qualification testing.

- (U) ($15,159) Design plant specific instrumentation and control equipment such as control panels, rod control instrumentation, and nuclear instrumentation and develop associated software, Conduct qualification testing of instrumentation and control engineering models.

- (U) ($9,953) Conduct power generation/distribution component and system development for equipment such as power converter/inverter modules and circuit breakers, taking advantage of existing electrical developments and improving power system efficiency, reliability, safety, Continue equipment qualification testing and incorporate results into design efforts as appropriate. Commence system compatibility testing.

4. (U) FY 1997 PLAN:

- (U) ($26,921) Continue plant arrangements effort. Conduct testing to ensure design meets goals for stress, shock, and acoustics. Construct plant configuration mock-ups to verify feasibility of overall plant arrangement. Incorporate test results into shielding design.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

- (U) ($14,129) Carry out development and associated performance, structural, and [deposition/corrosion] testing necessary to provide design confirmation, and verify component design performance. Conduct structural analyses to confirm unit meets design objectives.
- (U) ($26,554) Continue to design fluid transfer and control equipment and test engineering models to verify performance predictions.
- (U) ($14,656) Continue qualification testing of plant instrumentation and control equipment engineering models, incorporating results into preproduction designs.
- (U) ($11,961) Continue qualification and compatibility testing and incorporate results into designs for power generation/distribution components and systems. Build preproduction components. Conduct tests to validate preproduction designs.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	65,987	82,412	XXX	XXX
(U) FY 1995 Appropriated:	XXX	72,912	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG	0	-232	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	65,987	72,680	95,738	94,221

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1995 adjustment is due to an across the board reduction for university research and travel. A Below Threshold Reprogramming action to increase Project S2158 by $3.9M for FY 1995 has been approved.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S2158
PROJECT TITLE: S9G Nuclear Propulsion Plant Development

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0205675N (Operational Nuclear Power Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603570N PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems PROJECT NUMBER: S2158 PROJECT TITLE: S9G Nuclear Propulsion Plant Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Plant Arrangements	19,986	19,106	26,996	26,921
b. Advanced Steam Generator	5,995	8,857	15,985	14,129
c. Fluid Systems and Components	23,025	29,203	27,645	26,554
d. Instrumentation and Control	6,995	7,736	15,159	14,656
e. Power Generation Equipment	9,986	7,778	9,953	11,961
Total	65,987	72,680	95,738	94,221

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Programs

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1314 Advanced Surface Machinery (ASM) Programs	81,954	37,950	39,156	34,699	14,756	72,534	80,682	80,668	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: ASM Programs develop affordable advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements. These programs are in various phases of development ranging from concept formulation to full scale development. The goals of the ASM Programs are to: reduce acquisition and operating costs of naval ships; provide military advantages; contribute to American industrial competitiveness; and, lead to environmental compliance. These goals are to be accomplished by leveraging investments in technologies that will be usable by both the military and commercial sectors. Some technologies being developed for military application will have significant commercial viability upon completion of development, while other technologies being developed commercially have significant military applications and will be demonstrated and adapted for military use.

(U) ASM places primary emphasis on a system architecture and a systems engineering approach which maintains flexibility and minimizes investment until technologies are demonstrated, affordability is assessed, trade off decisions are made, and subsystems evaluated and brought together for optimal total ship cost effectiveness. The products of ASM include: Intercooled Recuperated (ICR) Gas Turbine Engine; Standard Monitoring and Control System (SMCS); Zonal Electrical Distribution System (ZEDS); Integrated Power System (IPS); and, Systems Engineering & Modular Architecture.

(U) ICR Gas Turbine Engine. The ICR Gas Turbine Engine is a 26,400 horsepower (with 10% growth margin to 29,040 horsepower) engine designed as a next generation marine gas turbine. ICR will significantly reduce life cycle fuel cost, provide a minimum impact alternative to increase range, and lead to environmental emissions compliance.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

(U) A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooler, recuperator, and variable area nozzles achieves a 30% propulsion fuel savings when compared to the LM2500. The RB211 is a modern commercial aircraft engine with over 2000 engines delivered to date and production projected well into the next century.

(U) The ICR engine began full scale system testing on 15 July 94 at Pyestock, U.K.. Development testing will include a total of fifteen different engine builds which will conclude in FY 1996. First engine build testing was completed on 15 September and achieved 80 percent of rated power. The second engine build was installed on 29 November. The engine achieved 100 percent power with the recuperator included on 21 December.

(U) Initial ship installation is targeted for a FY97 pilot ship with planned Fleet introduction in FY 00 DDG51 class ships. A Cooperative Agreement between the Royal Navy and US Navy was signed by USD(A&T) on 21 June 94 for in-kind and cash contributions to the ICR program. Negotiations are nearing completion for a Cooperative Program with the French Navy. These Cooperative Programs enable the ICR program to be rephased, accelerating the planned fleet introduction. In Feb 94, the Under Secretary of Defense for Acquisition and Technology, USD(A&T) approved an engine Pre-Planned Product Improvement (P3I) for incorporating engine improvements to the DDG51 class to improve fuel efficiency and ensure environmental compliance. A decision implementing the P3I will be made by ASN(RD&A) in 1997.

(U) Standard Monitoring and Control System (SMCS). The SMCS will integrate the sensing, transmission, interpretation and display of Hull Mechanical and Electrical (HM&E) parameters necessary for machinery control, condition monitoring/ assessment, signature control and damage control management. The system design is consistent with the total ship Integrated Communications and Control (IC^2) architecture while supporting and enhancing the proposed Integrated Condition Assessment System (ICAS).

(U) A contract for SMCS hardware and software necessary for an Advanced Development Model (ADM) was awarded to CAE Link Corporation in Binghamton, New York in May 1993. Initial ship installation is targeted for FY 96 DDG 51 and LPD17 class ships.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROJECT NUMBER: S1314
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT TITLE: Advanced Surface Machinery Programs

(U) SMCS offers potential to reduce machinery space manning, to reduce machinery system cost of ownership and to introduce a standard control system across multiple ship platform classes, taking maximum advantage of open system architecture and industry standards. SMCS provides the architecture necessary to support critical imperatives from the Ship Operational Characteristic Study (SOCS) for embedded readiness assessment, mission planning and training and condition based maintenance.

(U) Zonal Electrical Distribution System (ZEDS). The Zonal Electrical Distribution System is a new standard architecture for electrical distribution designed to improve ship producibility and reduce ship acquisition and construction costs. ZEDS includes the architecture, hardware, and software required to produce an affordable electric distribution system having comparable survivability to conventional systems.

(U) Initial installations of ZEDS will incorporate a zonal electrical distribution architecture in order to achieve major enhancements to producibility by reducing the number of watertight compartment penetrations and facilitate testing by ship construction zones. Initial ship installation is FY 94 DDG 51 class ships.

(U) Future improvements will address rapid reconfiguration and automated control in response to incipient faults and casualty conditions; fight through capability utilizing SMCS; substituting bus duct for conventional cabling; and changing to DC electrical power (common with submarines). Significant advances in power electronics are expected with broad commercial applications.

(U) Integrated Power System (IPS). The IPS provides complete ship power management by generating power for all load requirements from any combination of prime movers. IPS employs ICR, SMCS, and ZEDS, plus large scale high power density motors, high speed power electronics, and cost saving power distribution architectures. IPS components and technologies are defined through system effectiveness analyses, which include cost and performance factors. IPS addresses ASM Program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads if desired; improved survivability and vulnerability through increased arrangement flexibility; reduced manning through improved monitoring and control systems and reduced on-board maintenance requirements; improved ship signature characteristics if

required; improved design flexibility to meet future requirements of multiple ship types or missions; integrating power control and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load control functions; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components. The full-up target application for IPS is the twenty-first century surface combatant which is in the concept formulation stage. Elements of IPS such as solid state power electronics and variable speed drives on auxiliaries will be integrated in near-term ship acquisition targets. A Request For Proposals for Full Scale Development was issued in July 1994. Source selection is in process with expected contract award in Jan 95.

(U) Systems Engineering & Modular Architecture. Systems Engineering & Modular Architecture in the ASM Programs are focused on increasing the commonality of components used across ship types and in developing modules which will be integral with standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased commonality is to reduce the total cost of ship ownership by using common modules comprised of standard components and/or standard interfaces.

(U) ASM modules are being designed to support anticipated ship construction requirements. These modules include Power Generation Modules, Propulsion Motor Modules, Electric Power Transmission/Distribution/Conversion Modules, and Control Modules. Each of these major items consists of numerous sub-modules which, through computer aided design techniques, are integrated as necessary to fulfil unique ship requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($13,400) SMCS: Completed Preliminary Design Review (PDR) and Critical Design Review (CDR) for both core system hardware and software. Completed fabrication of SMCS hardware. Completed unit testing of hardware and commenced Hardware/Software Integration (HSI).

- (U) ($56,800) ICR: Completed detail design of ICR. Built prototype engine system. Constructed ICR test bed at Pyestock, UK, and initiated ICR system testing.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROJECT NUMBER: S1314
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT TITLE: Advanced Surface Machinery Programs

- (U) ($2,000) ICR: Continued construction of ICR test bed at NAVSURWARCEN SHIPSYSENGSTA Philadelphia, PA.
- (U) ($2,400) ZEDS: Developed prototype electric plant control algorithms for DC ZEDS. Completed construction and Factory Acceptance Testing of Ship Service Invertor Modules (SSIM).
- (U) ($5,200) IPS: Continued design of a 3MW generator. Continued construction of test site and Factory Acceptance Testing of a 3 KHP PM motor. Released IPS FSAD RFP.
- (U) ($2,154) Sys Eng: Performed systems engineering efforts including life cycle costs, producibility studies, manning studies, module development, system integration, architecture design, in support of ASMP efforts.

2. (U) FY 1995 PLAN:

- (U) ($10,717) SMCS: Complete advanced development model HSI and Factory Acceptance Testing (FAT) of the SMCS software and hardware. Conduct SMCS core system operational demonstrations on both the DDG51 Gas Turbine Land Based Engineering Site (LBES) and on the LSD41 Deisel Engine LBES located at NSWC Philadelphia.
- (U) ($ 2,780) ZEDS: Complete SSIM testing. Initiate transition of DC ZEDS into IPS.
- (U) ($13,877) IPS: Award IPS FSAD contract and begin full scale development of components (motor, generator, invertor, bus-duct). Complete PM motor and generator testing and conduct scale demonstration of IPS.
- (U) ($2,176) Sys Eng: Perform systems engineering efforts including life cycle costs, producibility studies, manning studies, module development, system integration, architecture design, in support of ASMP efforts.
- (U) ($ 7,400) ICR: Accelerate ICR program and facilitate preparation of the North American Land-Based Engineering Site at NAVAL SURFACE WARFARE CENTER PHILADELPHIA.

- (U) ($ 1,000) Seawater Intake Grates: Develop and evaluate cost effective low scrap manufacturing processes for fabrication of organic matrix composite, bio-fouling resistant searchest grates. Fabricate sea chest grates for LABEVAL and SHIPEVAL for structural integrity, leach rate, and bio-fouling resistance.

3. (U) FY 1996 PLAN:

- (U) ($33,778) IPS: Continue development of IPS FSAD including the following efforts: fabricate motor/invertor and generator/rectifier; develop FSAD and FSED software (requirements specifications, interface requirements specifications, and user manual); develop and test IPS supervisory control and zonal control software; manufacture ship service distribution system; FSED Systems Requirements Review (SRR); FSED Software Specifications Review (SSR); complete IPS FSED design review (DR1); and, begin preparation for IPS FSAD at LBES. Complete detailed design and begin construction of ZEDS Bus Duct for Fleet introduction ship acquisition program. Continue detailed design of Ship Service Inverter Modules.

- (U) ($ 3,491) SMCS: Complete LBES testing on DDG51 and LSD-41 Hot Plant. Complete selected MIL environmental test report. Scheduled Fleet introduction into DDG51 and LPD17 class ships.

- (U) ($ 1,887) Systems Engineering: Perform systems engineering efforts including life cycle costs, producibility studies, manning studies, module development, systems integration, architecture design. in support of ASMP efforts.

4. (U) FY 1997 PLAN:

- (U) ($ 2,725) SMCS: Complete SMCS core system. Enhance core system for adaptation with IPS and interface/integration with other shipboard control systems.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

- (U) ($28,158) IPS: Continue development of IPS including: complete generator subsystem, propulsion motor, and propulsion distribution subsystems fabrication and factory acceptance testing (FAT); take delivery of generator, propulsion motor, and propulsion distribution subsystems; complete manufacture and test of Ship Service Distribution System (SSDS); take delivery of SSDS; complete IPS FSED design review 2; and, complete IPS FSAD LBES design.

- (U) ($ 1,816) Systems Engineering: Perform systems engineering efforts including life cycle costs, producibility studies, manning studies, module development, systems integration, architecture design in support of ASMP efforts.

- (U) ($2,000) ICR: Begin assembly of DDG-51 ship integration test engine.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems

PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	81,954	72,355	XXX	XXX
(U) FY 1995 Appropriated:	XXX	80,755	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	-42,805	XXX	XXX
(U) FY 1996/97 OSD Budget Submit:	81,954	37,950	39,156	34,699

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 funding was reduced by $42,805K to transfer ICR Gas Turbine Engine Development from PE 0603573N Project S1314 to Ship Propulsion System, PE 0603508N Project S2259. Congress provided a Plus-up of $8,400K to accelerate the ICR program and facilitate preparation of the North American Land-Based Engineering Site. $1,000K was provided to improve sea water intake grates.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) SCN Line - TBD	0	0	0	0	0	0	0	0	TBD	TBD
(U) RDT&E,N - PE 0603508N Project S2259	0	41,500	25,558	31,791	59,678	8,255	0	0	TBD	TBD

(U) RELATED RDT&E:
(U) PE 0602121N (Surface Ship Technology)
(U) PE 0603721N(Environmental Protection)
(U) PE 0603508N (Ship Propulsion System)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q ICR LLM Option	1Q IPS MS0	ICR FLT Intro Decision	4Q IPS SC21 Decision	ICR DLE Decision IPS FSED Decision
Engineering Milestones	3Q SMCS CDR	2Q COMPL SSIM DEV		2Q COMPL IPS FABRICATION	
T&E Milestones	3Q ICR SYS TEST 4Q BEGIN AD MODEL DEMO OF SMCS	2Q COMPL SMCS FAT	1Q COMPL SMCS HOT PLANT DEMO	FY97 ICR 3000 END TEST	COMPL IPS FSAD LBES ICR QUAL TEST & TECH/OP EVAL
Contract Milestones		2Q AWARD IPS FSAD 3Q COMPL IPS RSAD PM DEMO			AWARD IPS FSED

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems
PROJECT NUMBER: S1314
PROJECT TITLE: Advanced Surface Machinery Programs

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. PRIMARY HARDWARE DEVELOPMENT	74,378	30,090	34,790	31,278
b. SYSTEMS ENGINEERING	2,608	3,598	2,542	2,380
c. DEVELOPMENTAL T&E	4,868	4,212	1,776	993
d. TRAVEL	100	50	48	48
Total	81,954	37,950	39,156	34,699

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
N0002492C4166 WESTINGHOUSE ELECTRIC CORPORATION, SUNNYVALE CA											
	C/CPAF	12/91	345,800	362,500	83,617	56,000	6,300	0	*2000	TBD	**362,500
N0002492C4207 NEWPORT NEWS SHIPBUILDING, NEWPORT NEWS VA											
	SS/CPFF	5/92	9,932	9,932	3,179	4,753	2,000	0	0	0	9,932
N0002493C4010 CAE-LINK, BINGHAMTON NY											
	C/CPAF	5/95	30,254	30,254	3,923	12,472	7,959	3,300	1,800	800	30,254
TBD (INTEGRATED POWER SYSTEMS (FSAD))											
	C/CPAF	2Q/95	TBD	TBD	0	0	10,000	30,900	27,100	CONT.	CONT.
TBD (INTEGRATED POWER SYSTEMS (FSED))											
	C/CPAF	1Q/99	TBD	TBD	0	0	0	0	0	TBD	TBD
NAVSURFWARCEN ANNAPOLIS MD											
	WR	1Q/93	CONT.	CONT.	28,182	3,152	4,767	3,481	1,589	CONT.	CONT.
Misc Contracts (less than $1M) Total:					13,946	2,765	3,900	1,045	1,805	CONT.	CONT.
Misc Gov't Activities(less than $1M) Total:					997	18	100	50	25	CONT.	CONT.

* PBD-130 moved ICR funds to PE 63508N Project S2259 through FY 97. ICR funds transition back to PE 63573N Project S1314 in FY 98.

** Total program estimate includes funds in PE 63573N/S1314 and 63508N/S2259.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROJECT NUMBER: S1314
PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT TITLE: Advanced Surface Machinery Programs

B.(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management: Not applicable.											
Test and Evaluation:											
NAVSURFWARCEN SHIPSYSENGSTA PHILADELPHIA PA	WR	1Q/93	CONT.	CONT.	10,906	2,794	2,924	380	380	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY: TBD

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development - TBD										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603573N PROGRAM ELEMENT TITLE: Advanced Surface Machinery Systems PROJECT NUMBER: S1314 PROJECT TITLE: Advanced Surface Machinery Programs

(U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	133,844	79,160	35,026	38,776	34,319	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	10,906	2,794	2,924	380	380	CONT.	CONT.
Total Project	144,750	81,954	37,950	39,156	34,699	CONT.	CONT.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603582N
PROGRAM ELEMENT TITLE: Combat System Integration

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0164 Combat System Integration	7,437	7,380	5,414	7,180	6,238	7,836	7,953	8,244	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides shore based testing of integrated combat direction, weapon, sensor and computing systems prior to their installation in operational fleet units. The operational computer programs are assembled and tested to assure proper configuration and interoperability in a test environment similar to their ultimate shipboard operational environment. Included is operational assessment testing of the integrated suite of computer programs. This is the only opportunity for this range of testing of individually developed and tested combat system subsystem programs prior to shipboard delivery for operational use. Combat system level configuration control is maintained by updates to the Surface Ship Combat System Master Plan (SSCSMP).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($4,592) Completed integration testing of Fire Control System MK 92 MOD 6 in FFG 7 class. Conducted integration testing of: AN/SQQ-89 Surface Warfare System, MK 23 Target Acquisition System and Tomahawk Weapon Control System upgrades in DD 963 class; Advanced Combat Direction System (ACDS) Block 0 improvements in CV/CVN and LHD 1 classes; Antisubmarine Warfare Module upgrade in CV/CVN classes; Tomahawk Vertical Launch System-Vertical Launch Antisubmarine Rocket System interoperability. Conducted operational assessment of combat system improvements in DD 963 class.

- (U) ($1,178) Continued planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.

- (U) ($1,200) Developed design for integration of additional subsystems including Cooperative Engagement

Capability, Vertical Launch System, Joint Intelligence Center and Ships Signal Exploitation Space in the LPD 17 combat system.

- (U) ($ 467) Continued SSCSMP updates.

2. (U) FY 1995 PLAN:

- (U) ($5,576) Conduct integration testing of: Advanced Combat Direction System (ACDS) Block 1; ACDS Block 0 improvements in CV/CVN and LHD 1 classes; Cooperative Engagement Capability for CV/CVN and LHD 1 classes. Conduct operational assessments of combat system improvements in FFG 7, New Threat Upgrade (NTU) and DD 963 classes.

- (U) ($1,349) Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.

- (U) ($ 455) Continue SSCSMP updates.

3. (U) FY 1996 PLAN:

- (U) ($4,065) Conduct integration testing of: Advanced Combat Direction System (ACDS) Block 1; ACDS Block 0 improvements and Cooperative Engagement Capability for CV/CVN and LHD 1 classes. Conduct integration testing of AN/SQQ-89 Surface Warfare System upgrades, Rolling Airframe Missile System and Rapid Anti-Ship Missile Integrated Defense System in DD 963 class.

- (U) ($1,038) Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.

- (U) ($ 311) Continue SSCSMP updates.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

4. (U) FY 1997 PLAN:

- (U) ($5,426) Conduct integration testing of Advanced Combat Direction System (ACDS) Block 1 upgrades and Shipboard Self Defense System in CV/CVN and LHD 1 classes.
- (U) ($1,342) Design test bed for CVN 68, CVN 76 and LPD 17 classes. Continue planning and preparations for out-year testing including simulation system, test bed and test procedures design and development.
- (U) ($ 412) Continue SSCSMP updates.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	6,237	7,911	XXX	XXX
(U) FY 1995 Appropriated:	XXX	7,911	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	1,200	-531	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	7,437	7,380	5,414	7,180

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The increase of $1,200M in FY 94 provided for the development of the LPD 17 combat system design for integration of additional subsystems including Cooperative Engagement Capability, Vertical Launch System, Joint Intelligence Center and Ships Signal Exploitation Space. The FY 95 reduction of $531K will result in a reduced scope of testing for the scheduled FY 95 ship class integration tests.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

(U) Schedule: There will be no major changes to the FY 95 schedule of integration tests.

(U) Technical: Selected combat system subsystem interfaces in the ship classes scheduled for FY 95 testing will undergo reduced testing increasing the probability of introducing unvalidated network software to the fleet.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Computer programs developed under these programs are tested in their integrated configuration:

(U) PE 0204571N (Consolidated Training Systems Development)
(U) PE 0205620N (Surface ASW Combat Systems Integration)
(U) PE 0603382N (Advanced Combat System Technology)
(U) PE 0603755N (Ship Self Defense)
(U) PE 0604301N (MK 92 Fire Control System Upgrade)
(U) PE 0604372N (New Threat Upgrade)
(U) PE 0604518N (CIC Conversion)
(U) PE 0604755N (Ship Self Defense)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Integration Testing				
Test Bed & Simulation Development	561	663	564	716
Planning	343	410	360	493
Procedures	431	508	420	545
Development	723	890	713	901
Conduct	1,993	2,364	1,496	2,230
Reporting	203	343	180	272
Configuration Management	539	575	450	568
Technical Support	726	878	671	751
b. SSCSMP	467	455	311	412
c. Travel	40	40	40	40
d. LPD 17 Integration Design	1,200	0	0	0
d. Miscellaneous	211	254	209	252
Total	7,437	7,380	5,414	7,180

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
None					0	0	0	0	0	0	0
Support and Management											
None					0	0	0	0	0	0	0
Test and Evaluation											
Integrated Combat System Test Facility, San Diego CA (See note)											
	WR	Various			43,258	0	0	0	0	0	0
Naval Surface Warfare Center, Port Hueneme Division, Port Hueneme CA											
	WR	10/93	Cont.	Cont.	40,976	4,850				Cont.	Cont.
	WR	10/94	Cont.	Cont.			5,135			Cont.	Cont.
	WR	10/95	Cont.	Cont.				3,886		Cont.	Cont.
	WR	10/96	Cont.	Cont.					5,126	Cont.	Cont.
Miscellaneous											
	Various	Various	Cont.	Cont.	35,363	2,587	2,245	1,528	2,054	Cont.	Cont.

Note: In FY 94 Navy reorganizations, Integrated Combat System Test Facility, San Diego CA became a division of Naval Surface Warfare Center, Port Hueneme Division, Port Hueneme CA.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603582N PROJECT NUMBER: S0164
PROGRAM ELEMENT TITLE: Combat System Integration PROJECT TITLE: Combat System Integration

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
None				0	0	0	0	0	0	0
Support and Management										
None				0	0	0	0	0	0	0
Test and Evaluation										
None				0	0	0	0	0	0	0

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	0	0	0	0
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	119,597	7,437	7,380	5,414	7,180	Cont.	Cont.
Total Project	119,597	7,437	7,380	5,414	7,180	Cont.	Cont.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0363 Insensitive Munitions Advanced Development	10,459	12,571	7,872	9,962	13,222	16,441	16,819	17,454	CONT.	CONT.
U1821 Conventional Fuze/Warhead Package	26,942	28,394	23,665	22,342	17,781	19,304	19,402	19,978	CONT.	CONT.
TOTAL	37,401	40,965	31,537	32,304	31,003	35,745	36,221	37,432	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:
INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT (IMAD) (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 IMAD program will provide, validate and transition technology for explosives, propellants and ordnance to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance.

CONVENTIONAL FUZE/WARHEAD PACKAGE (Project U1821): 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 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 Advance Threat Fuze; develop advanced integrated guidance/fuzing and warhead mass-focusing systems to increase lethality against current and emerging threats. 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0363 Insensitive Munitions Advanced Development	10,459	12,571	7,872	9,962	13,222	16,441	16,819	17,454	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:
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 probability 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($709) Validated and analyzed weapon systems POA&Ms for IM compliance planning. Analyzed the availability of critical chemicals.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

- (U) ($3,232) Development of high explosives included the following efforts. Completed large scale testing of general purpose explosives and continued to evaluate melt-castable formulations applicable to large warheads, such as JSOW, Tomahawk, SLAM and JDAM. Completed optimization and qualification of an improved pressed metal accelerating explosive for potential use in MK 50 Torpedo, submunitions, or shaped charge warheads. Evaluated underwater explosives with improved shock performance and sensitivity for possible incorporation by shallow water mine clearing.

- (U) ($1,994) Evaluation of IM ordnance concepts included the efforts below. Conducted full scale testing of technology concepts of weapon ordnance items for potential transition to MK 50 Torpedo, Predator, Sidewinder, or JSOW. Continued development, improvement and application of modeling and data bases that reduce and enhance IM warhead design and reduce test efforts.

- (U) ($4,524) Developed IM propellants and propulsion systems to include the efforts listed below. Evaluated insensitive booster and sustainer propulsion system in large scale testing for potential use by Standard Missile or other surface launched systems. Continued to develop and evaluate an improved performance minimum smoke propellant with less sensitivity using new ingredients such as CL-20. Demonstrated improved light weight rocket motor for application to man portable systems like Predator.

2. (U) FY 1995 PLAN:

- (U) ($899) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.

- (U) ($3,902) Develop high explosives which show improved IM characteristics while maintaining or improving operational performance. Qualify melt-cast general purpose explosive and evaluate performance characteristics such as long term aging. Initiate qualification, scale-up, performance and vulnerability testing of a castable CL-20 based explosive. Conduct large scale generic performance and vulnerability testing of improved underwater explosives.

- (U) ($2,450) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designs to support technology transitions. Continue development, improvement and application of modeling and data bases which reduce and enhance IM warhead design and test efforts.

- (U) ($5,320) Develop IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Evaluate concepts applicable to advanced air-to-air, shoulder launched and air-to-ground systems. Continue demonstration and evaluation of prototype IM dual thrust rocket motor for surface missile systems.

3. (U) FY 1996 PLAN:

- (U) ($590) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.

- (U) ($2,711) Demonstrate high explosives which show improved IM characteristics while maintaining or improving operational performance. Complete scale-up, performance and vulnerability testing of a castable CL-20 based explosives and qualify if warranted. Complete qualification of improved underwater explosives.

- (U) ($1,493) Continue evaluation of IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling and data base improvements and application that reduce and enhance IM warhead design and test eforts.

- (U) ($3,078) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Complete demonstration and evaluation of prototype IM dual thrust rocket motor for surface missile systems (SMS).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

4. (U) FY 1997 PLAN:

- (U) ($600) Continue validation and analysis of weapon systems POA&Ms for IM compliance. Analyze the availability of critical chemicals.
- (U) ($3,258) Demonstrate high explosives which show improved IM characteristics while maintaining or improving operational performance. Initiate deformable high explosives for new Anti-Air-Warfare Warheads.
- (U) ($1,930) Evaluate IM ordnance concepts. Conduct system demonstrations of new high explosives combined with improved warhead and booster designed to support technology transitions. Continue modeling and data base improvements and application that reduce and enhance IM warhead design and test efforts.
- (U) ($4,174) Evaluate and demonstrate IM propellants and propulsion systems which provide improved or comparable performance to in-service systems and better IM characteristics. Initiate formulation evaluation of ADN based propellant. Combine candidate IM propellants and case concepts to demonstrate compliance with IM and performance requirements. Evaluate concepts applicable to advanced air-to-air, shoulder launched and air-to-ground systems.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	10,459	12,608	XXX	XXX
(U) FY 1995 APPROPRIATED:	XXX	12,608	XXX	XXX
(U) Adjustments from APPROPRIATED/ FY 1995 PRESBUDG	0	-37	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	10,459	12,571	7,872	9,962

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1995 decrease of $37K is a result of Undistributed Congressional reductions for University Research and Travel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable.

FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602314N (Undersea Surveillance and Weapons Technology)
(U) PE 0602315N (MCM, Mining and Special Warfare Technology)
(U) PE 0603216N (Aviation Survivability)
(U) PE 0604603N (Unguided Conventional Air-launched Weapons)
(U) Cooperative technology transfer efforts with all weapons project offices are in progress. Close liaison is maintained with PE 0603514N (Ship Combat Survivability).

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Technology Optimization & Characterization	2,838	3,273	2,398	3,410
b. Technology Development & Demonstration	5,008	6,411	3,014	3,882
c. Technology Transition	700	775	740	870
d. Technical Coordination	1,204	1,217	1,035	1,095
e. Program Management	681	865	660	680
f. Travel	28	30	25	25
Total	10,459	12,571	7,872	9,962

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not Applicable.

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:											
NAVAIRWARCENWPNDIV, China Lake	WR	11/94	(Cont.)	(Cont.)	62,634	5,273	5,310	3,078	4,174	(Cont.)	(Cont.)
NAVSURFWARCEN Dahlgren Division	WR	11/94	(Cont.)	(Cont.)	60,252	4,601	2,530	1,493	1,600	(Cont.)	(Cont.)
NAVSURFWARCEN Indian Head Division	WR	11/94	(Cont.)	(Cont.)	7,633	500	4,636	3,221	4,078	(Cont.)	(Cont.)
Miscellaneous	WR	11/94	(Cont.)	(Cont.)	13,783	85	95	80	110	(Cont.)	(Cont.)

Support and Management: Not applicable

Test and Evaluation: Not applicable

GOVERNMENT FURNISHED PROPERTY Not applicable

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: S0363
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: IM Advanced Development

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	144,302	10,459	12,571	7,872	9,962	(Cont.)	(Cont.)
Subtotal Support and Management	0	0	0	0	0		
Subtotal Test and Evaluation	0	0	0	0	0		
Total Project	144,302	10,459	12,571	7,872	9,962	(Cont.)	(Cont.)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv Fuze/WH Package

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U1821 Conventional Fuze and Warhead Package	26,942	28,394	23,665	22,342	17,781	19,304	19,402	19,978	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 Advance Threat Missile Fuze (ATF). This project also addresses increased lethality against current and emerging threats with the development of an integrated guidance and fuzing system and a multi-focusing warhead system. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature development with minimum technical and financial risk.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($17,024) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP): Continued Full Scale Development (FSD), completed MSIIA, released for LRIP, conducted At-Sea TECHEVAL; initiated SPARROW MHIP Pre-planned Product Improvement (P3I) Program; commenced flight testing at Pacific Missile Test Center (PMTC).

- (U) ($472) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Completed analysis and cataloging of data of all tests. Prepared and distributed final report documenting results.

- (U) ($2,054) GUIDANCE INTEGRATED FUZE: Evaluated further candidate system configurations against system requirements and selected baseline for further development. Initiated hardware critical experiments and tool development.

- (U) ($3,592) DIRECTIONAL ORDNANCE SYSTEM (DOS) (Combined Advanced Aimed Warhead and Advanced Aimed Fuze): Continued system analysis and design; defined future critical test requirements.

- (U) ($400) ORDNANCE COMPONENT TECHNOLOGIES: Initiated efforts to design and develop ordnance components to support initialization systems, customized safe-arm device and fuze contact devices.

- (U) ($3,400) MULTI-FUNCTION FUZE: Evaluated 60 advanced development fuzes, achieved milestone II and awarded engineering manufacturing development contract.

2. (U) FY 1995 PLAN:

- (U) ($3,500) Conduct At-Sea OPEVAL 2/95.

- (U) ($1,734) Continue Pre-planned Product Improvement (P3I) Program.

- (U) ($2,000) Complete EDM Missile Fabrication.

- (U) ($4,096) GUIDANCE INTEGRATED FUZE: Continue hardware critical experiments on Radio Frequency (RF) energy and laser ranges; continue detailed analysis, development, and simulation.

- (U) ($6,244) DIRECTIONAL ORDNANCE SYSTEM (DOS) (Combined Advanced Aimed Warhead and Advanced Aimed Fuze): Continue system analysis and design and design of system components; perform critical tests for evaluation of system components and perform system integration tests.

- (U) ($2,200) ADVANCED AAW WARHEAD IMPROVEMENTS: Initiate project to improve fragmenting warheads, safe and arm (S&A) devices and fuze contact devices (FCD). Conduct static warhead firings.

- (U) ($800) ADVANCED STRIKE WARHEAD IMPROVEMENTS: Initiate project to improve fuze system to allow proper multi-mode warhead functioning against hard and soft targets for SLAM, Tomahawk and other strike systems. Conduct static arena tests.

- (U) ($6,100) MULTI-FUNCTION FUZE: Make Producibility Enhancements, fabricate and evaluate 100-150 fuzes, and update technical data package.

- (U) ($520) ORDNANCE COMPONENT TECHNOLOGY: Continue with fabrication of demonstration hardware and conduct lab and field demonstration tests. Complete effort on multipole high-voltage switch.

- (U) ($1,200) PASSIVE/ACTIVE (PACT) FUZE: Initiate project to develop a proximity fuze for a high single shot kill probability against air threats that are high speed, highly maneuverable, small in RCS and flying at extremely low altitudes above sea surface. Define requirements and formulate concept. Initiate supporting investigations.

3. (U) FY 1996 PLAN:

- (U) ($4,329) GUIDANCE INTEGRATED FUZE: Conduct validation experiment on RF array and laser rangefinder, continue analysis, simulation, and tool development.

- (U) ($7,436) DIRECTIONAL ORDNANCE SYSTEM: Complete system design and integration tests and define system demonstration configuration; continue with system analysis and risk assessments.

- (U) ($2,400) ADVANCED AAW WARHEAD IMPROVEMENTS: Conduct lab-bench test, develop specification and drawing package to support transition to E&MD.

- (U) ($1,600) ADVANCED STRIKE WARHEAD IMPROVEMENT: Continue system analysis and design; initiate system integration tests.

- (U) ($1,500) PASSIVE/ACTIVE FUZE: Continue with supporting investigations: Algorithm development, computer modeling, critical experiments, signal processing.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Fuze/WH Package

- (U) ($600) ORDNANCE COMPONENT TECHNOLOGY: Complete effort on universal Safe and Arming (S-A) chipset; continue with efforts on initiation systems and customized S-A Components; initiate effort on high G fiber-optic accelerometer.

- (U) ($5,800) MULTI-FUNCTION FUZE: Engineering, manufacturing, producibility enhancement for OPEVAL/TECHEVAL. Evaluate 1000 fuzes and update technical data package.

4. (U) FY 1997 PLAN:

- (U) ($3,197) GUIDANCE INTEGRATED FUZE: Develop lab/field test plans for laser rangefinder, start RF array prototype build, continue analysis and tool development.

- (U) ($6,945) DIRECTIONAL ORDNANCE SYSTEM: Conduct system demonstration; perform affordability assessment; develop specifications, drawings, and design and test data reports; prepare system demonstration report.

- (U) ($4,000) ADVANCED STRIKE WARHEAD IMPROVEMENT: Complete multimode warhead and penetration fuze integration tests and validate concept.

- (U) ($500) ORDNANCE COMPONENT TECHNOLOGY: Complete effort on initiation system; continue with very high energy energy density capacitors and high G fiber-optic accelerometer efforts.

- (U) ($1,100) DEFENSE SUPPRESSION: Initiate effort on advanced defense suppression systems.

- (U) ($3,600) PASSIVE/ACTIVE FUZE: Complete supporting investigations; perform integration and test, define baseline design.

- (U) ($3,000) MULTI-FUNCTION FUZE: Perform certification of OPEVAL/TECHEVAL and laboratory testing.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Fuze/WH Package

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	28,342	28,750	XXX	XXX
(U) FY 1995 APPROPRIATED:	XXX	28,750	XXX	XXX
(U) Adjustments from APPROPRIATED/ FY 1995 PRESBUDG:	-1,400	-356	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	26,942	28,394	23,665	22,342

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The decrease of $1,400K in FY 1994 results in an End-Of-Year execution update. The FY 1995 decrease of $356K resulted from a Small Business Innovative Research cut of $182K and Undistributed Congressional reductions for Consulting Support Services, University Research and Travel totalling $174K.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN Line 18 SPARROW Mods	26,830	26,797	30,791	59,751	71,256	89,393	65,812	66,503	0	456,378

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Fuze/WH Package

(U) RELATED RDT&E:

(U) PE 0603755N (SHIP SELF DEFENSE)

(U) PE 0604366N (STANDARD Missile Improvements) Block IIIB fully describes the common milestones for joint program that adds a common seeker to both STANDARD Missile and SPARROW Missile.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	SPARROW 4Q MS IIA	SPARROW 4Q MS III			
Engineering Milestones					
T&E Milestones	SPARROW PMTC 3Q FLT TEST	SPARROW 1Q TECHEVAL 2Q OPEVAL			
Contract Milestones		SPARROW 2Q LRIP 4Q PROD			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Munitions

A. (U) PROJECT COST BREAKDOWN: ($ in thousands) (Note 1)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Design and Analysis	8,049	13,756	14,614	12,655
b. Hardware Fabrication & Procurement	6,914	3,110	3,784	3,154
c. Demonstration Test & Evaluation	4,892	5,298	5,217	6,483
d. Operational Test & Evaluation	1,975	2,975	0	0
e. Engineering Support	3,812	2,600	0	0
f. Program Management Support	750	500	0	0
g. Travel	50	50	50	50
h. Other/Misc	500	105	0	0
Total	26,942	28,394	23,665	22,342

Note 1: MHIP project is also funded by PE PE 0604366N, Project U0439.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Munitions

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Naval Surface Warfare Center/Dahlgren	WR	Various	Con't	Con't	1,200	6,792	14,000	16,062	13,145	Con't	Con't
IRISS(Note 1)	CPAF	12/89	182,700	185,600	69,955	9,324	2,684	0	0	0	81,963
Naval Air Warfare Center Weapons Div/ China Lake	WR	Various	Con't	Con't	32,240	6,033	9,460	7,553	9,147	Con't	Con't
Support and Management Naval Air Warfare Center Weapons Div/ China Lake	WR	Various	2,885	2,885	1,767	618	500	0	0	0	2,885
Various	Various	Various	Con't	Con't	427	225	150	50	50	Con't	Con't

(1) This contract is funded by PE 0603609N and PE 0604366N.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603609N PROJECT NUMBER: U1821
PROGRAM ELEMENT TITLE: Conventional Munitions PROJECT TITLE: Conv. Munitions

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Test and Evaluation											
Naval Air Warfare Center Weapons Div/ China Lake	WR	Various	Con't	Con't	3,916	0	1,600	0	0	Con't	Con't
Holloman AFB	MIPR	Various	Con't	Con't	442	0	0	0	0	Con't	Con't
COMOPTEVFOR	PD	Various	Con't	Con't	0	3,950	0	0	0	Con't	Con't

GOVERNMENT FURNISHED PROPERTY: Not applicable.

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management										
Test and Evaluation										
Total										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603609N
PROGRAM ELEMENT TITLE: Conventional Munitions
PROJECT NUMBER: U1821
PROJECT TITLE: Conv. Munitions

	FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	103,395	22,149	26,144	23,615	22,292	Cont.	Cont.
Subtotal Support and Management	2,194	843	650	50	50	Cont.	Cont.
Subtotal Test and Evaluation	4,358	3,950	1,600	0	0	Cont.	Cont.
Total Project	109,947	26,942	28,394	23,665	22,342	Cont.	Cont.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603610N
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1873 LTWT TORP (ADV)	15,821	0	2,993	2,996	2,932	3,060	0	0	0	27,802

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The funding is to continue an ongoing MK-50 Torpedo improvement program to maintain the technological edge in US Navy torpedoes. The program is addressing improvements in shallow water, near surface performance, zero doppler target detection, and bottom target recognition in order to counter the high-tech diesel submarines which will be encountered in the littoral warfare arena.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($8,821) Conducted shallow water exercises against Rest of World submarines which assessed existing performance and new shallow water enhancements.
- (U) ($3,300) Developed prototype fire control external interface to provide additional target information and evaluated shaped charge warhead technology.
- (U) ($3,700) Enhanced existing models for shallow water scenarios, designed prototype Fleet Exercise Section for improved reliability, and evaluated combinations of existing fuels and/or development of new environmentally benign fuels.

2. (U) FY 1995 PLAN: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORP (ADV)

3. (U) FY 1996 PLAN:

- (U) ($1,493) Develop tactical software to refine shallow water search patterns and tactics, address multi-bounce propagation, and refine bottom avoidance algorithms.
- (U) ($1,500) Develop improved tactical software for counter-countermeasure performance and for short range acquisition.

4. (U) FY 1997 PLAN:

- (U) ($1,500) Continue development of tactical software to refine shallow water search patterns and tactics, address multi-bounce propagation, and refine bottom avoidance algorithms.
- (U) ($1,496) Continue development of improved tactical software for counter-countermeasure performance and for short range acquisition.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	15,821	0	XXX	XXX
(U) FY 1995 Appropriated:	XXX	0	XXX	XXX
(U) Adjustments from Approp/FY 1995 PRESBUDG:	0	0	XXX	XXX
(U) FY 1996/97 PRESBUDG:	15,821	0	2,993	2,996

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Not Applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE
PROJECT NUMBER: V1873
PROJECT TITLE: LTWT TORP (ADV)

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN/311800	47,041	0	0	0	0	0	0	0	0	1,420,761

(U) RELATED RDT&E:
(U) PE 0205632N (MK 48 ADCAP)
(U) PE 0604610N (LIGHTWEIGHT TORPEDO DEVELOPMENT)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones Engineering Milestones					
T&E Milestones					2Q/98 TECHEVAL 3Q/99 OPEVAL
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE
PROJECT NUMBER: V1873
PROJECT TITLE: LTWT TORP (ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Developmental Test & Evaluation	5,361	0	0	0
b. Software Development	3,805	0	2,043	2,346
c. Ancillary Hardware Development	1,365	0	0	0
d. Systems Engineering	5,290	0	900	600
e. Program Management Support	0	0	50	50
Total	15,821	0	2,993	2,996

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK-50 SHALLOW WATER PERFORMANCE PROJECT TITLE: LTWT TORP (ADV)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total 1/ FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVUNSEAWARCEN Newport, RI	WR	NOV 95	18,092	18,092	0	11,311	0	2,043	2,046	2,692	18,092
NAVSURFWARCEN White Oak, MD	WR	N/A	800	800	0	800	0	0	0	0	800
Miscellaneous	WR	VAR	600	600	0	0	0	200	200	200	600
Support and Management											
ARL, Penn State	PD	N/A	4,410	4,410	0	3,010	0	500	500	400	4,410
APL, Univ. of WA	PD	N A	1,200	1,200		700	0	200	200	100	1,200
Miscellaneous	WR	VAR	200	200	0	0	0	50	50	100	200
Test and Evaluation											
COMOPTEVFOR	WR	N/A	2,500	2,500	0	0	0	0	0	2,500	2,500

GOVERNMENT FURNISHED PROPERTY: Not applicable.

1/The funds from FY 1993 and prior were for the Advance Warhead Development line. A new program listed as the MK50 Shallow Water Performance is funded in FY 1994 and FY 1996 through FY 1999.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603610N PROJECT NUMBER: V1873
PROGRAM ELEMENT TITLE: MK50 SHALLOW WATER PERFORMANCE PROJECT TITLE: MK50 SHALLOW WATER PERFORMANCE

	Total 1/ FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total 2/ Program
Subtotal Product Development	0	12,111	0	2,243	2,246	2,892	19,492
Subtotal Support and Management	0	3,710	0	750	750	600	5,810
Subtotal Test and Evaluation	0	0	0	0	0	2,500	2,500
Total Project	0	15,821	0	2,993	2,996	5,992	27,802

1/The FY 1993 and prior funding was for the Advanced Warhead Development line.
2/The total program lists the total funding for the MK50 Shallow Water Performance program.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
B0020 Advanced Amphibious Assault Vehicle (AAAV)[1]	21,192	*32,700	32,366	31,379	51,418	85,575	92,524	58,702	CONT.	CONT.
C2237 Amphibious Vehicle Test Branch (AVTB)	0	1,799	1,791	1,791	1,791	1,791	1,791	1,791	CONT.	CONT.
TOTAL	21,192	34,499	34,157	33,170	53,209	87,366	94,315	60,493	CONT.	CONT.

1. FY 1994 includes $1,976 in support of the Assault Amphibious Vehicle 7A1 (AAV7A1) and $1,398 in support of the AVTB. FY 1995 and beyond AAV7A1 funding and discussion are contained in Program Element (PE) 0206623M, Project C0021. FY 1995 and beyond AVTB funding and discussion are contained in Project C2237 under this PE.

*Of the $32.7 million appropriated in FY 1995, $9.1 million is deferred by OSD as a congressional increase not requested in the budget.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AAAV Program will field a successor to the Marine Corps' current amphibious vehicle, the AAV7A1. The AAAV will provide the principal means of tactical surface mobility for the Marine Air-Ground Task Force during both ship-to-shore maneuver and subsequent combat operations ashore. The AVTB provides facilities and personnel which perform a broad range of testing, repair and technical services to amphibious vehicles.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
B0020 Advanced Amphibious Assault Vehicle (AAAV)	21,192	32,700	32,366	31,379	51,418	85,575	92,524	58,702	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AAAV Program will field a successor to the Marine Corps' current amphibious vehicle, the Advanced Amphibious Vehicle 7A1 (AAV7A1). The AAAV will provide the principal means of tactical surface mobility for the Marine Air-Ground Task Force (MAGTF) during both ship-to-shore maneuver and subsequent combat operations ashore.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($10,239) Designed and initiated fabrication and testing of full scale Automotive Test Rigs (ATRs) and conducted suspension component testing.
- (U) ($2,770) Continued studies, development, and testing of prototype engines.
- (U) ($1,200) Continued evaluation of Turbine engine for the propulsion system.
- (U) ($2,096) Using in-house support, charged costs to program funds for Department of Defense (DoD) or other government agency support to the program, for product development, for test and evaluation, or for management support.
- (U) ($1,513) Enlisted program support.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

- (U) The following efforts ($1,976) are in support of the AAV7A1 program.
- (U) ($0) Obtained production approval for reliability and maintainability improvements for the current existing transmission.
- (U) ($545) Initiated engine upgrade (EUP) efforts by commencing the Bradley Fighting Vehicle (BFV) 600 horsepower engine integration into the AAV7A1 hull.
- (U) ($443) Completed integration of Improved Suspension (ISUSP) into test vehicles.
- (U) ($322) Completed integration of Single Channel Ground-Air Radio System (SINCGARS) radios into the AAV7A1.
- (U) ($666) Provided engineering support for reliability and safety related improvements and modifications.
- (U) The following efforts ($1,398) are in support of the Amphibious Vehicle Test Branch (AVTB).
- (U) ($455) Provided for travel, supplies and services at the AVTB test site to support scheduled AAV7A1 developmental testing. These funds provided organic supply support including management operations, general accounting, and a maintenance float of equipment. Services included heating, air conditioning and other power charges, long distance telephone support and other routine support such as trash removal. Provided intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.
- (U) ($943) Provided AVTB personnel civilian salaries to support scheduled AAV7A1 testing. Planned and conducted developmental tests and reported results, identifying any unresolved test issues in accordance with approved test plans and procedures. Prepared analysis of field-reported problems as received. Provided recommendations pertaining to design requirements which effected both operational effectiveness and operational suitability. Performed all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provided technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepared technical analysis of proposed product improvements as requested. Prepared analysis of proposed engineering changes. Conducted hardware testing and evaluation of design changes, including verification of both

the design and the technical data, in accordance with approved test plans and procedures. Provided technical assistance in writing and revision of Technical Manuals. Provided technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware.

2. (U) FY 1995 PLAN:

- (U) ($12,460) Design and initiate fabrication and testing of two operational mock-up weapon stations.
- (U) ($2,536) Continue studies, development, and testing of prototype engines.
- (U) ($6,204) Provide in-house support.
- (U) ($1,200) Enlist program support and commence Defense Aquisition Board (DAB) Milestone I review.
- (U) ($9,100) $4.1M is for the rotary engine, the remaining $5.0M is for program acceleration.
- (U) ($1,200) Conduct testing and evaluation of ATRs.

3. (U) FY 1996 PLAN:

- (U) ($21,266) Competitively award the Demonstration and Validation phase contract.
- (U) ($6,800) Continue to provide in-house support.
- (U) ($1,200) Enlist program support to coordinate and update program planning.
- (U) ($2,700) Continue development and conduct 400 hour demonstration test of prototype engine(s).
- (U) ($400) Conduct Test & Evaluation of operational mock-up weapon stations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

4. (U) FY 1997 PLAN:

- (U) ($24,500) Continue prime contractor design, modeling, and simulation of the AAAV - Personnel (P) and Command (C) prototypes.
- (U) ($5,679) Continue to provide in-house support.
- (U) ($1,200) Continue to enlist program support to coordinate and update program planning.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	19,822	24,558	N/A	N/A
(U) FY 1995 Appropriated:	N/A	33,658	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	+1,370	-958	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	21,192	32,700	32,366	31,379

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 increase provided studies, development, and testing of prototype engines. FY 1995 funding was decreased by a total of $958 for the following undistributed Congressional reductions: Consulting Services, Small Business Innovative Research, University Research, and Travel.

(U) Schedule: The previous year's schedule has been adjusted to support the current program office's schedule.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), AAV7A1, Project C0021

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q SINCGARS MS III (AAV7A1) 3Q IRAM MS III (AAV7A1)	2Q MS I			
Engineering Milestones	1Q SINCGARS DEMOS (AAV7A1)			1Q AAAV (P) SYSTEM DESIGN REVIEW	
T&E Milestones		100 HOUR ENGINE DEMO	400 HOUR ENGINE DEMO		
Contract Milestones	3Q SINCGARS FRP (AAV7A1) 1Q ISUSP TEST ARTICLES (AAV7A1) 1Q EUP TEST ARTICLES (AAV7A1)	3Q ENGINE AWARD	2Q DEM/VAL AWARD		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Product Development (AAAV)	16,305	30,300	30,766	30,179
b. Support and Management (AAAV)	1,513	1,200	1,200	1,200
c. Test and Evaluation (AAAV)	0	1,200	400	0
d. Contractor Engr Support (AAV7A1)	876	0	0	0
d. Government Engr Support (AAV7A1)	538	0	0	0
e. Ancil Hardware Development (AAV7A1)	548	0	0	0
f. Travel (AAV7A1)	14	0	0	0
g. Travel, Supplies, & Services (AVTB)	455	0	0	0
h. Civilian Personnel (AVTB)	943	0	0	0
Total	21,192	32,700	32,366	31,379

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
TBD		TBD					9,100	0	0	0	9,100
TBD DEM/VAL	CPAF	JAN 96	0	0	0	0	0	21,266	24,500	CONT.	CONT.
GDLS (TURRET), Warren, MI	CPFF	JAN 95	6,410	6,410	0	0	6,410	0	0		
UDLP (TURRET), San Jose, CA	CPFF	DEC 94	6,100	6,050	0	0	6,050	0	0	0	0
ENGINE B (MTU), Friedrichshafen, Germany	CPFF	APR 94	2,770	2,770	0	2,770	1,225	2,700	0	0	
GDLS (ATR), Warren, MI	CPFF	SEP 93	15,773	15,773	10,684	5,089	0	0	0	0	15,773
FMC/UDLP (ATR), San Jose, CA	CPFF	SEP 93	15,834	15,834	10,684	5,150	0	0	0	0	15,834
ENG A II (MTU), Friedrichshafen, Germany	CPFF	APR 93	5,548	5,548	5,548	0	0	0	0	0	5,548
NSWC (TUR/DIE), Annapolis, MD	CPFF	AUG 93	1,200	1,200	0	1,200	0	0	0	0	1,200
NSWC (PSD), Annapolis, MD	CPFF	SEP 92	1,052	1,052	1,052	0	0	0	0	0	1,052

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development (cont.)											
ENG A I (MTU), Friedrichshafen, Germany	CPFF	MAR 91	1,000	1,000	1,000	0	0	0	0	0	1,000
GDLS (HTR), Warren, MI	CPFF	JUL 91	12,057	12,057	12,057	0	0	0	0	0	12,057
FMC (HTR), San Jose, CA	CPFF	JUL 91	12,253	12,253	12,253	0	0	0	0	0	12,253
ENG A I (MTU), Friedrichshafen, Germany	CPFF	AUG 91	1,067	1,067	1,067	0	0	0	0	0	1,067
GDLS (RED TEAM), Warren, MI	FFP	APR 90	1,500	1,500	1,500	0	0	0	0	0	1,500
FMC (RED TEAM), San Jose, CA	FFP	FEB 90	2,500	1,500	1,500	0	0	0	0	0	1,500
ENG 2250 (MTU), Friedrichshafen, Germany	CPFF	SEP 89	4,200	4,200	4,200	0	0	0	0	0	4,200
MISCELLANEOUS (AAAV)					12,644	2,096	7,515	6,800	5,679	CONT.	CONT.
TACOM (AAV7A1),Warren, MI	MIPR	VARIOUS	484	484	0	484	0	0	0	0	484
NSWC (AAV7A1), Crane Division, Louisville, KY	MIPR	VARIOUS	437	437	0	437	0	0	0	0	437
NSWC (AAV7A1), Annapolis, MD	MIPR	JAN 94	60	60	0	60	0	0	0	0	60
MISC (AAV7A1)	VARIOUS	VARIOUS	10,915	10,915	0	14	0	0	0	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: B0020
PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management											
TMA, Arlington, VA											
	CPFF	DEC 93			0	1,200	1,200	1,200	1,200	CONT.	CONT.
NSWC (PSD), Annapolis, MD											
	CPFF	MAR 91	2,160	2,160	2,160	0	0	0	0	0	2,160
MISC (AAAV)	WR		7,519	7,519	7,206	313	0	0	0	0	7,519
VSE (AAV7A1), Alexandria, VA											
	SS/CPFF	OCT 92	876	876	0	876	0	0	0	0	876
NAVSEASYSCOM (AAV7A1), Arlington, VA											
	MIPR	VARIOUS	77	77	0	77	0	0	0	0	77
MISC (AAV7A1)	VARIOUS	VARIOUS	28	28	0	28	0	0	0	0	28
AVTB, Camp Pendleton, CA											
	WR	SEP 93	1,398	1,398	0	1,398	0	0	0	0	1,398
Test and Evaluation					0	0	1,200	400	0	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault Vehicle (AAAV)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	74,189	17,300	30,300	30,766	30,179	CONT.	CONT.
Subtotal Support and Management	9,366	4,575	1,200	1,200	1,200	CONT.	CONT.
Subtotal Test and Evaluation	0	0	1,200	400	0	CONT.	CONT.
Total Project	83,555	21,192	32,700	32,366	31,379	CONT.	CONT.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2237 Amphibious Vehicle Test Branch (AVTB)	0	1,799	1,791	1,791	1,791	1,791	1,791	1,791	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The AVTB is a one-of-a-kind Department of Defense Test Facility for amphibious vehicles and supports the requirements of all services. The AVTB conducts developmental, combined developmental/operational, and follow-on testing and evaluation of production hardware. It also conducts Product Assurance Testing and substitute or alternative parts and material testing for amphibious vehicles and associated equipments. Because of its year-round temperate climate, diverse terrain, and 17 miles of coastline, the AVTB is ideal for amphibious vehicle, as well as ship related testing. The AVTB is in close proximity to San Clemente island which is used frequently for live fire sea to shore testing and high-speed water testing. The AVTB is committed to testing product improvement programs, engineering change proposal design changes, and field change requests.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Funding ($1,398) is contained in Project B0020, Advanced Amphibious Assault Vehicle (AAAV) under this program element.

2. (U) FY 1995 PLAN:

- (U) ($781) Provide for travel, supplies, and services at AVTB test site to support scheduled AAV7A1 developmental testing. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. The services include heating, air conditioning and other power charges, long distance telephone support, and other routine support such as trash removal. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.

- (U) ($1,018) Provide AVTB personnel civilian salaries to support scheduled AAV7A1 developmental testing. Plan and conduct developmental tests and report results, identifying any unresolved test issues in accordance with approved

test plans and procedures. Prepare analysis of field-reported problems as received. Provide recommendations pertaining to design requirements which affect both operational effectiveness and operation suitability. Perform all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provide technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepare technical analysis of proposed product improvements as requested. Prepare analysis of proposed engineering changes. Conduct hardware testing and evaluation of design changes, including verification of both the design and the technical data, in accordance with approved test plans and procedures. Provide technical assistance in writing and revision of Technical Manuals. Provide technical reviews and recommendations regarding proposed Modification, Technical, Retrofit Instructions, and Retrofit Kit Hardware.

3. (U) FY 1996 PLAN:

- (U) ($691) Provide for travel, supplies, support, and services at AVTB test site to support scheduled AAV7A1 Developmental Testing. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. The services include heating, air conditioning and other power charges, long distance telephone support, and other routine support such as trash removal. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.

- (U) ($1,100) Provide AVTB personnel civilian salaries to support scheduled AAV7A1 and AAAV Developmental Testing. Plan and conduct Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Prepare analysis of field-reported problems as received. Provide recommendations pertaining to design requirements that affect both operational effectiveness and suitability. Perform all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provide technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepare technical analysis of proposed product improvements as requested. Prepare analysis of proposed engineering changes. Conduct hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provide technical assistance in writing and revision of Technical Manuals. Provide technical reviews and recommendations regarding proposed Modifications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: C2237
PROJECT TITLE: Amphibious Vehicle Test Branch (AVTB)

4. (U) FY 1997 PLAN:

- (U) ($691) Provide for travel, supplies, support, and services at AVTB test site to support scheduled AAV7A1 Developmental Testing. These funds provide organic supply support including management operations, general accounting, and a maintenance float of equipment. The services include heating, air conditioning and other power charges, long distance telephone support, and other routine support such as trash removal. Provide intermediate maintenance (third echelon) of organic non-developmental communication electronic and ordnance equipment.

- (U) ($1,100) Provide AVTB personnel civilian salaries to support scheduled AAV7A1 and AAAV Developmental Testing. Plan and conduct Developmental Tests and report results, identifying any unresolved test issues in accordance with approved test plans and procedures. Prepare analysis of field-reported problems as received. Provide recommendations pertaining to design requirements that affect both operational effectiveness and suitability. Perform all echelons of maintenance on developmental items, including all on-hand assets of assault amphibious vehicles, within the capabilities of on-hand personnel, tools, test, and measuring equipment and facilities. Provide technical assistance and recommendations in the test of substitute or alternate parts and materials. Prepare technical analysis of proposed product improvements as requested. Prepare analysis of proposed engineering changes. Conduct hardware testing and evaluation of design changes, including verification of both the design and the technical data in accordance with approved test plans and procedures. Provide technical assistance in writing and revision of Technical Manuals. Provide technical reviews and recommendations regarding proposed Modifications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles PROJECT NUMBER: C2237 PROJECT TITLE: Amphibious Vehicle Test Branch (AVTB)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	1,841	N/A	N/A
(U) FY 1995 Appropriated:	N/A	1,841	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	-42	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	0	1,799	1,791	1,791

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 funding was decreased by a total of $42 for the following undistributed Congressional reductions: Small Business Innovation Research, University Research, and Travel. Also, funding previously indicated as "Program Management Support" was incorporated into the "Travel, Supplies and Services" discussion. This realignment was made because Program Management Support (contractor support) in FY 1995 was not accurate due to the support contract not being reissued after FY 1993. Efforts were transferred to in-house personnel.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands): Not applicable.

(U) RELATED RDT&E:

(U) PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems), Project C0021, AAV7A1
(U) PE 0603611M (Marine Corps Assault Vehicles), Project B0020, AAAV

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: C2237
PROJECT TITLE: Amphibious Vehicle Test Branch (AVTB)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones					
T&E Milestones		AAV7A1 DT	AAV7A1 DT	AAV7A1 DT	
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603611M
PROGRAM ELEMENT TITLE: Marine Corps Assault Amphibious Vehicles
PROJECT NUMBER: C2237
PROJECT TITLE: Amphibious Vehicle Test Branch (AVTB)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Travel, Supplies, and Services	0	781	691	691
b. Civilian Personnel	0	1,018	1,100	1,100
Total	0	1,799	1,791	1,791

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2104 Wide Area Mine Clearing System (WAMC)[1]	0	0	0	3,185	4,097	2,223	0	0	0	9,505
C2106 Advanced Countermeasures System (ACS)[2]	645	6,434	2,470	0	0	0	0	0	0	9,549
TOTAL	645	6,434	2,470	3,185	4,097	2,223	0	0	0	19,054

1. This program is formerly titled Wide Area Mine Clearing System (WAMC). The current title is Off/Route Smart Mine Clearance (ORSMC). FY 1994 through FY 1996 funding is contained in Program Element (PE) 0603640M, Marine Corps Advanced Technology Demonstrations (ATD), Project C2223, the consolidated Marine Corps ATD project. FY 1997 through FY 1999 funding is contained in this PE. FY 2000 through FY 2001 funding is contained in PE 0604612M, Marine Corps Mine Countermeasures (Engineering), Project C2104, WAMC.

2. This program was formerly titled Distributed Explosive Mine Neutralization System (DEMNS). The current title is Advanced Countermeasures System (ACS). FY 1994 funding is split between two program elements; $645 in this PE and $1,413 in PE 0603640M, Project C2223. FY 1995 and FY 1996 funding is contained in this PE. FY 1997 through FY 2001 funding is contained in PE: 0604612M, Project C2106, ACS.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE focuses on the development and demonstration of mine clearing/countering devices.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2104 Wide Area Mine Clearing System (WAMC)	0	0	0	3,185	4,097	2,223	0	0	0	9,505

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project is currently titled Off/Route Smart Mine Clearance (ORSMC). This program develops and demonstrates explosive, mechanical, and electro-magnetic technologies and concepts for neutralizing advanced and hardened threat land mines; wide-area, off-route smart mines; unexploded ordnance; and other obstacles during amphibious assault operations and subsequent operation ashore and in littoral areas. 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: FY 1994 Funding ($1,228) is contained in PE 0603640M, Marine Corps Advanced Technology Demonstrations (ATD), Project C2223, the consolidated Marine Corps ATD project.

2. (U) FY 1995 PLAN: FY 1995 funding ($1,113) is contained in PE 0603640M, Project C2223.

3. (U) FY 1996 PLAN: FY 1996 funding ($2,348) is contained in PE 0603640M, Project C2223.

4. (U) FY 1997 PLAN:

   - (U) ($600) Obtain Milestone I decision.
   - (U) ($600) Award Demonstration and Validation phase contract.
   - (U) ($1,985) Begin engineering and design of prototype systems and subsystems test components.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures PROJECT NUMBER: C2104 PROJECT TITLE: Off/Route Smart Mine Clearance (ORSMC)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	0	N/A	N/A
(U) FY 1995 Appropriated:	N/A	0	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	0	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	0	0	0	3,185

(U) CHANGE SUMMARY EXPLANATION: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0603606A (Landmine Warfare and Barrier Advanced Technology) Negotiations are underway to join Army programs and the ACS/ORSMC projects into joint programs at the appropriate milestone.
(U) PE 0603619A (Landmine Warfare and Barrier Advanced Demonstrations)
(U) PE 0604808A (Landmine Warfare and Barrier Engineering Development)
(U) PE 0602131M (Marine Corps Landing Force Technology)
(U) PE 0603612M (Marine Corps Mine Countermeasures Systems)
(U) PE 0603635M (Marine Corps Ground Combat/Support System)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstrations)
(U) PE 0602315N (Mine Countermeasures, Mining and Special Warfare Technology)
(U) PE 0603555N (Sea Control and Littoral Warfare Technology Demonstration)
(U) PE 0603782N (Shallow Water Mine Countermeasures Demonstrations)
(U) This program is in compliance with Tri-Service Reliance Agreements.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2104
PROJECT TITLE: Off/Route Smart Mine Clearance (ORSMC)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	0	0	0	1,800
b. Government Engineering Support	0	0	0	373
c. Systems Engineering	0	0	0	150
d. Technical Data	0	0	0	450
e. Integrated Logistics Support	0	0	0	212
Total	0	0	0	3,185

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures PROJECT NUMBER: C2104 PROJECT TITLE: Off/Route Smart Mine Clearance (ORSMC)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Night Vision Electronics Sensors Directorate (NVESD), Ft. Belvoir, VA	MIPR	OCT 96	8,475	8,475	0	0	0	0	2,840	5,635	8,475
Support and Management											
NVESD, Ft. Belvoir, VA	MIPR	OCT 96	1,030	1,030	0	0	0	0	345	685	1,030

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures PROJECT NUMBER: C2104 PROJECT TITLE: Off/Route Smart Mine Clearance (ORSMC)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	0	2,840	5,635	8,475
Subtotal Support and Management	0	0	0	0	345	685	1,030
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	0	0	0	0	3,185	6,320	9,505

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2106 Advanced Countermeasures System (ACS)	645	6,434	2,470	0	0	0	0	0	0	9,549

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project was formerly titled Distributed Explosive Mine Neutralization System (DEMNS). This program centers on neutralization of blast-hardened and complex-fuzed mines, and unexploded munitions (current and future threat) that defeat the effectiveness of current minefield breaching systems. Primary goals are: neutralization in-stride from a standoff position; very high neutralization percentages against all types of mines; and joint applicability for use with primary assault platforms to include land and amphibious assaults. This is a joint Army/Marine Corps program with the Army as the lead service satisfying their Standoff Minefield Breacher requirement.

(U) The ACS program researches and develops assault minefield breaching capabilities that will neutralize current and future blast-hardened and complex-fuzed mines from a standoff position. ACS will alleviate a critical deficiency in breaching minefields during amphibious operations. Current breaching assets are 1950s technology that do not meet breaching mission requirements.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: FY 1994 funding is contained in two PEs: $1,413 is contained in PE 0603640M, Marine Corps Advanced Technology Demonstrations (ATD), Project C2223, the consolidated Marine Corps ATD project and $645 in this PE.

- (U) ($635) Completed development of Milestone I documentation under Army lead program management. Marine Corps input was provided to Integrated Program Review documents being forwarded to the Army Program Executive Officer.
- (U) ($10) Provided travel for matrix support and program management personnel at Marine Corps Systems Command (MARCORSYSCOM), Quantico, Virginia.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures System (ACS)

2. (U) FY 1995 PLAN:

- (U) ($4,824) Award Demonstration/Validation (DEM/VAL) contract for research and development of three explosive breaching systems and fifteen rounds of explosive charges.
- (U) ($142) Award support contract for program documentation, analysis, and technical support to the program management office.
- (U) ($1,468) Provide Army, Navy, and government laboratory salaries. Provide travel support for program documentation functions and technical/contract support services.

3. (U) FY 1996 PLAN:

- (U) ($1,153) Continue DEM/VAL. Continue development and testing of system components.
- (U) ($172) Continue program documentation and contract progress analysis.
- (U) ($1,145) Continue to provide Army, Navy, and government laboratory salaries. Continue to provide travel support for program documentation functions and technical/contract support services.

4. (U) FY 1997 PLAN: FY 1997 funding ($2,791) is contained in PE 0604612M, Marine Corps Mine Countermeasures (Engineering), Project C2106.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures System (ACS)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,561	6,600	N/A	N/A
(U) FY 1995 Appropriated:	N/A	6,600	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	-1,916	-166	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	645	6,434	2,470	0

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1994 decrease of $1,916 was due to end-of-year execution adjustments. FY 1995 funding was decreased by a total of $166 for the following undistributed Congressional reductions: Consulting Services, Small Business Innovative Research, University Research, and Travel.

(U) Schedule: Administrative delays in cooperative efforts with the Army delayed point designation of this program. Programmatic efforts to create joint documentation and Marine Corps Requirements Validation delayed Milestone I until the second quarter of FY 1995. Mission Needs Statement and Operational Requirements Document completion is anticipated during the first quarter of FY 1995. The DEM/VAL contract will be awarded in the second quarter of FY 1995.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures System (ACS)

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0603606A/0603619A/0604080A (Army Standoff Minefield Breacher Program)
(U) PE 0603640M (Marine Corps Advanced Technology Demonstrations)
(U) PE 0604612M (Marine Corps Mine Countermeasures (Engineering))

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		2Q MS I			
Engineering Milestones					
T&E Milestones					
Contract Milestones		2Q CPIF			

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures System (ACS)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Program Manager Civilian Salaries	635	1,390	950	0
b. Travel	10	8	20	0
c. Professional and Management Service	0	142	172	0
d. Hardware Development	0	3,000	600	0
e. Software Development	0	20	100	0
f. Systems Engineering	0	1,715	300	0
g. Integrated Logistics Support	0	30	30	0
h. Government Engineering Support	0	30	30	0
i. Developmental Test and Evaluation	0	0	235	0
j. Miscellaneous	0	99	33	0
Total	645	6,434	2,470	0

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures

PROJECT NUMBER: C2106 PROJECT TITLE: Advanced Countermeasures System (ACS)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
TBD	C/CPIF/MIPR	JAN 95	5,382	5,382	0	0	4,824	558	0	0	5,382
Support and Management											
Night Vision Electronics Sensors Directorate, Ft. Belvoir, VA											
	MIPR	OCT 94	314	314	0	0	142	172	0	0	314
CAMBER CONTR	C/CPIR	OCT 94	2,863	2,863	0	0	1,460	1,403	0	0	2,863
MARCORSYSCOM, Quantico, VA											
	WR	OCT 93	38	38	0	10	8	20	0	0	38
ARDEC, Picatinny, NJ											
	WR	AUG 93	200	200	0	200	0	0	0	0	200
NSWC, Indian Head, MD											
	WR	AUG 93	100	100	0	100	0	0	0	0	100
MCCDC, Quantico, VA											
	WR	AUG 94	335	335	0	335	0	0	0	0	335
Test and Evaluation											
Miscellaneous			317	317	0	0	0	317	0	0	317

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603612M
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures
PROJECT NUMBER: C2106
PROJECT TITLE: Advanced Countermeasures System (ACS)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	4,824	558	0	0	5,382
Subtotal Support and Management	0	645	1,610	1,595	0	0	3,850
Subtotal Test and Evaluation	0	0	0	317	0	0	317
Total Project	0	645	6,434	2,470	0	0	9,549

C. (U) FUNDING PROFILE: Not applicable.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1598 Nuclear/Biological/Chemical (NBC) Equipment[1]	0	2,595	0	0	0	0	0	0	0	20,340
C1964 Joint Anti-Armor Weapons System (JAAWS)/Javelin	376	171	498	498	498	498	498	498	CONT.	CONT.
C2112 Lightweight 155 millimeter Howitzer (LW155)	0	6,361	10,881	11,543	31,301	31,136	14,720	9,946	CONT.	CONT.
C2113 Short Range Anti-Tank Weapon (SRAW)/Predator	23,895	14,041	31,535	33,408	4,545	0	0	0	0	121,887
C2247 Coastal Battlefield Reconnaissance and Analysis (COBRA)[2]	0	0	3,819	4,973	3,382	0	0	0	0	12,174
C2248 Advanced Lightweight Ground Weaponry (ALWGW)[3]	0	0	0	0	0	995	995	2,984	CONT.	CONT.
C2249 Survivability System for Amphibious Vehicles[4]	0	0	0	0	0	0	0	1,990	CONT.	CONT.
C2250 Team Target Engagement Simulator (TTES)[5]	0	0	0	995	995	0	0	0	0	1,990
C2251 Joint Advanced Amphibious Logistics Technology[6]	0	0	0	0	0	0	995	2,984	CONT.	CONT.
TOTAL	24,271	23,168	46,733	51,417	40,721	32,629	17,208	18,402	CONT.	CONT.

1. FY 1994 and FY 1996 and beyond funding was transferred to the Army Joint Program office. Funding is contained in Program Element (PE) 0603806A, NBC Defense Systems, Advanced Development.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System

2. FY 1994 through FY 1995 funding is contained in PE 0603640M, Marine Corps Advanced Technology Demonstrations (ATDs), Project C2223, the consolidated Marine Corps ATDs project. FY 1996 funding is split between two PEs: $3,819 in this PE and $1,935 in Project C2223 under PE 0603640M. FY 1997 through FY 1998 funding is contained in this PE. FY 1999 through FY 2001 funding is contained in PE 0604719M, Marine Corps Command/Control/ Communications Systems, Project C2254, COBRA.

3. FY 1994 funding is contained in PE 0602131M, Marine Corps Landing Force Technology. FY 1995 through FY 1998 funding is contained in PE 0603640M, Project C2223. FY 1999 through FY 2001 funding is split between two PEs: $2,500, $2,000, and $2,000 (FY 1998 - FY 2001 respectively) in PE 0603640M, Project C2223 and $995, $995, and $2,984 (FY 1998 - FY 2001 respectively) in this PE.

4. FY 1994 through FY 2000 funding is contained in PE 0603640M, Project C2223. FY 2001 funding is contained in the PE.

5. FY 1994 through FY 1996 funding is contained in PE 0603640M, Project C2223. FY 1997 funding is split between two PEs: $995 in this PE and $1,000 in PE 0603640M, Project C2223. FY 1998 funding is contained in this PE. FY 1999 through FY 2001 funding is contained in PE 0604657M, Marine Corps Ground Combat/Supporting Arms Systems, Project C2253, TTES.

6. FY 1994 through FY 1995 funding is contained in PE 0602131M. FY 1996 through FY 1999 funding is contained in PE 0603640M, Project C2223. FY 2000 through FY 2001 funding is split between two PEs: $3,000 and $3,000 (FY 2000 - FY 2001 respectively) in PE 0603640M, Project C2223 and $995 and $2,984 (FY 2000 - FY 2001 respectively) in this PE.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE supports the advanced development of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air-Ground Expeditionary Force amphibious operations.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1964 Joint Anti-Armor Weapons System (JAAWS)/Javelin	376	171	498	498	498	498	498	498	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($169) Monitored the joint development.
- (U) ($102) Participated in the joint developmental testing.
- (U) ($0) Underwent Defense Acquisition Board (DAB) review for Low Rate Initial Production (LRIP).
- (U) ($0) Briefed Navy Weapon Safety Explosive Safety Review Board.
- (U) ($25) Participated in joint development of pre-planned product improvement (P3I) program for new warhead.
- (U) ($80) Developed Marine Corps supportability plan and Milestone III documentation.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

2. (U) FY 1995 PLAN:

- (U) ($23) Continue to monitor the joint program to include the Army's cost savings program.
- (U) ($10) Continue to participate in the joint program to include developmental testing pre-planned improvement program.
- (U) ($0) Continue to monitor and participate in joint program to include LRIP and follow-on testing.
- (U) ($130) Conduct safety engineering support, testing, technical support in fuzing warheads, and other Javelin Program support initiatives.
- (U) ($8) Continue to participate in the joint program to include the area of Logistics Management.

3. (U) FY 1996 PLAN:

- (U) ($198) Monitor and participate in Production Qualification Test (PQT).
- (U) ($65) Monitor and participate in joint development, test and integration of P3I program to include new warhead technology.
- (U) ($190) Monitor and participate in product improvement of Javelin training devices.
- (U) ($45) Update Milestone III documentation and prepare Marine Corps Acquisition Decision Memorandum documentation.

4. (U) FY 1997 PLAN:

- (U) ($198) Continue to monitor and participate in PQT.
- (U) ($175) Continue to monitor and participate in P3I program.
- (U) ($125) Participate in development and integration of software upgrades.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	436	210	N/A	N/A
(U) FY 1995 Appropriated:	N/A	210	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	-60	-39	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	376	171	498	498

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The FY 1994 decrease of $60 limited the Marine Corps' monitoring of joint development and participation in joint developmental testing. FY 1995 funding was decreased by a total of $39 for the following undistributed Congressional reductions: Consulting Services and Small Business Innovative Research. These reductions will effect the level of effort that the Marine Corps places into the monitoring of the improved warhead program development by limiting involvement in system and critical design reviews. Although this decrease will effect Marine Corps participation in the program, it will have little significant effect on the overall Javelin program.

(U) Schedule: The Army, which has the lead in this joint project, reduced quantities by 50% during the first quarter of FY 1994. This realignment resulted in the Marine Corps receiving quantities later then initially scheduled; which caused the program to be restructured. This caused Milestone III to move to April 1996 (allowing for 2 LRIPs). Subsequently, the DAB review in June 1994 directed that there be 3 LRIPs, which moved Milestone III to May 1997 and caused a one year delay in Full Rate Production (FRP). These adjustments did not affect the Marine Corps' IOC, which remains scheduled for FY 1999.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC LINE 30 (BLI # 301100) Javelin	0	0	0	22,670	35,659	87,876	86,243	71,444	CONT.	CONT.

(U) RELATED RDT&E:

(U) PE 0604611A (Army Armor/Anti Armor Programs for Heavy and Light Systems), Project D4999

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	DAB PROGRAM REVIEW			3Q MS III	IOC FY 99
Engineering Milestones				SOFTWARE UPGRADES	
T&E Milestones	JOINT DT	JOINT LIVEFIRE PQT			
Contract Milestones	LRIP			FRP	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems
PROJECT NUMBER: C1964
PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Program Management Support	80	0	120	100
b. Government Engineering Support	256	130	313	313
c. Travel	40	41	65	85
Total	376	171	498	498

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems
PROJECT NUMBER: C1964
PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Joint Venture/Army CPIF *Army Funding Only		JUN 89	*744,000	744,000	666,000	47,000	31,000	0	0	0	744,000
Support and Management											
NSWC, Dahlgren, VA	Various	Various			10,333	253	122	290	290	CONT.	CONT.
NSWC, Crane, IN	Various	Various			1,021	25	12	29	29	CONT.	CONT.
MCLB, Albany, GA	Various	Various			6,453	98	37	179	179	CONT.	CONT.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Supporting Arms Systems PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons System (JAAWS)/Javelin

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development (No Marine Corps Funding)	0	0	0	0	0	0	0
Subtotal Support and Management	17,807	376	171	498	498	CONT.	CONT.
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	17,807	376	171	498	498	CONT.	CONT.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2112 Lightweight 155mm Howitzer (LW155)	0	6,361	10,881	11,543	31,301	31,136	14,720	9,946	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Lightweight 155 millimeter (mm) Howitzer is the replacement for the aging, operationally deficient M198 155mm Howitzer for both the Marine Corps and the Army. The LW155 will weigh 9,000 pounds, (approximately one-half the weight of its predecessor) and will offer significant strategic and tactical mobility improvements. The LW155 program is a cooperative effort and rapidly approaching joint program status. The Joint Operational Requirements Document (JORD) will be validated and approved by the third quarter of FY 1995.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: $6,550 of the following efforts were funded with FY 1993 Congressionally provided dollars; however, funding was not made available until FY 1994. The additional $280 was provided to further fund prototype testing and evaluation.

   - (U) ($5,580) Initiated industry studies and prototype testing and evaluations.
   - (U) ($250) Initiated joint services (Marine Corps/Army) operational employment assessment harmonization.
   - (U) ($1,000) Initiated M198 product improvement assessment.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

2. (U) FY 1995 PLAN:

- (U) ($4,311) Continue prototype and non-developmental item evaluation.
- (U) ($250) Complete requirement development. Validate/approve the JORD.
- (U) ($1,300) Develop detailed test plan for source selection to conduct Engineering and Manufacturing Development (EMD) phase.
- (U) ($500) Complete program documentation to support the Milestone I/II decision.

3. (U) FY 1996 PLAN:

- (U) ($1,099) Conduct component technology and prototype evaluation/testing.
- (U) ($8,399) Conduct system development.
- (U) ($1,383) Provide government in-house support and management.

4. (U) FY 1997 PLAN:

- (U) ($7,388) Conduct manufacturing planning utilizing in-house government support.
- (U) ($4,155) Provide prototype development for test article manufacturing.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	0	N/A	N/A
(U) FY 1995 Appropriated	N/A	6,500	N/A	N/A
(U) Adjustments from PRESBUDG:	0	-139	N/A	N/A
(U) FY 1996/97 PRESBUDG Budget Submit:	0	6,361	10,881	11,543

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Congress appropriated a total of $13,100 in FY 1993 funds and funding was decreased to $12,436 due to the following undistributed Congressional reductions: 3% program tax, Small Business Innovative Research (SBIR), Travel, and inflation adjustments. Due to the lack of a JORD between the Army and Marine Corps, the money was put on OSD withhold. The Army and Marine Corps later signed a Memorandum of Agreement and Congress released 50% ($6,550) of the $13,100 to pursue LW155 efforts. This $6,550 was not released until March 1994. An additional $280, of FY 1993 money, was provided to fund prototype testing and evaluation. The remaining FY 1993 funding ($5,886) was rescinded. FY 1995 funding was decreased by a total of $139 for the following undistributed Congressional reductions: SBIR and University Research. In accordance with Congressional interest, evidenced by the $6,500 increase in FY 1995, FY 1996 and beyond funding was budgeted for this program. This program has since been restructured to fully comply with Department of Defense acquisition guidelines.

(U) Schedule: This program is pursuing joint program status with the Army. The approved JORD is scheduled to be published in the fourth quarter of FY 1995 and FY 1995 funding ($6,361) is on hold pending the JORD signature. Because of the existence of industrially funded weapon system prototypes, the unique opportunity exists to dramatically reduce unnecessary development and to expeditiously field the howitzer to the Fleet Marine Force. With full funding commencing in FY 1996, a combined Milestone I/II is scheduled for FY 1996 followed by manufacturing planning and test article manufacturing during FY 1997 through FY 1998. Milestone III is planned for the first quarter of FY 2000.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2112
PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC (BLI# 218500) LW155	0	0	0	0	0	0	148,645	151,658	CONT.	CONT.

(U) RELATED RDT&E: PE 0603004A (Weapons and Munitions Advanced Development)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones			1Q MS I/II		1Q FY 00 MS III
Engineering Milestones					FY 98/99 PDR/CDR FY 99 PRR
T&E Milestones			3Q DT/OT I		3Q FY 99 IOT&E
Contract Milestones			EMD	FY 97/98 TEST ARTICLE MANUFACTURING	

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2112
PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	0	0	8,399	7,450
b. Development Test and Evaluation	0	4,641	839	250
c. Operational Test and Evaluation	0	0	204	0
d. Government Engineering Support	0	1,200	204	1,445
e. Program Management Support	0	500	880	1,938
f. Travel	0	20	20	50
g. Miscellaneous	0	0	335	410
Total	0	6,361	10,881	11,543

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
TBD	C/FPIF	MAY 96	TBD	69,600	0	0	0	8,399	7,450	CONT.	CONT.
Support and Management											
ARDEC, Picatinny, NJ	MIPR	OCT 96/97			3,000	0	1,720	959	2,398	CONT.	CONT.
AMCCOM, Rock Island, IL	MIPR	OCT 96/97			0	0	0	145	1,445	CONT.	CONT.
Test and Evaluation											
ARL, Aberdeen, MD		APR 94			3,830	0	4,641	1,099	0	CONT.	CONT.
TBD		APR 96/97			0	0	0	279	250	CONT.	CONT.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2112 PROJECT TITLE: Lightweight 155 millimeter Howitzer (LW155)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	8,399	7,450	CONT.	CONT.
Subtotal Support and Management	3,000	0	1,720	1,104	3,843	CONT.	CONT.
Subtotal Test and Evaluation	3,830	0	4,641	1,378	250	CONT.	CONT.
Total Project	6,830	0	6,361	10,881	11,543	CONT.	CONT.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2113 Short Range Anti-Armor Weapon (SRAW)/PREDATOR	23,895	14,041	31,535	33,408	4,545	0	0	0	0	121,887

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: SRAW/Predator 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. Modularity of the system will allow development of optimal warheads (flame, bunker-busting, multi-purpose) to fit on the flight module.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,102) Achieved Milestone II.
- (U) ($22,093) Initiated Engineering and Manufacturing Development (EMD).
- (U) ($700) Conducted Preliminary Design Review.
- (U) ($0) Continued actions to develop a joint program with the Army Multi-purpose Individual Munition (MPIM) warhead program.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

2. (U) FY 1995 PLAN:

- (U) ($14,041) Continue EMD phase of program.

3. (U) FY 1996 PLAN:

- (U) ($24,535) Continue EMD phase of program and conduct Critical Design Review.
- (U) ($3,500) Continue developmental testing.
- (U) ($3,500) Build test models.

4. (U) FY 1997 PLAN:

- (U) ($28,008) Complete EMD phase of program.
- (U) ($2,700) Begin operational testing.
- (U) ($2,700) Continue developmental testing.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	20,802	8,420	N/A	N/A
(U) FY 1995 Appropriated:	N/A	14,420	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	+3,093	-379	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	23,895	14,041	31,535	33,408

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 funding was increased by $3,093 to provide additional funding in support of the EMD start-up. Funding provides for materials, subcontracting support, as well as primary hardware support. Congress appropriated an additional $6,000 in FY 1995 funds. These funds will be used to continue the EMD by providing materials, subcontracting support, as well as primary hardware/product development support. FY 1995 funding was then decreased by a total of $379 for the following undistributed Congressional reductions: Consulting Services, Small Business Innovative Research, University Research, and Travel.

The funding profile reflected in the FY 1995 President's Budget provided for a 54 month EMD with minimal developmental efforts occurring in FY 1995 due to departmental funding constraints. However, Congress directed an acceleration of the program and appropriated the additional $6,000 in FY 1995.

FY 1994 Congressional language directed the Marine Corps to proceed with a three year (36 month) EMD and to integrate the Army MPIM warhead with its own SRAW missile flight module. The substantial funding increases of FY 1996 and FY 1997 are in adherence of this Congressional direction; however, the most efficient period under approved funding profile resulted in a 42 month EMD program.

(U) Schedule: See explanation provided in the "Funding" section.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PMC LINE 19 (BLI # 147100) (SRAW only)	0	0	0	0	0	48,448	88,620	66,354	CONT.	CONT.

(U) RELATED RDT&E: PE 0603313A (Missile and Rocket Advanced Technology)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	3Q MS II				1Q FY 98 MS III
Engineering Milestones	PDR		CDR		
T&E Milestones			DT I	OT I/II DT II	
Contract Milestones	EMD AWARD				

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	**6,750**	**1,814**	**3,269**	**276**
Airframe and Launcher	2,100	700	1,400	156
Electronics	2,300	700	1,600	120
Propulsion and Ordnance	1,950	400	269	0
System Integration	400	14	0	0
b. Materials and Subcontracting	**10,693**	**7,821**	**7,786**	**8,364**
c. Test Evaluation and Equipment	**920**	**600**	**4,020**	**4,800**
Support Equipment	400	440	800	455
Development Tests	520	160	0	0
Qualification Tests	0	0	3,220	3,776
Government Support	0	0	0	569
d. Production Support	**650**	**250**	**6,670**	**7,022**
Engineering Support	50	50	120	100
First Article Inspection and Test	0	0	2,410	2,737
Manufacturing and Process Engineering	600	200	4,140	4,185
e. Program Support	**1,510**	**220**	**2,850**	**3,035**
Quality Assurance	70	70	1,150	1,126
Procurement	1,220	60	960	902
Integrated Logistics Support	220	90	740	1,007
f. System Engineering	**740**	**150**	**1,100**	**1,297**
g. Project/Technical Management	**1,490**	**186**	**2,340**	**2,342**
h. Program Manager/In-house	**1,142**	**3,000**	**3,500**	**3,572**
i. Operational Testing	**0**	**0**	**0**	**2,700**
Total	**23,895**	**14,041**	**31,535**	**33,408**

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development: Basic Technology Initiative (BTI) funded the prime contract/contractor (LORAL) through FY 1992.											
LORAL, Newport Beach, CA	SS/CPFF	3 FEB 89	37,811	37,811	37,811	0	0	0	0	0	37,811
LORAL, Newport Beach, CA	SS/CRFF	2 JUN 94	96,622	96,622	0	23,666	11,398	28,895	30,748	1,915	96,622
Support and Management NSWC, Dahlgren, VA					6,595	125	2,500	2,500	2,500	2,500	16,720
Miscellaneous					507	104	143	140	160	130	1,184

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Armor Weapon (SRAW)/PREDATOR

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	37,811	23,666	11,398	28,895	30,748	1,915	134,433
Subtotal Support and Management	7,102	229	2,643	2,640	2,660	2,630	17,904
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	*44,913	23,895	14,041	31,535	33,408	4,545	152,337

* FY 1992 and prior efforts were provided by Balanced Technology Initiative funding in the amount of $30,450. The Marine Corps program began in FY 1992 and FY 1992 through FY 1993 funding totalled $14,463. Therefore, the total Marine Corps program is $121,887.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2247 Coastal Battlefield Reconnaissance and Analysis (COBRA)	0	0	3,819	4,973	3,382	0	0	0	0	12,174

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This system develops reconnaissance capabilities for Marine Corps amphibious operations and Army/Marine Corps land operations. Requirements are real-time high speed day/night reconnaissance operations for the detection of mines, minefields, and obstacles at standoff ranges. This program also develops sensors such as passive multi-spectral optical cameras, and infrared cameras, as well as advanced image processing algorithms. The program will be joint between the Marine Corps and the Army. COBRA will conduct far-field multi-spectral/passive sensing at high area coverage rates operating from a short range Unmanned Aerial Vehicle (UAV). It will provide real-time downlink, operator display, and a computer assisted automatic target recognition capability to support operational maneuver and survivability of the Landing Forces.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: FY 1994 funding ($3,266) is contained in PE 060340M, Marine Corps Advanced Technology Demonstrations (ATD), Project C2223, the consolidated Marine Corps ATD project.

2. (U) FY 1995 PLAN: FY 1995 funding ($1,975) was contained in PE 0603640M, Project C2223.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2247 PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

3. (U) FY 1996 PLAN: FY 1996 efforts are funded in two PEs: $1,935 is funded in PE 0603640M, Project C2223 and $3,819 is funded in this PE.

- (U) ($930) Initiate COBRA Advanced Development Model (ADM) system design/integration contract solicitation. Prepare Milestone I (MS I) documentation.
- (U) ($925) Award Demonstration/Validation (DEM/VAL) contract. Write Level-A performance specification.
- (U) ($850) Initiate Developmental Test I (DT I) planning for full system including flight tests on short range UAV.
- (U) ($1,114) Initiate development of infrared capability within multi-spectral sensor. Initiate system design effort.

4. (U) FY 1997 PLAN:

- (U) ($1,200) Prepare DT I test plans and initiate DT I. Redesign the system as required.
- (U) ($1,100) Draft Operational Test I (OT I) Test Plan. Design enhanced Phase I sensor, ground-based operator's display, and automatic target recognition algorithm for scattered mines.
- (U) ($1,500) Conduct sensor trade-off study. Fabricate and conduct sensor sub-component check-out/testing. Design sensor/UAV integration interfaces.
- (U) ($1,173) Initiate system component fabrication and flight test on Pioneer/Hunter. Conduct OT I.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2247
PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	0	N/A	N/A
(U) FY 1995 Appropriated:	N/A	0	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	0	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	0	0	3,819	4,973

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: As program uses became apparent, funding was continued in this program, transitioning from Advanced Technology Demonstrations Program Element 0603640M. A funding profile as well as feasible program schedule were then developed.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2247
PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestone			MS I		MS II
Engineering Milestones			ADM SYSTEM DESIGN/ INTEGRATION	DESIGN ENHANCEMENT	
T&E Milestones				DT I OT I	
Contract Milestones			AWARD DEM/VAL CONTRACT		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2247
PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Design/Integration/ Development	0	0	2,044	750
b. Component Fabrication	0	0	925	1,336
c. Developmental Testing/ Operational Testing	0	0	850	2,887
Total	0	0	3,819	4,973

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2247
PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development	TBD	TBD	TBD	0	0	0	0	2,670	3,393	0	6,063
Support and Management	TBD	TBD	TBD	0	0	0	0	384	500	340	1,224
Test and Evaluation	TBD	TBD	TBD	0	0	0	0	765	1,080	3,042	4,887

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System
PROJECT NUMBER: C2247
PROJECT TITLE: Coastal Battlefield Reconnaissance and Analysis (COBRA)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	2,670	3,393	0	6,063
Subtotal Support and Management	0	0	0	384	500	340	1,224
Subtotal Test and Evaluation	0	0	0	765	1,080	3,042	4,887
Total Project	0	0	0	3,819	4,973	3,382	12,174

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603635M
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2250 Team Target Engagement Simulator (TTES)	0	0	0	995	995	0	0	0	0	1,990

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The purpose of this project is to complete the advanced development of a revolutionary next generation training device for individual and small unit close combat training employing advanced modeling and simulation technology. Trainees will be emersed in virtual environments where they will conduct force-on-force engagements against computer generated hostiles on synthetic battlefields that can be populated with neutrals. The technology will be ruggedized for use in expeditionary and shipboard settings.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: FY 1994 funding ($1,714) is contained in PE 060340M, Marine Corps Advanced Technology Demonstrations (ATD), Project C2223, the consolidated Marine Corps ATD project.

2. (U) FY 1995 PLAN: FY 1995 funding ($2,000) is contained in PE 060340M, Project C2223.

3. (U) FY 1996 PLAN: FY 1996 funding ($1,000) is contained in PE 060340M, Project C2223.

4. (U) FY 1997 PLAN: FY 1997 efforts are funded in two PEs: $1,000 is funded in PE 0603640M, Project C2223 and $995 is funded in this PE.

- (U) ($995) Build Advanced Developmental Model that meets the criteria for expeditionary operations and the employment of all infantry weapons in the conduct of realistic tactical operations in a synthetic environment.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2250 PROJECT TITLE: Team Target Engagement Simulator (TTES)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	0	N/A	N/A
(U) FY 1995 Appropriated:	N/A	0	N/A	N/A
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	0	N/A	N/A
(U) FY 1996/97 PRESBUDG Submit:	0	0	0	995

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: The potential benefits of this program were not realized during the FY 1994 budget cycle. As program uses became apparent, funding was continued in this program, transitioning from Advanced Technology Demonstrations Program Element 0603640M. A funding profile as well as feasible program schedule were then developed.

(U) Schedule: See explanation provided in the "Funding" section.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2250 PROJECT TITLE: Team Target Engagement Simulator (TTES)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones					
Engineering Milestones				BUILD ADM	
T&E Milestones					DT I/OT I
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2250 PROJECT TITLE: Team Target Engagement Simulator (TTES)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Program Development	0	0	0	995

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
	TBD	TBD	TBD	0	0	0	0	0	995	0	995
Support and Management											
Test and Evaluation											
	TBD	TBD	TBD	0	0	0	0	0	0	995	995

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603635M PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/ Support Arms System PROJECT NUMBER: C2250 PROJECT TITLE: Team Target Engagement Simulator (TTES)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	0	995	0	995
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	995	995
Total Project	0	0	0	0	995	995	1,990

C. (U) FUNDING PROFILE: Not applicable.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0377 Joint Service Explosive Ordnance Disposal System										
	6,322	5,851	4,803	4,653	5,290	6,469	6,521	6,716	CONT.	CONT.
Q1317 Explosive Ordnance Disposal Diving Systems										
	2,659	2,511	2,495	2,367	2,395	2,790	2,806	2,887	CONT.	CONT.
TOTAL	8,981	8,362	7,298	7,020	7,685	9,259	9,327	9,603	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This is a Joint Service Program. This program provides for the development of Explosive 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.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q0377 Joint Service Explosive Ordnance Disposal System	6,322	5,851	4,803	4,653	5,290	6,469	6,521	6,716	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides Explosive Ordnance 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.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($732) Completed Technical Evaluation (TECHEVAL) for EX 50 Mod 0 Remote Controlled Reconnaissance Monitor (RECORM).
- (U) ($2,230) Completed subsystem integration on the Remote Ordnance Neutralization System (RONS).
- (U) ($2,500) Completed Development Testing (DT)-I testing on Mobile Ordnance Disruption System (MODS).
- (U) ($860) Initiated Lightweight Disposable Disrupter (LIDD) project.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q0377
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

2. (U) FY 1995 PLAN:

- (U) ($3,801) Obtain Milestone II decision for the RONS and MODS projects.
- (U) ($900) Initiate DT-I testing on LIDD project.
- (U) ($950) Initiate Recoilless Dearmer, formerly Explosively Actuated Tools, and Advanced Radiographic System (ARS) projects.
- (U) ($200) Obtain Milestone III decision for RECORM.

3. (U) FY 1996 PLAN:

- (U) ($800) Initiate Maincharge Disrputer, formerly Remote Firing Device.
- (U) ($1,000) Complete critical design review on MODS project.
- (U) ($1,128) Continue development on RONS project.
- (U) ($1,875) Obtain Milestone II Decision for LIDD, ARS, and Recoilless Dearmer projects.

4. (U) FY 1997 PLAN:

- (U) ($2,153) Complete DT-IIA on RONS project.
- (U) ($1,600) Complete TECHEVAL on MODS project.
- (U) ($900) Obtain Milestone III decision for ARS and Recoilless Dearmer projects.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	6,322	6,320	XXX	XXX
(U) FY 1995 Appropriated:	XXX	6,320	XXX	XXX
(U) Adjustments from Approp/FY95 PRESBUDG:	0	-469	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	6,322	5,851	4,803	4,653

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY95 - (-157) Work year utilization, (-95) Civilian Pricing, (-10) Univeristy Research, (-127) Contract Support Services reduction, (-8) Travel, (-72) SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 550900 (portion)	0	0	0	0	0	1,200	1,200	1,800	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

(U) RELATED RDT&E:

(U) PE 0602315N (MCM, Mining & Special Warfare Technology) Provides for the development of new technologies which show promise and the transition to advanced development.
(U) 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.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		1Q RECORM MS III 2Q RONS, MODS MS II	2Q ARS MS II 3Q LIDD MS II	4Q ARS MS III	CONT.
Engineering Milestones		4Q RONS CDR	4Q MODS CDR		CONT.
T&E Milestones	4Q RECORM TECHEVAL 4Q MODS DT-IA	4Q LIDD DT-I		3Q RONS DT-IIA 4Q MODS TECHEVAL	CONT.
Contract Milestones		3Q MODS EMD			CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT NUMBER: Q0377 PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	2,530	2,291	2,157	1,828
b. Software Development	250	200	200	0
c. ILS	1,000	950	800	950
d. Reliability & Maintainability	100	125	125	100
e. Developmental T&E	1,000	780	418	1,000
f. Operational T&E	100	30	0	0
g. Program Management Support	440	425	425	375
h. Program Management Personnel	150	150	150	125
i. Miscellaneous	752	900	528	275
Total	6,322	5,851	4,803	4,653

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q0377
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Joint Service Explosive Ordnance Disposal System

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVEODTECHDIV	ALLOT	Various	CONT.	CONT.	147,164	4,182	3,166	2,411	2,578	CONT.	CONT.
DOE	MIPR	Various	10,413	10,413	2,600	500	1,113	1,100	1,000	4,100	10,413
Eglin AFB	MIPR	Various	6,914	6,914	2,400	1,200	1,147	867	700	600	6,914
Support and Management											
Dynamic Systems	CPFF	1/93	2,027	2,027	362	440	425	425	375	0	2,027

Test and Evaluation Not applicable.

GOVERNMENT FURNISHED PROPERTY

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development	Not applicable.									
Support and Management	Not applicable.									
Test and Evaluation	Not applicable.									

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q0377
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance PROJECT TITLE: Joint Service Explosive

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	152,164	5,882	5,426	4,378	4,278	CONT.	CONT.
Subtotal Support and Management	362	440	425	425	375	0	2,027
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	152,526	6,322	5,851	4,803	4,653	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603654N
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Q1317 Explosive Ordnance Disposal Diving Systems	2,659	2,511	2,495	2,367	2,395	2,790	2,806	2,887	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Provides for 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 of sea mines and other underwater ordnance.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,880) Developed equipment which improves diver capability and endurance.
- (U) ($209) Developed a non-magnetic underwater lift system (LS).
- (U) ($173) Evaluated non-magnetic acoustic firing devices (AFD).
- (U) ($397) Continued Technical Evaluation (TECHEVAL) of the MK 98 Neutralization Charge.

2. (U) FY 1995 PLAN:

- (U) ($1,337) Continue developing equipment which improves diver capability and endurance.
- (U) ($449) Continue developing a non-magnetic underwater lift system.
- (U) ($725) Continue developing a non-magnetic acoustic firing device.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

3. (U) FY 1996 PLAN:

- (U) ($1,430) Continue developing equipment which improves diver capability and endurance.
- (U) ($550) Continue developing a non-magnetic underwater lift system.
- (U) ($515) Continue developing a non-magnetic acoustic firing device.

4. (U) FY 1997 PLAN:

- (U) ($1,028) Continue developing equipment which improves diver capability and endurance.
- (U) ($565) Continue developing a non-magnetic acoustic firing device.
- (U) ($774) Develop non-magnetic underwater equipment to detect objects in the water column.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,659	2,603	XXX	XXX
(U) Adjustments from PRESBUDG:	XXX	2,603	XXX	XXX
(U) Adjustments from Approp/FY95 PRESBUDG:	0	-92	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	2,659	2,511	2,495	2,367

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY95 - (-4) Univeristy Research, (-63) Contract Support Services reduction, (-3) Travel, (-22) SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN Line 114000 (portion)	1,196	2,052	1,117	2,937	2,999	4,491	4,351	4,496	CONT.	CONT.

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q MK 98 MS III 2Q AFD MS 0	4Q LS MS III	3Q AFD MS II	CONT.
Engineering Milestones			1Q AFD PDR		CONT.
T&E Milestones	3/4Q MK 98 DT II	2Q MK 98 DT II 2Q LS DT II	4Q AFD DT I 2Q LS OT II		CONT.
Contract Milestones					CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603654N PROJECT NUMBER: Q1317
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development PROJECT TITLE: Explosive Ordnance Disposal Diving Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	253	150	203	200
b. Software Development	80	40	0	0
c. Systems Engineering	915	568	575	346
d. ILS	341	596	298	387
e. Developmental Test & Evaluation	404	357	604	348
f. Operational Test & Evaluation	40	65	133	387
g. Program Management Personnel	323	320	324	334
h. Program Management Support	213	250	250	250
I. Miscellaneous	90	165	108	115
Total	2,659	2,511	2,495	2,367

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603711N
PROGRAM ELEMENT TITLE: Fleet Tactical Development

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0138 Tactical Development Support	4,464	4,573	4,268	3,505	3,541	4,351	4,386	4,518	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element funds the Navy's capability to automate, support, and improve collecting of fleet/joint/combined operational data, and reconstructing, analyzing, and providing feedback for exercises and operations. Fleet Command and Battle Group/Joint Tasks Group flag ships and ashore commands utilize the Shipboard Tactical Information Management System (STIMS) to assess and improve tactics, training, and operational readiness.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:
   - (U) ($1,411) Provided assessment support for Intermediate and Advanced Phase Training (ITA, COMPTUEX, FLEETEX) for six CV/CVN Battle Groups.
   - (U) ($594) Provided assessment support and STIMS training to forward deployed Battle Group staffs for seven Battle Groups. This included support to the joint tactical information distribution system operation and evaluation for the first LINK-16 Battle Group (USS CARL VINSON).
   - (U) ($965) Provided ashore and afloat reconstruction and assessment support for four of five Joint CINCLANTFLT/CINCPACFLT operations (Tandem Thrust, Team Spirit, ANNUALEX, RIMPAC, Solid Stance) and CINCUSNAVEUR combined and bi-lateral exercises (Display Determination, Distant Thunder, Dragon Hammer, Dynamic Guard) and real world operations (Provide Promise and Adriatic No Fly Zone). Supported a special project for the Joint Service Environment Group's post-Desert Storm analysis.
   - (U) ($1,494) Converted STIMS Display and Briefing module to MOTIF user interface. Ported this option of STIMS to

the TAC-3 computer. Developed fleet requested capabilities to integrate the Navy Tactical Information Compendium into STIMS, CPA data display graphically and in tabular form, parse AEGIS data obtained from the SMART system, dynamic track containment statistics and P-3C mission data obtained from the MARS system, Bearing and Range error list, land mass political boundaries/color fill/topography and ocean bottom depth contours.

2. (U) FY 1995 PLAN:
   - (U) ($1,446) Provide assessment support for Intermediate and Advanced Phase Training (ITA, COMPTUEX, FLEETEX) for six CV/CVN Battle Group/Joint Task Group.
   - (U) ($609) Provide assessment support and STIMS training to forward deployed Battle Group staffs for six CV/CVN Battle Groups.
   - (U) ($988) Provide reconstruction and assessment support for four CINCLANTFLT/CINCPACFLT Joint operations (Tandem Thrust, Team Spirit, Solid Stance, and Ocean Venture) and CINCUSNAVEUR Combined and bi-lateral exercises (Display Determination, Distant Thunder, Dragon Hammer, and Dynamic Guard, and real world operations).
   - (U) ($1,530) Develop a real-time front end processor for STIMS. Enhance the STIMS interface and simplify processes to support use of STIMS by Fleet personnel while forward deployed. Enhancement of scenario generation capabilities, event/engagement summaries, and detection/engagement opportunity determination. Integrate STIMS system components, provide testing, quality control, and configuration management. Investigate data from existing and emerging tactical and command and control systems.

3. (U) FY 1996 PLAN:
   - (U) ($1,350) Provide assessment support for Intermediate and Advanced Phase Training (ITA, COMPTUEX, FLEETEX) for five CV/CVN Battle Group/Joint Task Group exercises.
   - (U) ($568) Provide assessment support and STIMS training to forward deployed Battle Group staffs for six CV/CVN Battle Groups.
   - (U) ($922) Provide reconstruction and assessment support for five CINCLANTFLT/CINCPACFLT Joint operations (RIMPAC, Tandem Thrust, Team Spirit, Solid Stance, and Ocean Venture) and CINCUSNAVEUR Combined and bi-lateral exercises (Display Determination, Distant Thunder, Dragon Hammer, and Dynamic Guard, and real world operations).
   - (U) ($1,428) Complete and test real-time front end processor for STIMS. Develop Quantitative Measures products to support COMSECONDFLT Senior Officer Observer Team initiatives. Convert the Battle Group assessment support capabilities not already converted to the MOTIF user interface. Enhance the user interface to make full use of X Windows/MOTIF features. Enhancement of scenario generation capabilities, event/engagement summaries, and detection/engagement opportunity determination. Integrate STIMS system components; provide testing, quality

control, and configuration management. Investigate data from existing and emerging tactical and command and control systems.

4. (U) FY 1997 PLAN:
   - (U) ($1,108) Provide assessment support for Intermediate and Advanced Phase Training (ITA, COMPTUEX, FLEETEX) for five CV/CVN Battle Group/Joint Task Group exercises.
   - (U) ($467) Provide assessment support and STIMS training to forward deployed Battle Group staffs for five CV/CVN Battle Groups.
   - (U) ($757) Provide reconstruction and assessment support for three CINCLANTFLT/CINCPACFLT Joint operations (Tandem Thrust, Team Spirit, Ocean Venture) and CINCUSNAVEUR Combined and bi-lateral exercises (Display Determinations, Distant Thunder, Dragon Hammer, and Dynamic Guard, and real world operations).
   - (U) ($1,173) Continue development of Quantitative Measures to support Fleet-wide Tactical Training Plan initiatives. Enhancement of event/engagement summaries. Provide testing, quality control, and configuration management. Investigate data from existing and emerging tactical and command and control systems.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	4,414	4,678	XXX	XXX
(U) FY 1995 Appropriated:	XXX	4,678	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	+50	-105	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	4,464	4,573	4,268	3,505

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: FY 1994 funding increase is due to end of year execution update (+50). FY 1995 funding reduction is due to congressional undistributed cuts for university research (-7), travel (-6), and assessment for Small Business Innovative Research (-92).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603711N PROJECT NUMBER: R0138
PROGRAM ELEMENT TITLE: Fleet Tactical Development PROJECT TITLE: Tactical Development Support

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0605155N (Fleet Tactical Development and Evaluation)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Intermediate and Advanced Training Assessment	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	CONT.
Deployed Battle Group Assessment	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	CONT.
Joint/Combined Operations Assessment	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	As scheduled by Fleet	CONT.
STIMS Development Release	Q2 Software Update Release	Q2 Software Update Release	Q2 Software Update Release	Q2 Software Update	CONT.
	Q4 Software Update Release	Q4 Software Update Release	Q4 Software Update Release	Q2 Software Update Release	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603711N PROJECT NUMBER: R0138
PROGRAM ELEMENT TITLE: Fleet Tactical Development PROJECT TITLE: Tactical Development Support

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Intermediate/Advanced Training Assessment	1,411	1,446	1,350	1,108
b. Deployed Battle Group Assessment	594	609	568	467
c. Joint/Combined Operations Assessment	965	988	922	757
d. STIMS Development	1,494	1,530	1,428	1,173
Total	4,464	4,573	4,268	3,505

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

C. (U) FUNDING PROFILE: Not applicable.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603713N
PROGRAM ELEMENT TITLE: Ocean Engineering Development

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0099 Deep Submergence Biomedical Development	5,872	5,722	5,166	5,267	5,032	6,138	6,188	6,373	CONT.	CONT.
S0394 Shallow Depth Diving Equipment	5,800	8,025	0	0	1,053	2,197	2,236	2,303	CONT.	CONT.
TOTAL	11,672	13,747	5,166	5,267	6,085	8,335	8,424	8,676	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 underwater operations.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603713N
PROGRAM ELEMENT TITLE: Ocean Engineering Development

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0099 Deep Submergence Biomedical Development	5,872	5,722	5,166	5,267	5,032	6,138	6,188	6,373	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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, 30 Jan 92.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($2,559) Extended current decompression models to include multiple gasses. Reported on lithium hydroxide effectiveness in disabled submarine scenarios, improved saturation abort tables in disabled submarine scenarios.
- (U) ($1,351) Validated cold water acclimation protocol, developed standard hand immersion tests and assessed cold water exercise in the modification of peripheral and central receptor integration.
- (U) ($1,962) Achieved consensus on tool noise methodology, established a testing program for SODASORB, conducted testing of candidate labs for Navy diver air sampling program, developed methods to determine susceptibility to and preventative strategies for oxygen toxicity in divers, identified the consequences of subclinical decompression sickness.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603713N PROJECT NUMBER: M0099
PROGRAM ELEMENT TITLE: Ocean Engineering Development PROJECT TITLE: Deep Submergence Biomedical Development

2. (U) FY 1995 PLAN:

- (U) ($2,735) Assess oxygen as a contributor to decompression risk. Provide accurate prediction of risk in diving strategies to decrease decompression time (100% breathing in water, surface decompression, multiple inert gas diving, and gas switching). Extend disabled submarine crew survival time.
- (U) ($1,376) Develop psychomotor tests to measure performance mission-specific scenarios.
- (U) ($1,611) Deliver diver hearing conservation program, develop a system to monitor health status of Navy divers, monitor air quality testing of divers' air, improve human performance during specific diving scenarios, develop recommendations on return to diving following decompression sickness injury, study analysis and control of contaminants in closed spaces.

3. (U) FY 1996 PLAN:

- (U) ($3,249) Develop strategies to accelerate decompression and manage decompression risk. Develop methods to detect susceptibility to central nervous system (CNS) decompression sickness and CNS oxygen toxicity, minimize decompression and oxygen toxicity for shallow water repetitive level diving, identify consequences of subclinical CNS decompression sickness, identify methods to prevent CNS oxygen toxicity, extend disabled submarine crew survival time.
- (U) ($1,211) Identify parameters that affect work performance in mission specific scenarios, characterize physiological parameters of underwater breathing apparatus.
- (U) ($706) Conduct longitudinal monitoring of health status of divers, study effects of diver hearing conservation program.

4. (U) FY 1997 PLAN:

- (U) ($3,369) Test strategies to accelerate decompression and manage decompression risk. Modification of individual susceptibility to CNS oxygen toxicity and CNS decompression sickness, extend capability during shallow water repetitive level diving, identify platform specific diving requirements, improve HeO2 "bounce dive"

capability, identify consequences of subclinical CNS decompression sickness, identify methods to prevent CNS oxygen toxicity, extend disabled submarine crew survival time.

- (U) ($1,139) Develop strategies to improve performance in mission specific scenarios, identify response to changes in diving conditions (e.g., water temperature, visibility, current).

- (U) ($759) Identify the long term effects of repeated exposure to high partial pressures of oxygen, continue longitudinal monitoring of health status of divers, develop improvements for the diver hearing conservation program.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	5,811	5,972	XXX	XXX
(U) FY 1995 Appropriated:	XXX	5,972	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	+61	-250	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	5,872	5,972	5,166	5,267

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 increased by end-of-year execution update of $61K. FY 1995 reduced by: PBD 701 University Research $210K, PBD 633 Travel $8K and 1995 SBIR $32K.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603713N PROJECT NUMBER: M0099
PROGRAM ELEMENT TITLE: OCEAN ENGINEERING DEVELOPMENT PROJECT TITLE: DEEP SUBMERGENCE BIOMEDICAL

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Indirect Cost	1,650	1,696	1,620	1,608
b. Personnel	1,729	1,776	1,597	1,708
c. Consultants	266	273	261	278
d. Equipment	133	106	81	88
e. Supplies	608	593	386	423
f. Animals	54	56	54	57
g. Travel	165	170	162	173
h. Contracts	577	343	349	210
i. Systems Engineer	468	481	459	490
j. Miscellaneous	222	228	197	232
Total	5,872	5,722	5,166	5,267

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) Not applicable.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0400 Ordnance Reclamation	1,252	0	1,131	1,401	1,160	1,833	1,851	1,901	CONT.	CONT.
S0401 Shipboard Waste Management	43,725	40,883	57,264	46,309	39,777	35,666	40,829	29,048	CONT.	CONT.
T2042 Plastic Substitution	144	144	0	0	0	0	0	0	147	1,056
W2210 Aviation Pollution Prevention	0	0	1,821	2,164	2,158	2,629	2,229	2,023	CONT.	CONT.
Y0817 Pollution Abatement Ashore	7,732	8,212	5,731	5,437	5,509	6,752	7,222	7,705	CONT.	CONT.
TOTAL	52,853	49,239	65,947	55,311	48,604	46,880	52,131	40,677	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 Environmental Protection Agency Executive Order 12088 of October 1978, The Act to Prevent Pollution from Ships, 1993 Amendment 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 (ODSs). Four major areas of effort are addressed: air conditioning and refrigeration, halons, chlorofluorocarbons (CFC) recovery/recycling and solvents.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) The technology developed will permit the Navy to reduce the generation of pollutants and 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 land based 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 and in participation in the development of the Tri-Service Environmental Quality Strategic Plan. International cooperation and information exchange is achieved with allied nations through direct liaison with NATO-sponsored international symposia.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0400 Ordnance Reclamation	1,252	0	1,131	1,401	1,160	1,833	1,851	1,901	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Ordnance Reclamation 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 will be developed.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($150) Pyro Dye Incinerator - NAVSURFWARCENDIV CRANE and NAVAIRWARCENWPNDIV CHINA LAKE completed testing of Control Air Incinerator (CAI) and continued the development of continuous monitoring equipment for heavy metals and toxic organics.
- (U) ($450) Metal Brazing Explosive - NAVSURFWARCENDIV CRANE completed bench scale qualification testing of Composition A-3/LX-14. Completed design and initiated procurement of the prototype manufacturing process.
- (U) ($300) Commercial Mining Explosive - NAVSURFWARCENDIV INDIAN HEAD continued testing of the pilot unit (100 lbs/day) on various types of explosives and propellants and field test at rock quarries/mines.
- (U) ($200) Explosive D Conversion/Pyro Reclaim - NAVSURFWARCENDIV CRANE initiated lab/bench scale studies for conversion of Explosive D to marketable products and recovery of ingredients from pyrotechnic flares.
- (U) ($152) RDX/HMX Recovery - NAVSURFWARCENDIV CRANE completed lab/bench scale research effort to recover RDX and HMX from explosives and propellants. Initiated design of pilot scale recovery process.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0400
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Ordnance Reclamation

2. (U) FY 1995 PLAN: Not applicable. FY95 funding was deleted by Congressional action.

3. (U) FY 1996 PLAN:

- (U) ($1,131) NAVSURFWARCENDIV CRANE will complete development of the Controlled Air Incinerator for projectile spotting dyes/pyrotechnic colored smokes and development of a prototype process for producing a commercial metal brazing explosive from Navy projectiles and warheads for implementation at a DoD Single Manager for Conventional Ammunition facility or at a contractor demilitarization facility.

4. (U) FY 1997 PLAN:

- (U) ($1,401) NAVSURFWARCENDIV CRANE will complete development of a prototype process for producing a commercial mining explosive from explosives generated from Navy bombs, torpedoes, warheads and mines for implementation at a Dod Single Manager for Conventional Ammunition facility or at a contractor demilitarization facility.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,252	1,290	XXX	XXX
(U) FY 1995 Appropriated:	XXX	0	XXX	XXX
(U) Adjustments from Appropriated/PRESBUDG:	0	0	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	1,252	0	1,131	1,401

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

PROJECT NUMBER: S0400
PROJECT TITLE: Ordnance Reclamation

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 95 funding was deleted by Congressional Action.

(U) Schedule: Items within the Ordnance Reclamation Project will slip 10-12 months, based upon above Congressional Action.

(U) Technical: No changes.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable

(U) RELATED RDT&E: Not applicable

D. (U) SCHEDULE PROFILE: Not applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection PROJECT NUMBER: S0400 PROJECT TITLE: Ordnance Reclamation

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Pyro Dye Incinerator	150	0	100	100
b. Metal Brazing Explosive	450	0	426	400
c. Commercial Mining Explosive	300	0	300	400
d. Explosive D Conversion	200	0	100	145
e. RDX/HMX Recovery	148	0	150	160
f. Gun Propellant Reuse	0	0	50	55
g. Pyrotechnic Reclaim/Reuse	0	0	0	135
b. Travel	4	0	5	6
Total	1,252	0	1,131	1,401

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0401 Shipboard Waste Management	43,725	40,883	57,264	46,309	39,777	35,666	40,829	29,048	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Project develops equipments and procedures for managing shipboard waste. Emphasis is on developing shipboard systems to enable compliance with national, state, and international regulations and on achieving an affordable pollution-free profile for future ships. This program also develops conservation technologies and ozone-safe replacement chemical technologies for Navy solvents and shipboard refrigeration and firefighting systems.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($20,836) Ozone Depleting Substances - Completed development of backfit modifications for shipboard CFC-12 air conditioning systems. Continued development of backfit modifications for shipboard CFC-12 refrigeration systems. Continued development of non-chlorofluorocarbon (CFC) alternative and backfit modifications for shipboard CFC-114 air conditioning systems. Completed fabrication of future fleet non-CFC 125-ton twin screw air conditioning plant prototype. Initiated design of future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant. Completed report on non-vapor compression cooling technologies. Continued investigation of substitute substances for Halon fire fighting systems on aircraft and ships. Continued development of alternative firefighting agent delivery systems. Continued development of alternative solvents and processes for Ozone Depleting Substance (ODS) solvents.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

- (U) ($16,900) Solid Wastes (SW) - Completed design and fabrication of Plastics Processor (PP) installed shipboard and commenced Technical Evaluation (TECHEVAL) and Operational Evaluation (OPEVAL). Completed design and fabrication of Large Pulper (LP), Small Pulper (SP) and Solid Waste Shredder (SWS) installed shipboard and initiated Technical and Operational Evaluations. Initiated studies supporting FY 1996 Report to Congress on plan to comply with special area provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex V.

- (U) ($4,259) Liquid Waste Streams - Initiated development and testing of Breadboard (BB) secondary ultrafiltration membrane oily waste treatment system and initiated testing. Completed Small Boat Oil Water Separator program. Continued investigation of Shipboard Compensated Fuel Ballast System (SCFBS). Continued development and testing of graywater/blackwater treatment system and low-flow water minimization devices. Continued development of shipboard sewage Control and Holding Tank (CHT) system upgrades. Initiated development and test of breadboard graywater membrane treatment system.

- (U) ($1,730) Other Major Ship Wastes - Continued shipboard Hazardous Waste substitution and elimination task. Continued development of Recovered Oil Logistic system. Conducted field tests of Laser Detection and Sampling System.

2. (U) FY 1995 PLAN:

- (U) ($23,877) Ozone Depleting Substances - Complete development of backfit modifications for shipboard CFC-12 refrigeration systems. Select non-chlorofluorocarbon alternative refrigerant to CFC-114 for fleet implementation and continue development of backfit modifications for surface ship CFC-114 air conditioning systems. Complete manufacturer's qualification of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant prototype. Complete design and begin prototype fabrication of future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant. Continue investigation of substitute substances for Halon fire fighting systems on aircraft and ships. Continue development of alternative fire fighting agent delivery systems. Complete development of alternative solvents and processes for all ozone depleting substance solvents, except oxygen systems cleaning applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

- (U) ($7,800) Solid Wastes - Continue studies in support of Report to Congress to comply with special area provisions of MARPOL, Annex V. Complete Operational Evaluations and obtain Approval for Full Rate Production (AFRP) for the Plastics Processor, Small Pulper, Large Pulper and Solid Waste Shredder. Initiate investigation of Plasma Arc (PA) technology for solid waste. No funding has been budgeted for development of a shipboard zero discharge solid waste treatment system because no feasible system has been identified to date.

- (U) ($7,448) Liquid Waste Streams - Perform shipboard laboratory evaluations on over-arching liquid waste treatment concepts directed at future shipboard uniform discharge standards. Initiate evaluation of existing vortex incinerators to improve reliability and determine ability to handle other waste streams including concentrated oily wastes and graywater wastes. Continue test and evaluation of breadboard Graywater Treatment System (GWTS) and secondary Oily Waste Polishing Systems (OWPS). Continue investigation of shipboard compensated fuel ballast systems.

- (U) ($1,758) Other Major Ship Wastes - Continue shipboard Hazardous Waste substitution and elimination task. Continue development of Recovered Oil Logistics System. Commence development of Oil Spill Contingency Planning Program. Achieve Initial Operational Capability (IOC) of Laser Detection and Sampling System (LDSS).

3. (U) FY 1996 PLAN:

- (U) ($21,364) Ozone Depleting Substances - Convert first submarine CFC-12 refrigeration plant to HFC-134a for at-sea testing. Complete development of backfit modification kit for surface ship 125-ton CFC-114 air conditioning plant design. Continue development of backfit modifications for other surface ship CFC-114 air conditioning systems. Begin laboratory evaluation of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant prototype. Complete prototype fabrication and begin manufacturer's qualification of future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant. Complete development of alternative fire fighting agent delivery systems for new ship construction. Evaluate promising alternative fire fighting technologies from science and technology community. Complete development of alternative solvents and processes for oxygen systems cleaning applications.

- (U) ($25,280) Integrated Liquid Wastes - Continue development of shipboard over-arching liquid waste treatment system including the following: Initiate shipboard test and evaluation of a breadboard secondary oily waste polishing system and initiate development of advanced development model. Initiate shipboard test and evaluation of breadboard graywater treatment system and upgraded shipboard vortex incinerator system modified to process graywater and oily waste concentrate in addition to sewage. Initiate development of advanced development model graywater treatment system. Continue evaluation of low flow water minimization appliances, devices and marine sanitation devices. Initiate development of an advanced Oil Content Monitor (OCM). Design an Oil Water Separator (OWS) for shipboard compensated fuel ballast systems. Initiate development of improved bilge detergents.

- (U) ($3,000) Solid Wastes - Perform studies supporting FY 1996 Report to Congress on plan to comply with special area provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex V.

- (U) ($7,620) Other Major Ship Wastes - Continue shipboard Hazardous Waste substitution and elimination program. Initiate investigation, test and evaluation of non-asbestos substitute gaskets, packing and brake/clutch faces used in shipboard machinery. Initiate laboratory testing on compliant commercial paints to ensure that environmental regulatory limits for Volatile Organic Compound (VOC) content, Hazardous Air Pollutants (HAP) as well as heavy metal and toxic contaminants are met. Continue development of Recovered Oil Logistic System and Contingency Planning Program. Initiate development of In-Situ Burning System (ISBS) and Oil Skimmer Efficiency Improvement Program (OSEIP).

4. (U) FY 1997 PLAN:

- (U) ($14,700) Ozone Depleting Substances - Complete qualification of backfit modification kit for surface ship 125-ton CFC-114 air conditioning plant design. Complete development of backfit modification kits for two surface ship 200-ton CFC-114 air conditioning plant designs. Continue development of backfit modifications for other surface ship CFC-114 air conditioning systems. Convert first surface ship CFC-114 air conditioning plant to non-chlorofluorocarbon alternative refrigerant for at-sea testing. Complete laboratory evaluation of future fleet non-chlorofluorocarbon 125-ton twin screw air conditioning plant prototype. Complete manufacturer's qualification of future fleet non-chlorofluorocarbon 200-ton centrifugal air conditioning plant and 1.5-ton refrigeration plant; begin laboratory evaluations of prototype hardware. Evaluate promising alternative firefighting technologies from science and technology community.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

- (U) ($21,609) Integrated Liquid Wastes - Continue development of shipboard over-arching liquid waste treatment system including the following: Complete shipboard test of a breadboard secondary oily waste polishing system and continue development of advanced development model secondary oily waste treatment system, improved bilge detergents and advanced oil content monitor. Complete shipboard test and evaluation of breadboard graywater treatment system. Continue development of advanced development model graywater treatment system and continue testing upgraded vortex incinerator system. Continue evaluation of low flow water minimization appliances, devices and marine sanitation devices. Continue design of oil water separator for shipboard compensated fuel ballast systems and initiate fabrication and ship installation.

- (U) ($5,500) Solid Wastes - Complete effort supporting Report to Congress on plan to comply with special area provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), Annex V. Initiate development of a plastic processor system for submarine application.

- (U) ($4,500) Other Major Ship Wastes - Continue shipboard Hazardous Waste substitution and elimination task. Continue investigation of non-asbestos substitutes and initiate preparation of a final report and substitute specifications. Complete quality assurance testing on reformulated commercial paints to ensure they meet Military Specification qualification criteria. Continue Development of Recovered Oil Logistic System, Contingency Planning Program, In-Situ Burning System and Oil Skimmer Efficiency Improvement Program.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	43,725	41,312	XXX	XXX
(U) FY 1995 Appropriated:	XXX	41,312	XXX	XXX
(U) Adjustments from Appropriated/FY95 PRESBUDG	0	-429	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	43,725	40,883	57,264	46,309

(U) CHANGE SUMMARY EXPLANATION:

1. (U) Funding: The appropriated FY95 President's Budget was reduced by $429K as a result of assessments to the University Research, Small Business Innovative Research and Travel accounts.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

2. (U) Schedule Changes: Not applicable.

3. (U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

(U) RELATED RDT&E: Not Applicable.

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		1Q MS 0 GWTS 1Q MS 0 OWPS 2Q MS III SWS 2Q MS III PP 2Q MS III LP 2Q MS III SP 3Q IOC LDSS	3Q R-12 Mod IOC 3Q MS I GWTS 3Q MS I OWPS	1Q SW Report to Congress 1Q MS 0 Sub PP	Cont.
Engineering Milestones	3Q Comp CFC-12 AC Dev't	4Q Comp N-O_2 Solv Wk 3Q Comp CFC-12 Refer Dev't 1Q Select CFC-114 Replacement 1Q Investigate PA Technology	4Q Comp O_2 Solv Wk 1Q Initiate Dev't of OWS for SCFBS 1Q Initiate Dev't of Advanced OCM 1Q Initiate Dev't of Compliant Paints 1Q Initiate Dev't of Non-Asbestos Sub'ts 1Q Initiate Dev't of ISBS 1Q Initiate Dev't of OSEIP	4Q Convert 1st R-114 to Non-CFC Alt 3Q Comp Dev't for two 200-ton CFC-114 AC Plants 4Q Comp Tests of Breadboard GWTS 4Q Comp Quality Tests Reformulated Paints	Cont.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0401
PROJECT TITLE: Shipboard Waste Management

T&E Milestones	2Q Comp TECHEVAL LP	1Q Comp OPEVAL PP	Cont.
	2Q Comp TECHEVAL SWS	1Q Comp OPEVAL SP	
	3Q Comp TECHEVAL PP	1Q Comp OPEVAL SWS	
	3Q Comp TECHEVAL SP		
	3Q Comp OPEVAL LP		
Contract Milestones			Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

A.(U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Ozone Depleting Substances	20,836	23,877	21,364	14,700
b. Solid Wastes	16,900	7,800	3,000	5,500
c. Integrated Liquid Wastes	4,259	7,448	25,280	21,609
d. Other Major Shipboard Wastes	1,730	1,758	7,620	4,500
Total	43,725	40,883	57,264	46,309

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Westinghouse/Machinery Technology Division											
Pittsburgh, PA	C/CPFF	8/86	33,500	33,500	1,140	8,288	2,000	4,000	6,000	CONT.	CONT.
York International Corp.											
York, PA	SS/CPFF	12/9	25,000	25,000	1,500	500	1,000	1,000	1,000	20,000	25,000
Northern Research & Engineering Corp.											
Woburn, MA	C/CPFF	3/94	9,300	9,300	0	500	1,000	1,000	1,500	5,300	9,300
Misc. Contracts	Various		N/A	N/A	4,100	5,200	4,200	7,000	5,500	CONT.	CONT.
Support and Management:											
Misc. Contracts	C/CPFF	Various	70	70	70	0	0	0	0	0	70

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: S0401
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Shipboard Waste Management

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Test and Evaluation:											
NAVSURFWARCEN DET											
Annapolis, MD	WR	Various	N/A	N/A	7,295	9,121	11,583	14,764	11,709	CONT.	CONT.
NAVSURFWARCEN SHIPSYSENGSTA											
Philadelphia, PA	WR	Various	N/A	N/A	1,525	811	2,000	2,500	2,000	CONT.	CONT.
NRL											
Washington, DC	WR	Various	N/A	N/A	1,300	3,760	3,000	2,000	1,000	CONT.	CONT.
NAVAIRWARCENACDIV											
Warminster, PA	WR	Various	N/A	N/A	1,000	2,080	2,000	1,000	300	CONT.	CONT.
NNSY											
Portsmouth, VA	WR	Various	N/A	N/A	1,108	2,550	600	1,500	2,000	CONT.	CONT.
NAVAIRWARCENACDIV											
Lakehurst, PA	WR	Various	N/A	N/A	1,900	1,500	1,500	500	200	CONT.	CONT.
Wright Patterson AFB											
Fairborn, OH	MPPR	Various	N/A	N/A	850	1,700	1,000	1,000	1,000	CONT.	CONT.
Misc Gov't Labs	WR	Various	N/A	N/A	345	2,175	4,000	10,000	7,000	CONT.	CONT.
York International Corp.											
York, PA	C/CPFF	Various	25,000	25,000	2,600	3,500	4,000	1,500	600	12,800	25,000
Geo-Centers, Inc.											
Boston, MA	C/CPFF	Various	11,375	11,375	375	1,300	1,500	1,500	1,500	5,200	11,375
Misc Contracts	C/CPFF	Various	N/A	N/A	968	740	1,500	8,000	5,000	CONT.	CONT.

Government Furnished Property: N/A

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: S0401
PROJECT TITLE: Shipboard Waste Management

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	6,740	14,488	8,200	13,000	14,000	CONT.	CONT.
Subtotal Support and Management	70	0	0	0	0	0	0
Subtotal Test and Evaluation	19,266	29,237	32,683	44,264	32,309	CONT.	CONT.
Total Project	26,076	43,725	40,883	57,264	46,309	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2210 Aviation Pollution Prevention	0	0	1,821	2,164	2,158	2,629	2,229	2,023	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Development and implementation of technologies which will lead to environmentally safe naval aviation operations and support; compliance with international, federal, state, and local regulations and policies; reduction of increasing compliance costs and personal liability; and enhancement of naval aviation mission effectiveness. Naval aviation pollution prevention efforts were previously supported by Project Y0817, Pollution Abatement Ashore. This project will support that part of project Y0817 that addressed aviation pollution prevention technologies as well as additional operational and shipboard aviation requirements previously unsupported.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1995 PLAN: Not applicable.

3. (U) FY 1996 PLAN:

- (U) ($1,510) Develop and test: Alternatives for cadmium, chromium, and cyanide plating; nonchromate aluminum pretreatment; non-hazardous chemical paint stripping processes; compliant solvents and cleaners; blast media treatment processes; molten salt bath plating process; zinc-nickel and tin-zinc alternates to cadmium plating; and nonchromated sealants.
- (U) ($161) Optimize low volatility diluents and non-toxic corrosion control pigments.
- (U) ($150) Demonstrate performance of water-borne topcoat.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEETDATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection PROJECT NUMBER: W2210 PROJECT TITLE: Aviation Pollution Prevention

4. (U) FY 1997 PLAN:

- (U) ($1,636) Continue to develop and test: Alternatives for cadmium, chromium,and cyanide plating nonchromate aluminum pretreatment; non-hazardous chemical paint stripping processes; compliant solvents and cleaners; blast media treatment processes; molten salt bath plating process; zinc-nickel and tin-zinc alternates to cadmium plating; and nonchromated sealants.
- (U) ($192) Continue to optimize low volatility diluents and non-toxic corrosion control pigments.
- (U) ($211) Continue to demonstrate performance of water-borne topcoat. Develop non-hazardous shipboard aviation materials and processes.
- (U) ($125) Begin development of aircraft engine emissions control processes.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	0	0	XXX	XXX
(U) FY 1995 Appropriated:	XXX	0	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	0	0	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	0	0	1821	2164

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Funding for Naval aviation pollution prevention efforts were previously supported by Y0817, Pollution Abatement Ashore. This project will support that part of Y0817 that addressed aviation pollution prevention technologies, as well as additional requirements previously unsupported.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: W2210
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Aviation Pollution Prevention

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602233N (Readiness/Training/Environmental Quality)

(U) PE 0603716D (Strategic Environmental R&D Program)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: W2210
PROJECT TITLE: Aviation Pollution Prevention

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Development Test & Evaluation	0	0	1,414	1,642
b. Operational Test & Evaluation	0	0	395	510
c. Travel	0	0	12	12
Total	0	0	1,821	2,164

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NAVAIRWARCENACDIV Warminster, PA	WX	10/95			0	0	0	1,514	1,912	CONT.	CONT.
NRL Washington, DC	WX	10/95			0	0	0	295	240	CONT.	CONT.
Support and Management											
Travel					0	0	0	12	12	CONT.	CONT.
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: W2210
PROJECT TITLE: Aviation Pollution Prevention

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	0	0	1,809	2,152	CONT.	CONT.
Subtotal Support and Management	0	0	0	12	12	CONT.	CONT.
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	0	0	0	1,821	2,164	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection

(U) COST (Dollars in thousands)

NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY2001 ESTIMATE	TO COMPLETE	PROJECT TOTAL PROGRAM
Y0817 Pollution Abatement Ashore	7,732	8,212	5,731	5,437	5,509	6,752	7,222	7,705	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops, validates, and implements new technologies to prevent pollution and to comply with environmental laws and policies applicable to Naval Shore Operations in order to reduce cost, regulatory oversight, and personal liability while sustaining or enhancing the ability to accomplish military missions.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,295) Aircraft Maintenance - Implemented non-Cr anodizing. Demonstrated water-borne topcoat and non-Cr primer on aircraft and support equipment. Tested non-hazardous depainting methods. Tested alternatives to Cd plating. Demonstrated a treatment process for waste plastic blast media.

- (U) ($3,102) Facilities Operation - Designed fuel pipe leak detection. Tested water pipe lining. Finished acceptance tests for lead analyzer and bioluminescent bioassay. Completed user instructions for reduced solids IW treatment and NOx emissions control. Adapted instruments for use in subsurface pollutant identification. Tested small arms range cleanup system on clay soil, and demonstrated anaerobic treatment of petroleum contaminated groundwater.

- (U) ($832) Materials Management - Installed and evaluated bulk fuel tank leak detection. Classified expired hazardous materials for alternates to disposal.

- (U) ($1,701) Ordnance Management - Designed explosive waste boiler nozzle. Completed rocket motor scrubber design. Assessed data from pyrotechnic test burns. Tested supercritical fluid extraction on two more propellants. Developed double base propellant formulations without solvent. Demonstrated nitrate ester oxidation pilot plant for water and scale up air treatment system.

- (U) ($802) Ship Repair - Constructed, started-up, and tested ship boiler cleaning denitrification plant. Fabricated fluidized bed sloped grid abrasive recycler and completed facility design/permits. Developed low viscosity epoxy and alkyd resin alternatives and replacement for ketone solvent system.

2. (U) FY 1995 PLAN:

- (U) ($2,053) Aircraft Maintenance - Demonstrate a non-Cr aluminum pretreatment. Optimize low volatile organic compound (VOC) diluents. Optimize Zn-Ni and Sn-Zn alternates to Cd plating. Develop non-Cr sealants. Prepare specifications for low VOC cleaners. Develop Non-Cr bonding process. Test alternate plating and stripping chemicals and processes. Issue non-Cr primer specification.

- (U) ($1,560) Facilities Operation - Field test underground fuel pipe leak detection. Transfer epoxy pipe lining process via site demonstration. Transfer engine modification technology for diesel engine emissions. Administer tri-service strategic environmental quality plan update. Test underground pollutant sensors. Prepare final design/operation specifications for rifle range cleanup. Fund Phase II SBIR contract for the development of an air-borne lead analyzer.

- (U) ($1,068) Material Management - Improve/modify field installation and conduct tests of bulk fuel leak detection system. Implement alternate disposal of first group of expired shelf-life items.

- (U) ($2,053) Ordnance Management - Test explosive mixtures in boiler fuel. Procure, install, and test rocket motor exhaust scrubber. Test pyrotechnic dye destruction parameters on an existing commercial incinerator. Assist field installation/production use of supercritical fluid extraction to recover propellant ingredients. Install ultraviolet destruction unit for explosives in air.

- (U) ($1,478) Ship Repair - Validate ketone replacement paint system. Test prototype equipment for interior space paint removal. Negotiate contract and construct abrasive recycling facility. Complete validation and transition sodium nitrite treatment.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

3. (U) FY 1996 PLAN:

- (U) ($3,750) Compliance - Complete validation of: (a) system for early detection of fuel leaks from underground pipelines; b) gas scrubber to minimize airborne emissions from test firing of rocket motors; c) use of Controlled Air Incinerator for destruction of colored smokes and dyes in Navy pyrotechnics; and d) use of UV oxidation technologies for in situ destruction of nitrate ester waste streams from explosive manufacturing processes. Continue field demonstrations of: a) fuel leak detection system for large underground fuel storage tanks at Navy's Red Hill supply center; and b) systems for control of VOC/Toxic air emissions from Navy-unique industrial processes. Finalize concept and begin design of demonstration prototype for: a) retrofit to bring Navy mobile turbine generators into compliance with NOx emission regulations; b) system to remove heavy metal contaminants from ship generated wastewater prior to discharge into shoreside treatment plants; and c) system to recycle oil from oily wastes from shipyard processes.

- (U) ($1,981) Prevention - Complete validation of sloped-grid fluidized-bed recycler for shipyard blasting abrasive materials. Conduct demonstration testing of: a) process for disposing of explosive wastes by using as an industrial boiler fuel supplement; b) process for producing propellants without solvents that have VOC/Toxic air emissions; c) longer shelf-life terms for Navy hazardous materials; and d) process to restore condition of expired oil and solvent based paints in lieu of disposal. Complete design and begin construction of prototype closed-loop paint application system for ship hull coatings. Select concepts for demonstration of the recycling and/or reutilization of shipyard hazardous wastes.

4. (U) FY 1997 PLAN:

- (U) ($3,575) Compliance - Complete validation of leak detection system for Red Hill fuel tanks. Develop implementation criteria for VOC/Toxics air emissions control systems for Navy industrial processes. Construct and begin testing of: a) NOx emission reduction system for mobile turbine generators; b) ship wastewater pretreatment system to remove heavy metals; and c) recycling system for oily wastes from Navy industrial processes. Resume identification of lithium battery treatment and recycling opportunities. Begin final validation of: a) Molten Salt Oxidation for the destruction of propellants, explosives and pyrotechnics; and b) Supercritical Water Oxidation for the treatment of hazardous organic liquid wastes.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

- (U) ($1,862) Prevention - Complete validation of: a) disposal of explosive waste by using as an industrial boiler fuel supplement; and b) production of propellants without use of VOC/Toxic air emitting solvents. Conduct demonstration testing of: a) longer shelf-life terms for Navy hazardous materials; b) process to restore condition of expired oil and solvent based paints; c) closed-loop paint application system for ship hull coatings; and d) systems to recycle and/or reutilize shipyard hazardous wastes. Evaluate technologies for inclusion in sensors to determine extent of deterioration of expired hazardous materials.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	7,732	8,352	XXX	XXX
(U) FY 1995 Appropriated:	XXX	8,352	XXX	XXX
(U) Adjustments from Approp/FY 1995 PRESBUDG:		-140	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	7,732	8,212	5,731	5,437

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes from the FY1995 Appropriated/FY1995 PRESBUDG to the FY1996/97 PRESBUDG for FY95 reflect Congressional undistributed reductions for Univ Res (-$13K), Travel (-$11K), and SBIR tax (-$116K).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SERDP	1,000	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

(U) RELATED RDT&E:

(U) PE 0602233N (Readiness, Training and Environmental Quality Technology)

(U) PE 0603716D (Strategic Environmental R&D Program (SERDP))

D. (U) SCHEDULE PROFILE: This project is categorized as non-ACAT. During the FY94-FY97 timeframe there will be over 50 distinct demonstration/validation tasks being executed. Typically, it takes 2 additional years after completion of a successful demonstration/validation before a new technology is fully implemented.

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	14 Dem/Vals compltd 4Q	15 Dem/Vals compltd 4Q	6 Dem/Vals compltd 4Q	6 Dem/Vals compltd 4Q	
Engineering Milestones					
T&E Milestones					
Contract Milestones					

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROJECT NUMBER: Y0817
PROGRAM ELEMENT TITLE: Environmental Protection PROJECT TITLE: Pollution Abatement Ashore

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Engineering	1,862	739	1,719	761
b. Prototype Development/Acquisition	1,487	1,150	1,146	815
c. Testing and Evaluation	3,719	4,927	1,891	2,882
d. Technical Documentation	664	1,396	975	979
Total	7,732	8,212	5,731	5,437

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NFESC Port Hueneme, CA	WR	3/18/94	N/A	N/A	14,745	3,644	2,469	2,714	3,464	CONT.	CONT.
NAVAIRWARCENACDIV Warminster, PA	WR	3/10/94	N/A	N/A		985	1,764	0	374	CONT.	CONT.
NAVSURFWARCEN DET Annapolis, MD	WR	2/16/94	N/A	N/A		602	1,569	1,513	1,292	CONT.	CONT.
NAVSURFWARCENDIV Indian Head, MD	WR	2/24/94	N/A	N/A		1,701	1,694	866	307	CONT.	CONT.
NAVSURFWARCENDIV Crane, IN	WR		N/A	N/A		0	569	638	0	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603721N PROGRAM ELEMENT TITLE: Environmental Protection PROJECT NUMBER: Y0817 PROJECT TITLE: Pollution Abatement Ashore

NCCOSC San Diego, CA	WR	5/2/94	N/A	N/A	11,270	540	0	0	0	CONT.	CONT.
NRL Washington, DC	WR	3/15/94	N/A	N/A	690	260	147	0	0	CONT.	CONT.
Various Activities					9,392						
Support and Management			N/A								
Test and Evaluation			N/A								

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603721N
PROGRAM ELEMENT TITLE: Environmental Protection
PROJECT NUMBER: Y0817
PROJECT TITLE: Pollution Abatement Ashore

GOVERNMENT FURNISHED PROPERTY - Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	36,097	7,732	8,212	5,731	5,437	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	36,097	7,732	8,212	5,731	5,437	CONT.	CONT.

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FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0829 Energy Conservation (ADV)	2,721	2,773	1,976	2,019	1,848	2,213	2,241	2,220	CONT.	CONT.
R0838 Mobility Fuels (ADV)	1,561	6,255	0	0	0	0	0	0	0	121,700
TOTAL	4,282	9,028	1,976	2,019	1,848	2,213	2,241	2,220	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports projects to evaluate, adapt, and develop energy related technologies for ship, aircraft, and land-based operations to: (a) increase fuel-related weapons 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) relax unnecessarily restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels when military specification fuels are unavailable or in short supply; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. 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 $140M per year by 1995 and $165M per year by FY 2000 are projected compared to 1985 costs.

(U) 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 the 1992 Energy Policy Act, Executive Orders 12902 of Mar 94, Defense Energy Policy Memorandum 91-2 of May 91, and OPNAV Instruction 4100.5D of Apr 94. Joint Mission Areas/Support Areas (JMA/SA): This program directly supports the Readiness, Support, and Infrastructure SA. It also supports the following JMA's: Forward Presence, Joint Surveillance, Strategic Sealift, and Joint Strike.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603724N
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0829 Energy Conservation (ADV)	2,721	2,773	1,976	2,019	1,848	2,213	2,241	2,220	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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; develop improved hull coatings and auxiliary equipment for ships; and develop renewable/alternative energy resources, energy conservation technologies, and energy use management strategies for Navy shore facilities.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:
   - (U) ($657) Aircraft: Continued Integrated Flight and Propulsion Control (IFPC) Technology Demonstration Program--developed/validated hardware, software and system integration. Evaluated IFPC technology retrofit potential for F/A-18C/D. Initiated joint Energy Program/J52 Component Improvement Program (CIP) turbine seal replacement software program.
   - (U) ($1,320) Ships: Evaluated 2nd generation ozone safe refrigerants for energy efficiency benefits; determined operating cycle requirements and equipment modification necessary to maximize energy efficiency. Conducted small to medium scale evaluation of promising non-toxic anti-fouling (AF) coating systems. Modified hull cleaning protocols/equipments to meet the needs of silicone "easy release" AF coatings. Evaluated efficiency improvement options for LM 2500 gas turbine engine and powertrain.
   - (U) ($744) Facilities: Established qualifications standards for DoD use of new (thin film) photovoltaic (PV) receptor technology. Developed wind turbine selection criteria for DoD applications. Evaluated geothermal (ground source) heat pumps for space heating/cooling. Developed integrated Energy Resource Planning investment strategies. Designed PV/hybrid power systems for site specific applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

2. (U) FY 1995 PLAN:
- (U) ($838) Aircraft: Initiate IFPC technology demonstration via selection of control modes, software development and rig tests. Transition J52 CIP turbine seal mod to NAVAIR J52 CIP program. Integrate Flight Performance Advisory System (FPAS), developed in category 6.5, into IFPC program.
- (U) ($1,240) Ships: Redesign major Navy air conditioning compressor impellers (sized for DD-963, CG-47, DDG-51, LHD, CV) to efficiently use ozone-safe alternative refrigerants. Transition successful non-toxic AF materials/coating systems to category 6.5 ship applications. Continue to adapt hull cleaning process to needs of advanced AF coatings. Design stern wedge/flap for CG-47/DD-963 and evaluate reduced tip clearance propellers to increase propulsion efficiency.
- (U) ($433) Facilities: Establish criteria for DoD application of Solar Thermal Electric Systems. Evaluate PV integrated roof systems for distributed load center grid support applications. Evaluate utility demand control system (UDCS) peak shaving technology for Navy applications.
- (U) Program will not add to FY 1995 control. See FY 1996 Plan.

3. (U) FY 1996 PLAN:
- (U) ($262 FY 1995 $592 FY 1996) Aircraft: Continue IFPC technology demonstrations for F414 engine and F/A-18 E/F airframe. Demonstrate inlet distortion model and advanced control logic effects on full authority digital engine control operation and resulting engine responses.
- (U) ($1,150) Ships: Develop direct current fluorescent lighting with integral emergency ballasts (zero harmonic distortion, twice the energy savings of new alternating current system). Evaluate bow bulbs for DDG-51 and DD-963/CG-47 hulls to reduce powering requirements. Qualify hull cleaning procedures for "easy release" silicone AF coatings.
- (U) ($234) Facilities: Develop prototype solar thermal electrical generation system. System integration for combined wind/solar hybrid power system. Demonstrate UDCS ability to monitor base wide demand and implement base wide peak shaving procedures.

4. (U) FY 1997 PLAN:
- (U) ($700) Aircraft: Complete IFPC technology demonstrations and transition technology to F414 engine and F/A-18 E/F airframe development programs. Enhance FPAS fidelity for F/A-18E/F.
- (U) ($1,050) Ships: Transition robotic hull cleaning device from category 6.2 to fleet use (will allow selective spot cleaning for slime and/or hard fouling). Continue screening tests of advanced AF materials/coating systems. Transition fuel cell power generation from category 6.2 to fleet demonstration.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

- (U) ($269) Facilities: Systems Integration of advanced PV receptors and power processors/controller technology. Integration studies and resource assessments for geothermal power generation at additional Navy sites.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,722	2,799	XXX	XXX
(U) FY 1995 Appropriated:	XXX	2,799	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	-1	-26	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	2,721	2,773	1,976	2,019

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1994 funding reduction is due to end of year execution update (-1). FY 1995 reduction is due to undistributed congressional cuts for university research (-4), travel (-3), and assessment for Small Business Innovative Research (-19).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
- (U) PE 0601153N (Defense Research Sciences)
- (U) PE 0602121N (Surface Ship and Submarine HM&E Technology)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT NUMBER: R0829 PROJECT TITLE: Energy Conservation (ADV)

- (U) PE 0602122N (Aircraft Technology)
- (U) PE 0602234N (Materials, Electronics, and Computer Technology)
- (U) PE 0603217N (Air Systems and Weapons Advanced Technology)
- (U) PE 0603712N (Environmental Quality and Logistics Advanced Technology)
- (U) PE 0604710N (Navy Energy Program (ENG))

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROGRAM ELEMENT TITLE: Navy Energy Program (ADV)
PROJECT NUMBER: R0829 PROJECT TITLE: Energy Conservation (ADV)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. System Development & Integration	2,721	2,773	1,976	2,019
Total	2,721	2,773	1,976	2,019

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NSWC, Annapolis	WR	N/A	N/A	N/A	36,387	1,320	1,240	1,150	1,050	Cont.	Cont.
NAWCAD, Trenton	WR	N/A	8,500	8,500	5,301	657	1,100	592	700	0	8,500
Miscellaneous					50,534	744	433	234	269	Cont.	Cont.

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603724N PROJECT NUMBER: R0829
PROGRAM ELEMENT TITLE: Navy Energy Program (ADV) PROJECT TITLE: Energy Conservation (ADV)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	92,222	2,721	2,773	1,976	2,019	Cont.	Cont.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	92,222	2,721	2,773	1,976	2,019	Cont.	Cont.

C. (U) FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Y0995 Navy Facilities Systems	1,368	2,493	1,803	893	797	952	959	988	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides for advanced development to reduce the cost 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; (b) Specialized equipment to reduce peacetime costs, capability shortfalls and risks to the Seabee Underwater Construction Teams; and (c) Compile test data for survivability of facilities. It focuses on needs where private construction R&D is lacking, and transfers university research to Navy application/acquisition.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,101) Designed HP Magazine demonstration for full scale explosive testing. Continued facility survivability test data compilation and analysis.
- (U) ($67) Completed Arctic Underwater ROV for ten-fold endurance and range improvement and terminated testing of Cold-Start Generator for emergency electricity and heat in Arctic.
- (U) ($200) Began testing at NAS Fallon with aircraft sorties against targets both treated and untreated with Camouflage, Concealment, and Deception (CCD) techniques using conventional and precision guided weapons.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROJECT NUMBER: Y0995
PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT TITLE: Navy Facilities Systems

2. (U) FY 1995 PLAN:

- (U) ($2,293) Design HP Magazine prototype for full scale explosive testing. Conduct tests to certify the explosive safety properties of the pit covers.
- (U) ($100) Complete validation of rapid load assessment techniques for evaluating the capability of piers to support military operations. Techniques were developed under PE0602233N, Mission Support Technology.
- (U) ($100) Complete testing on effectiveness of CCD techniques; evaluate and report on most effective use of CCD to protect targets and train aircrews.

3. (U) FY 1996 PLAN:

- (U) ($1,803) Continue construction and quality assurance of the HP Magazine prototype. Develop test plans for FY 1997 operational and certification tests.

4. (U) FY 1997 PLAN:

- (U) ($ 893) Complete construction and quality assurance of the HP Magazine prototype. Conduct operational and certification tests. Compile and analyze test data, and complete technical documentation required to obtain DOD Explosive Safety Board approval. Apply for DOD Explosive Safety Board approval.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	1,368	2,500		
(U) FY 1995 Appropriated:		2,500		
(U) Adjs from Approp/FY 1995 PRESBUDG:		-7		
(U) FY 1996/97 PRESBUDG Submit:	1,368	2,493	1,803	893

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROJECT NUMBER: Y0995
PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT TITLE: Navy Facilities Systems

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes from FY 1995 Appropriated/FY 1995 PRESBUDG to the FY1996/97 PRESBUDG reflect adjustments for Congressional undistributed reductions.

(U) Schedule: Not applicable

(U) Technical: Not applicable

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROJECT NUMBER: Y0995
PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT TITLE: Navy Facilities System

(U) RELATED RDT&E:

(U) PE0602233N (Mission Support Technology)
(U) PE0602234N (Materials, Electronics and Computer Technology)
(U) PE0603792N (Advanced Technology Demonstrations)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones				Explosive Safety Board Documentation 3Q	
Engineering Milestones	Magazine Prototype Basis of Design 4Q	Magazine Prototype Design 3Q		Magazine Construction 1Q	
T&E Milestones		Pit Cover Certification 2Q		Magazine Certification 2Q	
Contract Milestones		Prototype Box Construction 3Q	Prototype Cells Construction 3Q		

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement
PROJECT NUMBER: Y0995
PROJECT TITLE: Navy Facilities Systems

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Systems Engineering	806	85	0	108
b. Prototype Development	225	0	0	0
c. Prototype Fabrication	0	1887	1639	0
d. Test and Evaluation	267	418	0	729
e. Technical Documentation	70	103	164	56
Total	1368	2493	1803	893

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603725N PROJECT NUMBER: Y0995
PROGRAM ELEMENT TITLE: Facilities Improvement PROJECT TITLE: Navy Facilities Systems

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS
NFESC, Port Hueneme, CA

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
					58,074						
Product Development											
NFESC	WX		N/A	N/A		1,368	1,143	434	893		
Contractor TBD	FP		N/A	N/A		0	1,350	1,369	0		
Support and Management											
Test and Evaluation											

GOVERNMENT FURNISHED PROPERTY: Not applicable

Item Description	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development										
Support and Management				N/A						
Test and Evaluation										

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement
PROJECT NUMBER: Y0995
PROJECT TITLE: Navy Facilities Systems

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	58,074	1,368	2,493	1,803	893		
Subtotal Support and Management	0	0	0	0	0		
Subtotal Test and Evaluation	0	0	0	0	0		
Total Project	58,074	1,368	2,493	1,803	893		

FY 1996 RDT&E BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U0172 CIWS (PHALANX)	3,000	3,425	0	0	0	0	0	0	0	6,425
U2039 COOP ENGAGEMENT CAPABILITY (CEC)	200,424	148,815	180,049	182,236	156,832	92,856	49,428	52,720	CONT.	CONT.
U2133 QUICK REACTION COMBAT CAPABILITY (QRCC)	27,078	18,889	4,689	4,644	4,555	4,899	4,926	5,072	CONT.	CONT.
U2136 LINK IRON	49,571	40,048	52,584	54,686	41,132	48,002	48,454	49,980	CONT.	CONT.
U2184 FORCE ANTI-AIR WARFARE COORDINATION TECHNOLOGY (FACT)	7,126	6,290	8,298	8,240	7,978	8,299	8,359	8,622	CONT.	CONT.
U2236 SMALL CALIBER GUN TEST	2,500	0	0	0	0	0	0	0	0	2,500
TOTAL	289,699	217,467	245,620	249,806	210,497	154,056	111,167	116,394	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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. These projects focus on ship defense improvements through the development of advanced concepts and capabilities which will enhance both defense in depth of ships in a force and self defense of individual ships in a littoral war fighting environment. Cooperative Engagement Capability (CEC), Project U2039, develops concepts for coordinating all Battle Force sensors into a single, real-time, composite track picture having fire control quality. Quick Reaction Combat Capability (QRCC), Project U2133, provides advanced concepts and technology developments for the multi-sensor integration of ship detection equipment, integration and coordination of ship self defense weapons, and coordination of hardkill and softkill assets to improve individual ship self defense capabilities against the ASCM threat. Force Anti-Air Warfare Coordination Technology (FACT), Project U2184, demonstrates Force Anti-Air Warfare (AAW) concepts and capabilities which will enhance the AAW war fighting ability of ships and aircraft and to enable the coupling of the force into a single, distributed AAW weapon system through more effective use of tactical data, and force sensors and weapons. A description of Project U2136, LINK IRON, is not included due to a higher level of classification.

FY 1996 RDT&E BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

(U) JUSTIFICATION FOR BUDGET ACTIVITY: These projects are funded under Demonstration and Validation because they develop and integrate hardware and software for experimental demonstrations and tests related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U2039 Cooperative Engagement Capability (CEC)	200,424	148,815	180,049	182,236	156,832	92,856	49,428	52,720	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: 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 weapons system. CEC will significantly improve our Battle Force defense in depth, including both local area and ship 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, 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.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability (CEC)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($91,965) Developed and demonstrated cued and remote data missile firing engagement with AEGIS and new threat upgrade class ships. Demonstrated Airborne Early Warning Aircraft Air CU(P3).
- (U) ($42,625) Developed and demonstrated cued self defense missile firing engagements.
- (U) ($21,985) Completed Composite Identification and Cooperative Engagement Decision data collection.
- (U) ($15,358) Developed and tested Fleet CEC tactics and operations.
- (U) ($5,635) Conducted Developmental Test/Operational Testing (DT/OT).
- (U) ($10,000) Assessed potential contribution of airships to airborne components of CEC.
- (U) ($11,356) Initiated engineering design effort to develop airborne version of Common Equipment Set (CES) for integration with E-2C aircraft.
- (U) ($1,500) Developed self-aligned gate technology for support of acceleration processor production for use in CES subsystems.

2. (U) FY 1995 PLAN:

- (U) ($18,170) Complete analysis of DT/OT lessons learned to fully support continued developmental efforts in CEC system design and fleet operations and tactics.
- (U) ($67,509) Continue development of shipboard CES and incorporate results of DT/OT testing into system design and ship integration.
- (U) ($63,136) Continue development of airborne CES for integration with E-2C aircraft.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability (CEC)

3. (U) FY 1996 PLAN:

- (U) ($3,050) Complete Initial Operation Capability (IOC) certification for shipboard CEC system.
- (U) ($137,324) Continue development of shipboard CES.
- (U) ($10,000) Continue development of airborne CES for integration with E-2C aircraft.
- (U) ($7,240) Continue assessment of system performance and development of tactical applications during active fleet exercises.
- (U) ($22,435) Develop organic infrastructure for CES Integrated Logistics Support (ILS).

4. (U) FY 1997 PLAN:

- (U) ($122,980) Continue development of shipboard CES.
- (U) ($44,600) Continue development of airborne CES for integration with E-2C aircraft.
- (U) ($5,156) Conduct Initial Operational Test and Evaluation (IOT&E) of shipboard CES.
- (U) ($9,500) Continue development of organic ILS infrastructure for CES.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 Presidents's Budget:	200,424	134,617	XXX	XXX
(U) FY 1995 Appropriated:	XXX	157,117	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-8,302	XXX	XXX
(U) FY 1996/97 OSD Budget Submit:	200,424	148,815	180,049	182,236

RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability (CEC)

CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes in FY 95 funding due to Undistributed Congressional reductions for University Research (-5,391), Consulting Services (-470), Travel (-183), and Small Business Innovative Research (-2,258).

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in Thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN 260600	0	0	0	0	88,438	91,043	102,602	112,909	480,233	875,225
SCN Various	0	0	0	9,300	12,600	28,000	37,800	61,100	104,200	253,000
O&M 1D4D	0	0	2,494	15,320	16,233	20,695	25,600	29,067	CONT.	CONT.

(U) RELATED RDT&E:
(U) PE 0205604N (Tactical Data Links)
(U) PE 0604307N (AEGIS Combat System Engineering)
(U) PE 0604366N (Standard Missile Improvements)
(U) PE 0604518N (Combat Information Center Conversion)
(U) PE 0204152N (E2C Improvements)

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability (CEC)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
PROGRAM MILESTONES		2Q MS I&II	4Q IOC		1Q FY98 MS IIA 1Q FY99 MS III 4Q FY00 FOC/MSD/NSD
ENGINEERING MILESTONES	2Q PDR/CDR	1Q CDR (E-2C) 3Q PDR (E-2C)	1Q PDR/CDR		
T&E MILESTONES	1Q DT/OT 2Q P-3 DEMO	2Q P-3 DEMVAL		3Q IOT&E	2Q FY98 E-2C DEMO 3Q FY98 DT-IIC/OT-IIB 3Q FY99 DT-II (E-2C) 4Q FY99 OT-II (E-2C)
CONTRACT MILESTONES	4Q ECI MOD				1Q FY 98 (LRIP Award) 1Q FY 99 (FRP Award)

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability (CEC)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Program Management	15,682	10,547	11,090	10,645
b. Systems Engineering	20,766	22,935	22,281	20,840
c. Equipment Assembly	58,050	43,832	38,340	23,420
d. Software Development	25,009	18,659	21,913	20,998
e. Integration	40,658	33,264	53,175	72,412
f. Installation	5,945	1,025	6,749	6,128
g. Test	18,414	2,603	10,240	11,401
h. Technical Data	2,243	2,798	2,826	2,482
i. ILS	13,657	13,152	13,435	13,910
Total	200,424	148,815	180,049	182,236

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense
PROJECT NUMBER: U2039
PROJECT TITLE: Cooperative Engagement Capability (CEC)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:											
E-Systems St. Petersburg, FL	SS/CPFF	3/95	Cont.	Cont.	0	74,672	76,184	85,343	46,000	Cont.	Cont.
JHU/APL Laurel, MD	SS/CPFF	1/95	Cont.	Cont.	0	45,000	24,109	29,000	24,000	Cont.	Cont.
ITT Van Nuys, CA	CPFF	12/94	6,756	6,756	0	2,250	3,506	400	400	200	6,756
RAYTHEON Tewksbury, MA	CPFF	12/94	3,158	3,158	0	1,610	1,268	100	50	130	3,158
NAVSURFWARCENDIV Crane, IN	WR	Var	Cont.	Cont.	0	3,894	1,075	3,500	3,000	Cont.	Cont.
NAVSURFWARCENDIV Dahlgren, VA	WR	Var	Cont.	Cont.	0	8,479	2,056	2,500	4,000	Cont.	Cont.
NAVSURFWARCENDIV Port Hueneme, CA	WR	Var	Cont.	Cont.	0	12,418	2,000	4,500	4,000	Cont.	Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability (CEC)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) - (Continued)

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
NCCOSC, RDTE DIV San Diego, CA	WR	11/94	Cont.	Cont.	0	5,245	9,551	6,500	3,830	Cont.	Cont.
DRPM, AEGIS	PD	Various	160,835	160,835	0	15,035	17,800	34,000	45,000	49,000	160,835
NAVSUP Washington, DC	PD	Various	2,636	2,636	0	2,586	50	0	0	0	2,636
NAVAIR PMA-231 Washington, DC	PD	Various	174,223	174,223	0	5,400	7,866	9,857	44,600	106,500	174,223
NAVAL AIRSHIP PROG. Washington, DC	PD	Various	10,000	10,000	0	10,000	0	0	0	0	10,000
Miscellaneous	Various	Various	9,971	9,971	0	3,896	182	827	290	4,776	9,971
Support and Management:											
Technautics, Inc. Alexandria, VA	CPFF	4/95	Cont.	Cont.	0	1,072	1,102	1,132	1,175	Cont.	Cont.
VITRO Silver Spring, MD	SS/CPFF	11/94	1,925	1,925	0	1,750	175	0	0	0	1,925
Miscellaneous	Various	Various	Cont.	Cont.	0	1,482	467	585	535	Cont.	Cont.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2039 PROJECT TITLE: Cooperative Engagement Capability (CEC)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) - Continued

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Test and Evaluation:											
OPTEVFOR Norfolk, VA	WR	Various	4,969	4,969	0	1,395	0	225	1,437	1,912	4,969
Miscellaneous	Various	Various	14,269	14,269	0	4,240	1,424	1,580	3,919	3,106	14,269

GOVERNMENT FURNISHED PROPERTY: Not Applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	Total FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	0	190,485	145,647	176,527	175,170	Cont.	Cont.
Subtotal Support and Management	0	4,304	1,744	1,717	1,710	Cont.	Cont.
Subtotal Test and Evaluation	0	5,635	1,424	1,805	5,356	5,018	19,238
Total Project	0	200,424	148,815	180,049	182,236	Cont.	Cont.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U2133 Quick Reaction Combat Capability (QRCC)	27,078	18,889	4,689	4,644	4,555	4,899	4,926	5,072	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The QRCC program provides ships with an integrated self defense capability to defend against aircraft and missile attack. The capability will shorten reaction time, increase ships fire power and automate previously manpower intensive functions. In the present and projected littoral warfare environment, ships other than AEGIS, which have manual or unintegrated ship defense systems, are unable to protect themselves sufficiently to perform their intended missions. The QRCC concept converts manual control of several different ship self defense systems into a single integrated capability under the computer aided control of ship operators. It does this through the implementation of the Ship Self Defense System (SSDS) and improvements to other self defense system elements to integrate multiple sensors, coordinate and integrate weapon systems, provide hardkill and softkill integration, and automate the detection through engagement sequence under the control of flexible embedded doctrine. The current focus of this project is the advanced development of ship defense technologies which leverage recent critical experiments, the Rapid Anti-Ship Missile Integrated Defense System (RAIDS) program efforts, and the SSDS demonstration on USS WHIDBEY ISLAND (LSD 41) conducted in June 1993. Improvements to current system performance with respect to short range anti-air ship self defense, in order to stay abreast or ahead of emerging improvements to the threat, will examine transitioning advanced technology applicable to multi-sensor integration sensors, improvements to ship defense local command and control functions, integration and coordination of weapon systems, hardkill/softkill integration, and advanced self defense system concepts.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Quick Reaction Combat Capability

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,800) Progressed towards achievement of Milestone IV/II for SSDS MK 1 system.
- (U) ($13,785) Continued transitioning to Engineering and Manufacturing Development (E&MD) for SSDS MK 1 version for LSD class ship, to include Preliminary Design Review and Critical Design Review.
- (U) ($800) Progressed towards RAIDS Follow-on Test and Evaluation (FOT&E) for FFG 7 class ship.
- (U) ($300) Initiated adaptions of MK 1 system for installation aboard DD 963 and LHD class ships.
- (U) ($3,552) Conducted analysis of Ship Self Defense System capabilities in support of Investment Strategies and Cost and Operational Effectiveness Analyses (COEAs).
- (U) ($3,800) Continued integration of Central Identification Friend or Foe, Identification Doctrine Processor, and non-cooperative target recognition programs with SSDS.
- (U) ($3,041) Conducted development efforts in support of Self Defense Test Ship (SDTS) and Wallops Island Test Sites.

2. (U) FY 1995 PLAN:

- (U) ($2,143) Complete transitioning to E&MD for SSDS MK 1 version for LSD class ship, to include risk reduction studies.
- (U) ($700) Conduct advanced engineering studies to support the integration of SSDS with the Advanced Combat Direction System (ACDS) Level 2 LHD variant in order to provide the LHD class with an Integrated Ship Defense (ISD) capability.
- (U) ($11,200) Continue development efforts on the SDTS to include remoting of all combat system signals, data extract capability and complete outfitting in support of planned testing.

- (U) ($4,846) Continue analysis efforts focusing on impact of Littoral Warfare environment on SSDS architecture/elements and required design improvements, to include SSDS MK 1 system adaptation/risk reduction studies for LHD, LHA, and CV/CVN class ships.

3. (U) FY 1996 PLAN:

- (U) ($1,072) Complete Integrated Ship Defense (ISD) adaptation/risk reduction studies for LHD class ships, to include preliminary design.
- (U) ($2,567) Continue analysis efforts focusing on required upgrades to existing elements and identifying new initiatives required to pace the evolving Anti-Ship Cruise Missile (ASCM) threat.
- (U) ($700) Commence ISD adaptation/risk reduction studies for LHA and CV/CVN class ships.
- (U) ($350) Commence investigations of DOD and non-DOD technology initiatives available to address optimization of hardkill/softkill sensors and weapons.

4. (U) FY 1997 PLAN:

- (U) ($1,475) Complete ISD adaptation/risk reduction studies for LHA and CVN class ships.
- (U) ($2,519) Continue analysis and requirements efforts to update impact of Littoral Warfare environment and continued ASCM evolution on Ship Self Defense elements.
- (U) ($650) Incorporate hardkill/softkill optimization techniques into transition of Advanced Self Defense Combat System (ASDCS) ATD.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Quick Reaction Combat Capability

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	27,078	8,646	XXX	XXX
(U) FY 1995 Appropriated:	XXX	19,846	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	- 957	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	27,078	18,889	4,689	4,644

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes in FY95 funding due to Undistributed Congressional reductions for University Research (-515), Consulting Services (-75), Federally Funded Research Development Centers (-45), Travel (-11), and Small Business Innovative Research (-311).

(U) Schedule: Re-scheduled MSII from FY94 to FY95 compresses E&MD phase and moves OT and MSIII from FY96 to FY97.

(U) Technical: Transition for ASDCS ATD. Reflects integration with ACDS.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands)

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO PROGRAM	TOTAL COMPLETE
(U) OPN Line 523400 Pt Def. Sppt Eqmt										
(RAIDS)	12,104	573	0	0	0	0	0	0	0	12,677
(SSDS)	0	0	15,643	18,815	22,557	45,869	51,128	49,522	CONT.	CONT.
(U) OM&N 14D70 Wpn Maint. QRCC	3,007	3,913	3,985	6,357	4,859	5,913	6,400	6,554	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Quick Reaction Combat Capability

(U) RELATED RDT&E:

(U) PE 0604755N (SHIP SELF DEFENSE)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		2Q MK 1 MS II		2Q MK 1 MS III	
Engineering Milestones		1Q MK 1 TLDR * 3Q MK 1 IPDR **			
T&E Milestones				1Q LSD 41 Class DT II 2Q LSD 41 Class OT II	2Q 98 CVN-76 FOT&E 4Q 98 LHD FOT&E 2Q 99 LHA FOT&E 4Q 99 CVN-68 FOT&E 2Q 01 LPD-17 OT&E
Contract Milestones		2Q MK 1 EMD	2Q MK 1 PROCMT	2Q MK 1 PROCMT	

* TLDR: Top Level Design Review
** IPDDR: In Process Detailed Design Review

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Self Defense

PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROJECT TITLE: Quick Reaction Combat Capability

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	3,904	0	0	0
b. Ancillary Hardware Development	350	0	0	0
c. Software Development	8,011	3,000		
d. Systems Engineering	6,271	1,038	710	875
e. Training Development	500	0	0	0
f. Integrated Logistics Support	600	0	0	0
g. Configuration Management	300	0	0	0
h. Install	1,856	0	0	0
i. Test & Evaluation	2,000	11,365	400	400
j. Government Engineering Support	1,466	1,466	1,870	1,722
k. Program Management Support	1,200	1,370	1,459	1,395
l. Documentation	600	600	200	200
m. Travel	20	50	50	52
Total	27,078	18,889	4,689	4,644

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Quick Reaction Combat Capability

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)
PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Hughes Tucson, AZ	SS/FP	5/94	17,575	17,575	9,050	8,525	0	0	0	0	17,575
NAVSURFWARCENDIV Port Hueneme, CA	WR	various	6,015	6,015	3,800	2,215	0	0	0	0	6,015
NAVSURFWARCENDIV Dahlgren, VA	WR	various	17,315	17,315	11,500	4,815	1,000	0	0	0	17,315
TBD	SS/FP	various	2,246	2,246	0	0	2,246	0	0	0	2,246
Support and Management											
Techmatics Arlington, VA	SS/FP	1/93	3,150	3,150	1,250	1,200	643	0	0	57	3,150
JHU/APL Laurel, MD	SS/FP	10/93	CONT.	CONT.	6,730	4,085	1,050	1,550	1,473	CONT.	CONT.
NAVELEXACT St. Inigoes, MD	WR	various	3,800	3,800	0	3,800	0	0	0	0	3,800
NRL Washington, DC	WR	various	CONT.	CONT.	650	650	650	650	650	CONT.	CONT.
NWAC Seal Beach, CA	WR	various	CONT.	CONT.	0	400	500	600	600	CONT.	CONT.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2133
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Quick Reaction combat Capability

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management											
NAVSURFWARCENDIV Dahlgren, VA	WR	various	CONT.	CONT.	0	800	900	900	883	CONT.	CONT.
TBD	SS/FP	various	CONT.	CONT.	0	0	500	589	638	CONT.	CONT.
Test and Evaluation											
NAVSURFWARCENDIV Port Hueneme, CA	WR	various	CONT.	CONT.	1,000	388	11,200	200	200	CONT.	CONT.
COMOPTEVFOR Norfolk, VA	WR	various	CONT.	CONT.	0	200	200	200	200	CONT.	CONT.
NAVSURFWARCENDIV Dahlgren, VA	WR	various	3,000	3,000	3,000	0	0	0	0	0	3,000

GOVERNMENT FURNISHED PROPERTY: Not applicable.

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	24,350	15,555	3,246	0	0	0	43,151
Subtotal Support and Management	8,630	10,935	4,243	4,289	4,244	CONT.	CONT.
Subtotal Test and Evaluation	4,000	588	11,400	400	400	CONT.	CONT.
Total Project	36,980	27,078	18,889	4,689	4,644	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603755N
PROGRAM ELEMENT TITLE: Ship Self Defense

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
U2184 Force Anti-Air Warfare Coordination Technology (FACT)	7,126	6,290	8,298	8,240	7,978	8,299	8,359	8,622	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Force Anti-Air Warfare Coordination Technology (FACT) Program is an advanced development effort designed to demonstrate Force Anti-Air Warfare (AAW) concepts and capabilities which will significantly improve our Force defense in depth, including both local area and self defense capabilities against current and future AAW threats. FACT improvements are 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. FACT defines requirements and develops prototype systems or modifications to existing systems to test new concepts for the coordination of Force AAW operations. Some examples of prototype systems now in production are AN/SPS-48C Detection Data Convertor, AN/SPS-48E Environmental Control Feature, Shipboard Gridlock System Automatic Correlation, (SGS/AC), and Dial-a-Track Link-11 Quality Selection. Other FACT developments nearing production stages are the Automatic Identification System (Auto-ID) and the Multifrequency Link-11 capability; Dual Net Multifrequency Line (DNMFL); Force Threat Evaluation Weapons Assignment (FTEWA); and Precision ESM Tracking to Non-Cooperative Detect, Track and ID Targets. Short and long term objectives will be phased in to produce higher degrees of ship defense and battle coordination and effectiveness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($4,500) Supported integration of Force Threat Evaluation and Weapon Assignment (FTEWA) into major AAW combatants.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROJECT NUMBER: U2184
PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT TITLE: Force Anti-Air Warfare Coordination Technology (FACT)

- (U) ($1,626) Provided engineering for improving Link-11 interoperability among Force participants, Joint Services, and Allied network participants. Developed recommendations for improving Link-16 integration into Force, including interoperability with existing Link-11.

- (U) ($1,000) Continued Remote Data Engage (RDE) and Remote Missile Launch (RML) development.

2. (U) FY 1995 PLAN:
- (U) ($2,940) Continue advanced development of FTEWA in support of Combat Air Patrol (CAP) and Surface-to-Air Missile (SAM) integration.

- (U) ($1,150) Develop and demonstrate Auto-ID with Electronic Surveillance Measures (ESM).

- (U) ($800) Continue Remote Data Engage (RDE) development

- (U) ($600) Support Remote Missile Launch (RML) and Forward Pass development.

- (U) ($400) Conduct experiments to determine feasibility of integrating non-organic data to identify organic Battle Group air tracks in real time.

- (U) ($400) Support Link interoperability between Joint and Allied forces, including multiple simultaneous links with emphasis on track identification, and command and control in support of FTEWA.

3. (U) FY 1996 PLAN:
- (U) ($3,700) Continue advanced development of Force Threat Evaluation and Weapon Assignment (FTEWA) in support of Combat Air Patrol (CAP) and Surface-To-Air (SAM) integration.
- (U) ($1,500) Develop and demonstrate AUTO-ID with Electronic Surveillance Measures (ESM).
- (U) ($1,000) Support Remote Missile Launch (RML) and Forward Pass.
- (U) ($1,000) Continue Remote Data Engage (RDE) development.
- (U) ($698) Support LINK 11 interoperability between Joint and Allied Forces, including multiple, simultaneous links with emphasis on track ID, command and control in support of FTEWA.
- (U) ($400) Continue experiments to determine feasibility of integrating non-organic data to ID organic Battlegroup air tracks in real time.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2184 PROJECT TITLE: Force Anti-Air Warfare Coordination Technology (FACT)

4. (U) FY 1997 PLAN:

- (U) ($3,700) Continue advanced development of FTEWA in support of Combat Air Patrol and Surface-To-Air (SAM) integration.
- (U) ($1,500) Develop and demonstrate AUTO-ID with Electronic Surveillance Measures (ESM).
- (U) ($1,000) Continue RDE development.
- (U) ($1,000) Support RML and Forward Pass.
- (U) ($699) Support LINK interoperability between Joint and Allied Forces, including multiple, simultaneous links with emphasis on track ID, command and control in support of FTEWA.
- (U) ($341) Continue experiments to determine feasibility of integrating non-organic data to ID organic Battle Group air tracks in real time.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	3,226	8,025	XXX	XXX
(U) FY 1995 Appropriated:		8,025	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG:	+3,900	-1,735	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	7,126	6,290	8,298	8,240

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2184 PROJECT TITLE: Force Anti-Air Warfare Coordination Technology (FACT)

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Changes in funding are due to: FY 1994 - Below Threshold Reprogramming (BTR) increase of +$3,900 ($2,500 Forced Threat Evaluation and Weapon Assignment (FTEWA), $1,400 Improving Link 11 Interoperability and Link 16 Integration); FY 1995 - Undistributed Congressional reductions for University Research (-1,599), Small Business Innovative Research (-127), and Travel (-9).

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0205604N (Tactical Data Links)
(U) PE 0604307N (AEGIS Combat System Engineering)
(U) PE 0604366N (Standard Missile Improvements)
(U) PE 0604518N (Combat Information Center Conversion)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603755N PROGRAM ELEMENT TITLE: Ship Self Defense PROJECT NUMBER: U2184 PROJECT TITLE: Force Anti-Air Warfare Coordination Technology (FACT)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Equipment Development and Test	7,126	6,290	8,298	8,240
Total	7,126	6,290	8,298	8,240

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	Advanced Environmental Acoustic Support (AEAS)									
	9,669	9,340	7,743	7,324	7,321	11,231	11,220	11,554	CONT.	CONT.
R2017	Advanced Underwater Acoustic Modeling Project (AUAMP)									
	2,086	2,162	1,622	1,573	1,603	2,070	2,100	2,124	CONT.	CONT.
V0823	Sensor Performance Prediction (SPP)									
	7,839	8,135	6,677	6,514	6,640	9,264	9,351	9,628	CONT.	CONT.
TOTAL	19,594	19,637	16,042	15,411	15,564	22,565	22,671	23,306	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Combat Systems Oceanographic Performance Assessment (CSOPA) Program Element provides oceanographic/atmospheric research and development 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 mine warfare 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 system and area technical assessments. Emphasis is placed on shallow water and other harsh environments, and regional conflict scenarios. The Advanced Environmental Acoustic Support (AEAS) Project conducts oceanographic and acoustic measurements, develops computer prediction products and tactical decision aids, measurement instrumentation, and data bases, and conducts analyses in support of undersea warfare and mine warfare systems. The Advanced Underwater Acoustic Modeling Project (AUAMP) is focused on the development of a family of acoustic system performance

prediction products beginning with active system models and data bases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. The Sensor Performance Prediction Project develops computer-based, on-board capabilities to provide system performance predictions, operating mode selection guidance and decision aids for tactical platforms based on AEAS and AUAMP-developed models and historical data bases using *in situ* measurements and synoptic data. These guidance products are essential to maximize the effective employment of combat systems and weapons in highly complex regional conflict littoral warfare areas. The CSOPA Program products are being tailored for, and assimilated into, the Joint Maritime Command Information System to provide accurate system performance predictions and into fleet trainers to provide realistic ocean environments in support of warfare simulations. Direct support to existing fleet systems is provided in the Combatant Data Collection thrust which focuses on *in situ* measurements through operational weapon systems and provides direct, real-time feedback to optimize system performance in tactical situations. The CSOPA Program supports the Joint Mission Areas of Joint Littoral Warfare and Joint Surveillance.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120 Advanced Environmental Acoustic Support (AEAS)	9,669	9,340	7,743	7,324	7,321	11,231	11,220	11,554	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Department of Defense has turned its focus from the global threat of the Soviet Union to the future regional conflict scenarios outlined in the Defense Planning Guidance (DPG). Most of the DPG scenarios require operating naval forces in the earth's littoral waters which are shallow, have highly variable (in space and time) oceanographic conditions and confined maneuvering space. Of key concern to the U.S. Navy is the dual threat posed by very quiet diesel submarines capable of opposing U.S. naval forces and sea mines which will dramatically restrict force mobility and hamper or curtail amphibious operations. To counter these threats, there is an urgent and continuing need for the Navy to fully understand the ocean areas in which they will operate in the future. This project provides the necessary research and development to: a) rapidly and automatically acquire a broad array of oceanic data in littoral areas using organic sensors on fleet platforms and use these data to optimize system performance; b) accurately predict the performance of warfighting systems under development or employed in those areas; c) develop new capabilities in environmental acoustic models and data bases to support assessments of regional conflict ocean areas; d) develop environmentally sensitive decision aids to support tactical decisions made in real time during a regional conflict; and e) develop a synthetic environment module (virtual ocean) which will drive future simulations.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:
   - (U) ($4,030) Updated/tested shipboard Combatant Data Collection (CDC) techniques to include extraction of surface scattering strength and surface reflection loss for SQS-53 sonar predictions. Completed flight testing of prototype airborne CDC system. Began development/test of airborne shallow water area characterization techniques using SSQ-110 sonobuoy.

- (U) ($3,000) Modified and demonstrated virtual ocean for high frequencies. Designed long-term acoustic measurement equipment, and designed data recording systems for measurement efforts off the U.S. coast as surrogate environment for foreign sites of interest.

- (U) ($1,630) Updated/evaluated Mine Warfare Environmental Decision Aids Library (MEDAL) to address surface mine countermeasures (MCM) missions. Integrated software system into Joint Maritime Command Information System architecture. Began development of Amphibious Warfare tactical decision aid.

- (U) ($1,009) Completed environmental assessment for the Korean Waters. Developed critical environmental factors atlas for potential regional conflict areas in northern Arabian Sea.

2. (U) FY 1995 PLAN:

- (U) ($2,700) Evaluate airborne CDC data acquisition techniques and signal processing algorithms. Test/evaluate surface CDC techniques and algorithms in different shallow water environments.

- (U) ($2,227) Develop a new Mine Warfare tactical decision aid capability to include airborne MCM planning and evaluation, electronic environmental data ingest. Evaluate at-sea. Develop Amphibious Warfare tactical decision aid capability to include effects of surf on assault vehicles.

- (U) ($3,277) Complete the high frequency virtual acoustic ocean and demonstrate by stimulating the AN/SQQ-32 search sonar signal processor.

- (U) ($1,136) Develop critical environmental factors atlases for potential regional conflict areas in Korean shallow water operating areas. Investigate potential sources for existing littoral data, acquire and integrate for use with Expeditionary Warfare systems. Evaluate denied area measurement data acquisition concepts and approaches.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: R0120
PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

3. (U) FY 1996 PLAN:

- (U) ($2,429) Begin development of virtual acoustic ocean for mid-frequency tactical sonars, Extended Echo Range Sonobuoys and active Advanced Distributed Systems.
- (U) ($3,064) Begin development of MCM tactics and optimization algorithms for Mine Warfare Tactical Decision Aid and interface with meteorological and oceanographic data distribution system. Interface Amphibious Warfare Tactical Decision Aid to meteorological and oceanographic, and mapping, charting and geodesy sensors. Evaluate both decision aids during fleet exercises. Evaluate Mine Warfare systems performance in littoral environments.
- (U) ($2,250) Complete development and demonstration of airborne rapid area oceanographic and acoustic characterization techniques. Verify and validate surface ship sonar (SQS-53) acoustic parameter extraction algorithms and techniques in two littoral environments.

4. (U) FY 1997 PLAN:

- (U) ($3,330) Complete MCM tactics and optimization algorithms. Begin minefield planning module. Evaluate Mine Warfare systems performance in littoral environments. Link Amphibious Warfare decision aid to meteorological and oceanographic data distribution network. Evaluate at-sea.
- (U) ($1,431) Complete virtual acoustic ocean development. Begin development of virtual atmosphere for simulations/stimulations of radar systems used for theater anti-missile and air defense. Evaluate Navy systems performance in surrogate environment and extrapolate to foreign sites of interest.
- (U) ($2,563) Complete verification and validation of AN/SQS-53 acoustic parameter extraction algorithms in two littoral environments. Transition to PMO-411. Transition rapid area characterization techniques to PMA-546 and fleet squadrons. Begin development of active air source/receiver algorithms.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	9,669	9,737	XXX	XXX
(U) FY 1995 Appropriated:	XXX	9,737	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-397	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	9,669	9,340	7,743	7,324

(U) CHANGE SUMMARY EXPLANATION:
(U) Funding: In FY 1995, there are congressional undistributed reductions for: university research ($-213K); FFRDCs ($-10K); travel ($-13K); and the FY 1995 assessment for Small Business Innovative Research ($-161K).

(U) Schedule: Long term acoustic measurements in littoral region have been deferred.

(U) Technical: Acoustic systems operating in littoral regions will have reduced capability to deal with effects of spatial and temporal changes in the oceanic medium.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0205620N (Surface ASW Combat System Integration) - Transition of surface ship CDC efforts.
(U) PE 0602702E (Tactical Technology) - Advanced Research Projects Agency simulation development program.
(U) PE 0603254N (Anti-Submarine Warfare Systems Development) - Environmental support to the Extended Echo Range sonobuoy.
(U) PE 0603502N (Surface and Shallow Water MCM) - Integration of MEDAL into combat systems.

D. (U) SCHEDULE PROFILE: Not applicable.

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: R0120
PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	7,369	7,687	6,643	6,524
b. Ancillary Hardware Development	900	0	0	0
c. Development Support Equipment Acquisition	0	253	0	0
d. Miscellaneous	1,400	1,400	1,100	800
Total	9,669	9,340	7,743	7,324

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Naval Research Laboratory, Washington, D.C.	WR	11/2/93	Cont.	Cont.	5,800*	4,140	3,500	2,500	2,500	Cont.	Cont.
Planning Systems Inc., McLean, VA	C/CPFF	5/3/93	Cont.	Cont.	845	1,140	1,000	900	900	Cont.	Cont.
Paramax, Reston, VA	C/CPFF	12/24/92	6,736	6,736	560	1,130	1,340	1,380	1,435	891	6,736
Miscellaneous					3,325*	3,259	3,500	2,963	2,489	Cont.	Cont.

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

PROJECT NUMBER: R0120 PROJECT TITLE: Advanced Environmental Acoustic Support (AEAS)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	13,913	9,669	9,340	7,743	7,324	Cont.	Cont.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	13,913	9,669	9,340	7,743	7,324	Cont.	Cont.

*R0120 is a continuing program. Only FY 1993 dollars are shown.

C. FUNDING PROFILE: Not applicable.

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: . Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2017 Advanced Underwater Acoustic Modeling Project (AUAMP)										
	2,086	2,162	1,622	1,573	1,603	2,070	2,100	2,124	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: As Navy sonar systems become more sophisticated and their use in shallow water is increasing, there is an urgent and continuing need to understand underwater sound boundary interactions and propagation through the oceanic medium. The shallower waters of the earth's littoral regions are characterized by extreme variability in time as well as space. This project is focused on the development of a family of acoustic models which will predict the performance of existing and future Navy sonar systems. Initial efforts have concentrated upon the development of a multi-source, multi-receiver, fully Anti-Submarine Warfare (ASW) system performance prediction capability in ASW systems currently being planned and developed for use in the 1990's urther efforts are directed toward the stochastic prediction of performance of mid- and high-frequency tactical and mine warfare sonars, with an eventual goal of high fidelity simulation.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($759) Developed and tested Phase I, Optimization algorithms for sensor suite line-up guidance. Participated in Critical Sea Tests and Magellan Exercise.
- (U) ($370) Upgraded mid-frequency model to include accepted scattering algorithms for surface and bottom interactions for Advanced Environmental Acoustic Support Project Combatant Data Collection use.
- (U) ($210) Upgraded high frequency model used for the prediction of the AN/SQQ-32 mine hunting sonar erformance.

- (U) ($617) Began development of the techniques necessary to ascertain the geoacoustic bottom properties of shallow-water areas for a High Frequency Bottom Loss (HFBL) data base.

- (U) ($130) Finalized upgrades to Navy standard ambient noise prediction model and transitioned to Naval Oceanographic Office for configuration management and distribution.

2. (U) FY 1995 PLAN:

- (U) ($762) Complete and test Phase II optimization algorithms for sensor suite line-up guidance. Participate in sea tests.

- (U) ($300) Complete the development of a range dependent active sonar model for surface ship active sonars in a multi-static setting. This will operate 100-3000 Hz and include multi-sources, multi-receivers and a bottom loss data base continuous over this frequency range for active and passive performance.

- (U) ($209) Develop new capability in the high frequency acoustic model to include new absorption and target strength algorithms.

- (U) ($500) Create a HFBL data base for shallow waters of the western Pacific Ocean.

- (U) ($391) Investigate sources of coastal noise and upgrade ambient noise prediction model to cover frequencies greater than 500 Hz.

3. (U) FY 1996 PLAN:

- (U) ($747) Begin development of bottom scattering models for minehunting sonars and incorporate into high frequency system performance model.

- (U) ($700) Verify and validate the range dependent active sonar performance model against data acquired in support of Extended Echo Range sonobuoy and surface ship sonars.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

PROJECT NUMBER: R2017
PROJECT TITLE: Advanced Underwater Acoustic Modeling Project

- (U) ($175) Begin verification and validation of the high frequency acoustic time series simulator portion of the virtual acoustic ocean.

4. (U) FY 1997 PLAN:

- (U) ($653) Verify and validate high frequency model for AN/SQQ-32 minehunting sonar performance predictions.
- (U) ($561) Document high frequency acoustic time series simulator and submit for accreditation.
- (U) ($359) Document range dependent active sonar performance model (ASPM) and submit for accreditation.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	2,086	2,219	XXX	XXX
(U) FY 1995 Appropriated:	XXX	2,219	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-57	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	2,086	2,162	1,622	1,573

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: In FY 1995, there are congressional reductions for: university research ($-3K); FFRDCs ($-10K); travel ($-3K); and the FY 1995 assessment for Small Business Innovative Research ($-41K).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: R2017 PROJECT TITLE: Advanced Underwater Acoustic Modeling Project

(U) Schedule: Verification, validation, and accreditation of computer models will be delayed.

(U) Technical: Acoustic models will have reduced functionality.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0602435N (Oceanographic and Atmospheric Technology) - Joint efforts in boundary interaction physics.
(U) PE 0603747N (Undersea Warfare Advanced Technology) - Evaluation of ASPM during Critical Sea Tests.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)
PROJECT NUMBER: R2017
PROJECT TITLE: Advanced Underwater Acoustic Modeling Project (AUAMP)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Software Development	1,786	1,862	1,372	1,323
b. Miscellaneous	300	300	250	250
Total	2,086	2,162	1,622	1,573

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: R2017
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Advanced Underwater Acoustic Modeling Project (AUAMP)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Miscellaneous					3,028*	2,086	2,162	1,622	1,573	Cont.	Cont.

Support and Management: Not applicable.

Test and Evaluation: Not applicable.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: R2017
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Advanced Underwater Acoustic Modeling Project (AUAMP)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	3,028	2,086	2,162	1,622	1,573	Cont.	Cont.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	3,028	2,086	2,162	1,622	1,573	Cont.	Cont.

*R2017 is a continuing program. Only FY 1993 dollars are shown.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603785N
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V0823 Sensor Performance Prediction (SPP)	7,839	8,135	6,677	6,514	6,640	9,264	9,351	9,628	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The SPP program 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/high resolution environmental data bases. SPP maximizes the full performance potential of complex systems by increasing their detection/tracking performance. The program is focused on the development of new combat system performance prediction and tactical decision aid capabilities for highly complex littoral environments to support regional conflict scenarios. It addresses the multi-warfare areas, particularly missile and air defense/strike capabilities, that are critical to operate in the littoral and the hinterland and includes all platforms (i.e. surface, submarine and air).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($1,975) Updated Anti-Submarine Warfare (ASW) TDA to include: Active search fusion, measured/synoptic environmental data, and non-acoustic detection/counterdetection capabilities. Expanded the ASWTDA to address the total SPP Expeditionary Decision Support requirements for the littoral regions.

- (U) ($2,373) Updated the Surface Ship SPP Advanced Development Model (ADM) to include SQS-53C module enhancements and littoral warfare product requirements. Evaluated at-sea.

- (U) ($2,041) Updated/evaluated the Submarine SPP ADM to address sensor/weapon upgrades; increased the use of measured/synoptic environmental data; and incorporated non-acoustic system predictions and non-acoustic vulnerability.

- (U) ($1,450) Updated/evaluated the Integrated Carrier ASW Prediction System II and the P3 Maritime Patrol Aircraft Laptop Prediction System to include Extended Echo Ranging prediction capability, new sonobouy predictions, processor mode selection guidance and non-acoustic predictions. Evaluated at-sea.

2. (U) **FY 1995 PLAN:**

- (U) ($2,222) Complete the initial SPP Expeditionary Decision Support capability to ingest and utilize expanded in-situ/synoptic environmental data and non-acoustic detection/counterdetection capabilities specifically for littoral areas. Evaluate at-sea.

- (U) ($2,175) Develop a new Surface Ship SPP ADM capability to include: mine detection/avoidance aids, non-acoustic tactical decision aids and shallow water counterdetection predictions. Test at-sea.

- (U) ($1,850) Develop a prototype Electro-Magnetic performance prediction/TDA system to optimize employment of fleet radars in the highly variable littoral areas against the diesel submarine and low flying missiles. Evaluate at-sea.

- (U) ($1,888) Develop a new Submarine SPP ADM capability to include: performance predictions/line-up support, mine warfare decision aids, all sensor search fusion and optimum weapon preset predictions and Expeditionary Warfare products. Test at-sea.

3. (U) **FY 1996 PLAN:**

- (U) ($3,036) Initiate development of a Joint Littoral/Multi-Mission TDA for submarine, air and surface ships that will provide an integrated acoustic and non-acoustic combat system performance prediction capability using in-situ and synoptic Meteorological and Oceanographic data for the multi-threat, multi-warfare scenario. This system will be tied into the Joint Maritime Command Information System for information connectivity. In addition, it will provide more automated and "event triggered" performance prediction/tactical decision aid capabilities in order to maintain tactical control and address the requirements for reduced manning. Test at-sea.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: V0823
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Sensor Performance Prediction (SPP)

- (U) ($2,181) Complete development of the initial Electro-Magnetic/Electro-Optic Performance Prediction/Decision Support System for Anti-Submarine, Anti-Missile and Air Defense/Strike Warfare. Test at-sea.

- (U) ($1,460) Incorporate the prototype Electro-Magnetic and Electro-Optic capabilities into the current surface ship, air and submarine performance prediction system ADM to maximize Expeditionary Warfare decision support in the littoral areas. Test at-sea.

4. (U) FY 1997 PLAN:

- (U) ($2,300) Complete development of the initial Joint Littoral Decision aids for use in shallow water against diesel submarines/low flying missiles. Incorporate into an integrated Expeditionary Decision Support System. Evaluate at-sea during Fleet Regional Conflict/Littoral exercises.

- (U) ($1,742) Develop refinements and new capabilities for the Electro-Magnetic/Electro-Optic Performance Prediction/Decision Support System based on initial at-sea use. Develop additional combat system connectivity to measure systems performance. Test at-sea.

- (U) ($2,472) Develop new functionality for the submarine, air and surface ship ADM to further address the multi-threat, multi-warfare scenarios. This new functionality will include predictions for new combat systems, greater use of highly variable in-situ and synoptic environmental data, increased connectivity and "greater automation/event triggering" to reduce manning requirements. Test at-sea.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	7,839	8,361	XXX	XXX
(U) FY 1995 Appropriated:	XXX	8,361	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:	0	-226	XXX	XXX

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603[illegible]N PROJECT NUMBER: V0823
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Sensor Performance Prediction (SPP)

(U) FY 1996/97 PRESBUDG Budget Submit:	7,839	8,135	6,677	6,514

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: In FY 1995, there are congressional reductions for: university research ($-28K); consulting services ($-63K); FFRDC ($-6K); travel ($-11K); and the FY 1995 assessment for Small Business Innovative Research ($-118K).

(U) Schedule: Some new functionality will be delayed.

(U) Technical: Reduced use of in-situ data ingest for both environmental and sensor data which will reduce the effectiveness of our systems in the littoral. Reduced efforts to develop multi-mission TDAs for regional conflict scenarios.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0603207N (Air/Ocean Tactical Applications)
(U) PE 0603504N (Advanced Submarine Combat Systems Development)
(U) PE 0603553N (Surface ASW)
(U) PE 0604218N (Air/Ocean Equipment Engineering)

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones	4Q Update T&E Master Plan (TEMP)	4Q Update TEMP	4Q Update TEMP	4Q Update TEMP	Cont.
Engineering Milestones	1Q Surface Ship and Submarine SPP ADM's Crit. Design Review (CDR)	1Q EM/EO Perf. Prediction/TDA CDR	2Q Joint Littoral/Multi-Mission Decision Aid CDR		Cont.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT NUMBER: V0823 PROJECT TITLE: Sensor Performance Prediction (SPP)

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
		3Q Surface Ship and Submarine SPP ADM's CDR 3Q SPP Expeditionary Decision Support CDR	3Q Surface and Submarine Ship SPP ADM's CDR		
T&E Milestones	2Q Surface Ship SPP ADM Sea Test 3Q Integrated Carrier ASW Prediction System II Sea Test	2Q EM/EO Perf. Prediction/TDA and Surface and Submarine SPP ADM Sea Test 4Q SPP Expeditionary Decision Support Sea Test	4Q EM/EO Perf. Prediction/TDA Sea Test 4Q Surface, Air, Submarine ADM's Sea Test	3Q Joint Littoral/Multi-Mission Decision Aid Sea Test 4Q Surface, Air, Submarine ADM's Sea Test	Cont.
Contract Milestones	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: V0823
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Sensor Performance Prediction (SPP)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Development Support Equipment Acquisition	50	50	75	100
b. Software Development	3,719	4,375	3,195	3,037
c. Systems Engineering	1,465	1,225	1,050	1,100
d. Integrated Logistics Support	690	627	600	615
e. Configuration Management	175	175	200	200
f. Development Test & Evaluation	925	996	900	900
g. Contractor Engineering Support	100	100	100	100
h. Government Engineering Support	540	475	445	350
i. Program Management Support	150	87	87	87
j. Travel	25	25	25	25
Total	7,839	8,135	6,677	6,514

UNCLASSIFIED

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: V0823
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Sensor Performance Prediction (SPP)

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands):

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
Analysis & Tech. Inc., Middletown, RI	CPFF	11/93	Cont.	Cont.	2,960	2,098	2,193	1,697	1,675	Cont.	Cont.
Sonalysts Inc., Waterford, CT	CPFF	11/89	Cont.	Cont.	3,255	2,538	2,526	2,006	1,980	Cont.	Cont.
Miscellaneous					770*	1,488	1,758	1,442	1,422	Cont.	Cont.
Support and Management											
Miscellaneous					707*	790*	662	632	537	Cont.	Cont.
Test and Evaluation											
Miscellaneous					1,067*	925	996	900	900	Cont.	Cont.

GOVERNMENT FURNISHED PROPERTY: Not applicable.

UNCLASSIFIED

RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603785N PROJECT NUMBER: V0823
PROGRAM ELEMENT TITLE: Combat Systems Oceanographic Performance Assessment (CSOPA) PROJECT TITLE: Sensor Performance Prediction (SPP)

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	6,985	6,124	6,487	5,145	5,077	Cont.	Cont.
Subtotal Support and Management	707	790	652	632	537	Cont.	Cont.
Subtotal Test and Evaluation	1,067	925	996	900	900	Cont.	Cont.
Total Project	8,759	7,839	8,135	6,677	6,514	Cont.	Cont.

*V0823 is a continuing program. Only FY 1993 dollars are shown.

C. FUNDING PROFILE: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2156 Naval Surface Fire Support	25,200*	19,075	12,028	27,601	31,212	29,421	29,580	30,399	CONT.	CONT.

*Program restructured from S2093

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Naval Surface Fire Support Mission will be met near term utilizing Tactical Air (TACAIR), Missiles and Gun Systems. The NSFS Program Office will acquire all gun related systems in order to meet the range, accuracy, and lethality requirements of the Mission Needs Statement dated 11 May 1992. Gun related systems are to include: a 5"/54 Gun Weapon System modification, a Precision Guided Munition, a gun fire control system and some ballistic ammunition work. These combined weapon systems will provide the required standoff capability to safely destroy shore targets. Advanced technologies will be necessary to fulfill projected mission requirements for large caliber gun systems in NSFS. 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. The program will provide critical NSFS capabilities necessary to support all phases of amphibious operations. The Acquisition Decision Memorandum (November 1992) approved initiation of program Phase 0.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it develops and integrates hardware for experimental test related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS/PLANS:

- (U) ($1,700) Prepared Milestone I documentation.
- (U) ($1,500) Completed Concept Formulation for 5" gun system, ammunition, and fire control.
- (U) ($3,500) Established coordinated program plan for Navy/Defense Nuclear Agency Electrothermal Chemical (ETC) Technology Program. Provided Navy technical direction to DNA contractors for: ETC Propelling Charge Design Requirements; ETC Gun System requirements; ETC Power System Hull/Mechanical/Electrical Design requirements; and Projectile Design Requirements.
- (U) ($101) Initiated Turbine Generator, rectifier and LDCG (Limited Duty Cycle Generator) contracts.
- (U) ($1,900) Demonstrated High G (Gravity) Gun Launched Electronics Survivability. Demonstrated Gun Launched Command Guided Projectile Technology.
- (U) ($800) Prepared ETC Technology Program Master Test Plan.
- (U) ($3,200) Revised Advanced Gun Weapon System Technology (AGWST) contract for Liquid Propellant (LP) Gun Technology Program. Award LP contract.
- (U) ($12,499) Continue conduct of PGM risk reduction efforts. Perform Naval Surface Fire Support (NSFS) Missile Demonstration (Forward Financing FY 1995 efforts).
- (U) ($3,576) Complete Milestone II/IV for the 5"/MK 45 Extended Range Modification. Award contract for 5"/MK 45 Extended Range Modification.

2. (U) FY 1995 PLAN:

- (U) ($3,000) Conclude Electrothermal Chemical Gun technology efforts.
- (U) ($7,799) Continue development of 5"/MK 45 Extended Range Modification (forward financing FY 1996 effort).
- (U) ($4,700) Prepare for Precision Guided Munitions (PGM) MS I and conduct PGM risk reduction efforts. Perform NSES Missile Demonstration (Forward financing FY 1996 efforts).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

3. (U) FY 1996 PLAN:

- (U) ($12,028) Continue development of 5"/MK 45 Extended Range Modification.

4. (U) FY 1997 PLAN:

- (U) ($11,039) Award DEM/VAL contract for PGM.
- (U) ($16,562) Continue development of 5"/MK 45 Extended Range Modification.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	23,700	9,629	XXX	XXX
(U) FY 1995 Appropriated:	XXX	19,349	XXX	XXX
(U) Adjustments from Appropriated/ FY 1995 PRESBUDG	+1,500	-274	XXX	XXX
(U) FY 1996/97 PRESBUDG Submit:	25,200	19,075	12,028	27,601

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: Increase in FY 1994 provided to complete the Cost and Effectiveness Operational Analysis and preparation of Milestone I Decision point. The FY 1995 decrease of $274K resulted from an Small Business Innovative Research reduction of $208K and Undistributed Congressional reductions for university research and travel totalling $66K.

(U) Schedule: Contract award of 5"/MK 45 Extended Range Mod in FY 1995 delayed one month.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E: Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology PROJECT TITLE: Naval Surface Fire Support

D. (U) SCHEDULE PROFILE:

	FY 1994	FY 1995	FY 1996	FY 1997	TO COMPLETE
Program Milestones		4Q MS II/IV 5"/ MK 45 EXTENDED RANGE MOD	4Q MS I PGM		CONT.
Engineering Milestones			2Q PDR 5"/MK 45 EXTENDED RANGE MOD	3Q CDR 5"/MK 45 EXTENDED RANGE MOD	CONT.
T&E Milestones					CONT.
Contract Milestones		4Q CA 5"/ MK 45 EXTENDED RANGE NOD		1Q CA PGM	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Primary Hardware Development	5,100	11,726	7,527	20,201
b. Ancillary Hardware Development	9,300	2,200	500	2,200
c. Government Engineering	7,500	3,000	2,201	3,700
d. Systems Engineering	1,700	1,600	1,400	1,000
e. Miscellaneous	1,600	549	400	500
Total	25,200	19,075	12,028	27,601

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons Systems Technology PROJECT TITLE: Naval Surface Fire Support

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method/ Fund Type Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development											
NSWC DAHLGREN,VA	WR	VAR	CONT.	CONT.	1,625	3,600	3,100	3,200	2,750	CONT.	CONT.
NSWC DAHLGREN,VA	RC	VAR	CONT.	CONT.	0	1,452	0	100	2,000	CONT.	CONT.
NSWC CRANE,IN	WR	VAR	CONT.	CONT.	4,038	4,325	2,000	1,150	1,300	CONT.	CONT.
NSWC CRANE,IN	RC	VAR	CONT.	CONT.	3,681	3,500	0	0	0	CONT.	CONT.
NSWC ANNAPOLIS,MD	WR	VAR	CONT.	CONT.	0	2,000	100	100	150	CONT.	CONT.
NSWC ANNAPOLIS,MD	RC	VAR	CONT.	CONT.	0	600	500	300	1,000	CONT.	CONT.
NSWC INDIAN HD,MD	WR	VAR	CONT.	CONT.	291	1,400	1,100	650	800	CONT.	CONT.
NSWC INDIAN HD,MD	RC	VAR	CONT.	CONT.	0	0	400	500	3,000	CONT.	CONT.
NSWC PORT HUE,CA	WR	VAR	CONT.	CONT.	0	0	250	150	150	CONT.	CONT.
FMC/Minneap,MN	CPFF	09/95	CONT.	CONT.	0	0	4,000	2,500	3,500	CONT.	CONT.
DRAPER LABS, Cambridge, MA	PD	10/94	CONT.	CONT.	0	537	5,000	0	0	CONT.	CONT.
MARTIN MARIETTA Philadelphia, PA	CPFF	06/94	1,435	1,435	0	1,435	0	0	0	CONT.	CONT.
JOHNS HOPKINS APL, Laurel, MD	PD	03/95	1,800	1,800	0	1,800	0	0	0	CONT.	CONT.
MCDONNELL DOUGLAS AEROSPACE St. Louis, MO	PD	02/95	3,000	3,000	0	3,000	0	0	0	CONT.	CONT.
TBD-PGM	TBD	12/96	CONT	CONT	0	0	0	3,000	9,700	CONT.	CONT.
MISCELLANEOUS	VAR	VAR	CONT.	CONT.	2,941	1,551	2,625	378	3,251	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

	FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Support and Management	0	0	0	0	0		
Test and Evaluation	0	0	0	0	0		

GOVERNMENT FURNISHED PROPERTY - Not applicable.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603795N PROJECT NUMBER: S2156
PROGRAM ELEMENT TITLE: Gun Weapons PROJECT TITLE: Naval Surface Fire Support Systems Technology

	FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development	12,576	25,200	19,075	12,028	27,601	CONT.	CONT.
Subtotal Support and Management	0	0	0	0	0	0	0
Subtotal Test and Evaluation	0	0	0	0	0	0	0
Total Project	12,576	25,200	19,075	12,028	27,601	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603800N
ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM

PROJECT NUMBER: D2209
PROJECT TITLE: JASTP

(U) COST (Dollars in thousands)

PROJECT NUMBER TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
D2209	29,663	98,272	149,295	199,305	292,426	409,349	196,921	0	0	1,375,231

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The JAST Program has been chartered to facilitate the evolution of fully validated affordable operational requirements and proven operational concepts, and also transition the key technologies to enable the successful development and production of affordable next generation strike aircraft weapon systems for the Navy, Marine Corps, Air Force and our allies. The JAST Program is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program effective in FY 1995. The Advanced Research Projects Agency (ARPA) contributes funding for the concept flight demonstration effort commencing in FY 1996.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under DEMONSTRATION & VALIDATION because it integrates hardware for test related to specific ship or aircraft applications.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS: Conducted concept exploration studies and provided in-house support as follows (Navy only funding in FY 1994):

   - (U) ($11,597) Strike warfare concept studies.
   - (U) ($ 5,049) Strategy-to-technology analysis.
   - (U) ($ 259) Structures and Materials.
   - (U) ($ 1,570) Flight Systems.
   - (U) ($ 105) Manufacturing.

- (U) ($ 1,000) Propulsion.
- (U) ($ 988) Avionics.
- (U) ($ 704) Weapons integration.
- (U) ($ 2,017) Supportability.
- (U) ($ 439) Technology integration planning support.
- (U) ($ 5,935) Program operations, including program office functions.

2. (U) FY 1995 PLAN: Complete concept exploration, begin concept development and provide in-house support as follows (Breakout reflects combined Navy and Air Force funding):

- (U) ($55,670) Strike warfare systems design development.
- (U) ($37,819) ASTOVL.
- (U) ($ 7,410) Strategy-to-technology analysis.
- (U) ($ 9,837) Structures and Material.
- (U) ($10,150) Flight Systems.
- (U) ($ 4,973) Manufacturing and Producibility.
- (U) ($17,754) Propulsion.
- (U) ($18,622) Avionics.

- (U) ($ 7,247) Weapons integration.
- (U) ($ 5,017) Supportability.
- (U) ($ 1,249) Technology integration planning support.
- (U) ($ 6,325) Program operations, including program office functions.

3. (U) FY 1996 PLAN: Continue concept development and begin advanced aircraft concept demonstrations and provide in-house support as follows (Breakout reflects Navy, Air Force and ARPA funding):

- (U) ($56,284) Strike warfare systems design development.
- (U) ($77,058) Concept flight demonstration efforts.
- (U) ($ 6,900) ASTOVL.
- (U) ($ 7,639) Strategy-to-technology analysis.
- (U) ($25,054) Structures and Materials.
- (U) ($31,200) Flight Systems.
- (U) ($12,000) Manufacturing and Producibility.
- (U) ($33,488) Propulsion.
- (U) ($36,096) Avionics.
- (U) ($17,300) Weapons integration.

- (U) ($20,000) Supportability.
- (U) ($ 1,154) Technology integration planning support.
- (U) ($ 6,983) Program operations, including program office functions.

4. (U) FY 1997 PLAN: Continue advanced aircraft concept demonstrations and provide in-house support as follows (Breakout reflects Navy, Air Force and ARPA funding):

- (U)($193,580) Concept flight demonstrations.
- (U) ($ 7,600) Strategy-to-technology analysis.
- (U) ($66,450) Structures and Materials.
- (U) ($31,900) Flight Systems.
- (U) ($11,000) Manufacturing and Producibility.
- (U) ($60,000) Propulsion.
- (U) ($55,000) Avionics.
- (U) ($22,700) Weapons integration.
- (U) ($23,900) Supportability.
- (U) ($ 1,154) Technology integration planning support.
- (U) ($ 6,777) Program operations support.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT NUMBER: D2209 PROJECT TITLE: JASTP

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	$29,663	$100,037	XXX	XXX
(U) FY 1995 Appropriated:	XXX	100,037	XXX	XXX
(U) Adjustments from Appropriated/FY 1995 PRESBUDG:		- $1,765	XXX	XXX
(U) FY 1996/97 PRESBUDG Budget Submit:	$29,663	$ 98,272	$149,295	$199,305

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1995 adjustment reflects reduction for SBIR.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) This is a joint program with no executive service. Navy and Air Force each provide approximately equal shares of annual funding for the program effective in FY 1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996.

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)RDT&E 0603800F	0	83,801	151,186	199,831	304,263	413,616	196,967	0	0	1,349,664
(U)RDT&E 0603800E	0	0	30,675	80,925	83,922	19,000	16,000	10,000	CONT.	CONT.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

(U) RELATED RDT&E:
Milestone II for a joint follow-on E&MD program for the next generation strike aircraft weapon systems(s) is planned in FY 2000. The follow-on aircraft weapon system(s) program will develop a family of aircraft from concepts proven under the JAST Program, incorporating affordable technologies transitioned from the JAST Program.

	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U)RDT&E 0604800F:	0	0	0	0	0	0	127,324	464,441	CONT	CONT
(U)RDT&E 0604800N:	0	0	0	0	0	0	127,295	464,456	CONT	CONT

D. (U) SCHEDULE PROFILE: Not applicable; this is a technology demonstration program, not an acquisition program.

	FY 1994	FY 1995	FY 1996	FY 1997
Program Milestones				
Engineering Milestones				
T&E Milestones				
Contract Milestones				

Program Phases
Concept exploration (May 94 - Nov 94)
Concept development (definition and design research) (Dec 94 - Mid 96)
Concept demonstration (includes flying concept demonstrations) (Mid 96 - Jan 00)

Transition to joint follow-on Engineering and Manufacturing Development (E&MD) program with Milestone II (FY 00).

Continue technology maturation demonstration/transition under the JAST Program.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: February 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT: 0603800N PROJECT NUMBER: D2209
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM PROJECT TITLE: JASTP

A. (U) PROJECT COST BREAKDOWN: ($ in thousands) Breakout reflects combined Navy, Air Force and ARPA funding. This is a joint Navy and Air Force program with no lead service. Navy and Air Force have each budgeted approximately equal shares of annual funding effective in FY 1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996. The funding resource breakout is provided on page 2.

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Strike warfare concept studies	11,597			
b. Strike warfare systems design development		55,670	56,284	
c. Concept flight demonstrations			77,058	193,580
d. ASTOVL		37,819	6,900	
e. Strategy-to-technology analysis	5,049	7,410	7,639	7,600
f. Structures and materials	259	9,837	25,054	66,450
g. Flight Systems	1,570	10,150	31,200	31,900
h. Manufacturing	105			
i. Manufacturing and producibility		4,973	12,000	11,000
j. Propulsion	1,000	17,754	33,488	60,000
k. Avionics	988	18,622	36,096	55,000
l. Weapons integration	704	7,247	17,300	22,700

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

DATE: February 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0603800N
PROGRAM ELEMENT TITLE: JOINT ADVANCED STRIKE TECHNOLOGY (JAST) PROGRAM

PROJECT NUMBER: D2209
PROJECT TITLE: JASTP

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
m. Supportability	2,017	5,017	20,000	23,900
n. Technology integration planning support	439	1,249	1,154	1,154
o. Program operations support	5,935	6,325	6,983	6,777
Total	29,663	182,073	331,156	480,061
*Funding Resources				
Navy PE 0603800N	29,663	98,272	149,295	199,305
Air Force PE 0603800F	-0-	83,801	151,186	199,831
ARPA PE 0603800E	-0-	-0-	30,675	80,925
Total	29,663	182,073	331,156	480,061

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION: Not applicable

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0798 OTH Targeting	1,550	1,733	1,903	1,807	1,722	1,947	1,960	2,018	Cont.	Cont.
X2144 SEW Engineering	2,749*	3,213	3,839	3,859	4,023	5,099	5,141	5,292	Cont.	Cont.
TOTAL	4,299	4,946	5,742	5,666	5,745	7,046	7,101	7,310	Cont.	Cont.

* Amount reflects $2.3M reprogrammed (BTR #94-6 dtd 11 April 1994) to Project X2144 from PE 0604574N, Project X1976. The budget justification below reflects the Project as restructured by the reprogramming.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Space and Electronic Warfare (SEW) Architecture/Engineering Support is a non acquisition systems engineering effort, the objective of which is to ensure that: naval command, control, communications, computers and intelligence (C4I), surveillance, and command and control warfare (C2W) components of SEW are effectively integrated; the composite operational capabilities of the SEW system (not the individual component systems) conform to the changing goals and objectives of the new National Defense Strategy and evolving joint war fighting doctrine such as "...From the Sea" and C4I For the Warrior; and SEW systems and systems integration reflect leading-edge information transfer and information processing technologies, including integration of government and commercial off-the-shelf (COTS/GOTS) capabilities, to enhance operational capability or reduce cost. The Program Element contains two projects, Over-the-Horizon (OTH) Targeting and SEW Engineering.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under the Demonstration & Validation Budget Activity because it develops and integrates hardware for experimental tests related to specific ship or aircraft applications.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4

PROGRAM ELEMENT: 0604707
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support

(U) COST (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0798 OTH Targeting	1,550	1,733	1,903	1,807	1,722	1,947	1,960	2,018	Cont.	Cont.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Over-the-Horizon Targeting (OTH-T) project line (X0798) supports prototyping and engineering activities critical to the development of operational capabilities to target TOMAHAWK and HARPOON cruise missiles beyond the sensor range of the launch platforms. Specifically, to:

- Demonstrate enhanced capability to integrate aircraft sensor data using prototype onboard sensor interface systems, and provide that information via UHF satellite communications to: (1) the Force Over-the-Horizon Track Coordinator (FOTC) for input into the common tactical picture, and (2) to TOMAHAWK and HARPOON cruise missile targeting systems. These efforts resulted in the OUTLAW HUNTER-configured P-3 aircraft successfully employed in Operation Desert Storm. Prototyping efforts have continued to demonstrate size/weight reductions to accommodate carrier-based S-3 aircraft (OUTLAW VIKING) and helicopters (OUTLAW SEAHAWK), and SSN data satellite connectivity. Future efforts will focus on the potential contribution of new technology such as direct sequence spread spectrum communications to support global tracking of friendly forces;

- Develop and promulgate composite OTH-T system specifications;

- Certify the interoperability of, and exercise configuration control over, any system that operates on the Officer-in-Tactical Command Information Exchange (OTCIXS) net to ensure the integrity of the net for transmission of OTH-T messages as new systems come onto the net, or as existing systems undergo substantive software revisions/upgrades; and,

- Provide technical expertise afloat and ashore via a cadre of highly-trained Fleet systems engineers who ensure smooth integration of new capabilities into OTH-T during major Fleet exercises and demonstrations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707 PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture/Engineering Support PROJECT TITLE: OTH Targeting

(U) The OTH-T project is closely aligned with SEW Engineering because it provides a successful model and source of expertise for SEW/C4I Fleet systems engineering, as well as an interoperability testbed at the Reconfigurable Land-Based Test Site (RLBTS).

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($775) Provided Fleet Engineering Support to Fleet Commanders in Chiefs (CINCs) to perform the following: Monitored technical performance of Officer in Tactical Command Information Exchange System (OTCIXS) global satellite network during introduction and demonstration of new capabilities. Provided end-to-end system engineering expertise to ensure smooth integration of new Fleet capabilities during major fleet exercises and demonstrations.

- (U) ($775) OTH Targeting Interoperability Certification - Utilized Reconfigurable Land Based Test Site (RLBTS) to test major software enhancements of Naval Tactical Command Systems-Afloat, Tomahawk Weapons Control System Block III, and upgrades to the Tactical Data Information Exchange System (TADIXS-A) to verify compliance with interoperability requirements in accordance with OPNAVINST 9410.5 and CJCSINST 6212.01.

2. (U) FY 1995 PLAN:

- (U) ($875) Provide Fleet Engineering Support to Fleet Commanders in Chiefs (CINCs) to perform the following: Monitor technical performance of OTCIXS during introduction and demonstration of new capabilities. Provide end-to-end system engineering expertise to ensure smooth integration of Naval Tactical Command and Control System (NTCCS) and Ocean Surveillance Information System Baseline Upgrade Evolutionary Development (OBU/OED) systems migration into the Joint Maritime Command Information System (JMCIS, GCCS, and coalition interfaces).

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707 PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support PROJECT TITLE: OTH Targeting

- (U) ($858) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements of NTCCS, OBU/OED migration to JMCIS, to verify compliance with interoperability requirements in accordance with OPNAVINST 9410.5 and CJCSINST 6212.01.

3. (U) FY 1996 PLAN:

- (U) ($250) Conduct prototyping and demonstrations of OUTLAW HAWKEYE, an initiative to field a Ultra High Frequency Satellite Communications Data Package for the E-2C Aircraft and to integrate the JMCIS/GCCS into aircraft tactical data display systems. Evaluate improved high data rate comms architecture for large and small ships and aircraft.

- (U) ($801) Provide Fleet Engineering Support to Fleet CINCs to perform the following: Monitor technical performance of OTCIXS during testing of interoperability of Advanced Tomahawk Weapon Control System, advanced submarine combat system (AN-BSY-2), and migration of Battle Group Passive Horizon Extension System (BGPHES) into JMCIS. Provide end-to-end system engineering expertise to ensure smooth integration of these same systems into the Fleet.
- (U) ($852) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements, i.e., BGPHES migration into JMCIS, ATWCS and BSY-2, to verify compliance with interoperability requirements in accordance with OPNAVINST 9410.5 and CJCSINST 6212.01.

4. (U) FY 1997 PLAN:

- (U) ($250) Continue OUTLAW series of prototyping and demonstrations to transition advanced technology and/or new capability to the fleet.

- (U) ($707) Provide Fleet Engineering Support to CINCs to perform the following: Monitor technical performance of the tactical global satellite network during testing of new capabilities. Provide end-to-end system engineering expertise afloat and ashore to ensure smooth integration of new capabilities during major fleet exercises and demonstrations.

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707 PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support PROJECT TITLE: OTH Targeting

- (U) ($850) OTH Targeting Interoperability Certification - Utilize RLBTS to test evolutionary software enhancements of follow-on versions of JMCIS, to verify compliance with interoperability requirements in accordance with OPNAVINST 9410.5 and CJCSINST 6212.01.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget	1,550	2,175		
(U) FY 1995 Appropriated:		2,175		
(U) Adjustments from Appropriated/PRESBUDG:	0	-442		
(U) FY 1996/97 OSD/OMB Budget Submit:	1,550	1,733	1,903	1,807

(U) CHANGE SUMMARY EXPLANATION: N/A

(U) Funding: FY-95 was decreased by $442K, $415K to reflect undistributed reductions for Travel, Consulting Services, and University Research and $27K to accommodate Small Business Innovative Research.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: (Dollars in thousands) N/A

(U) RELATED RDT&E: Not Applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

FY 1996 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN Date: Feb 1995

BUDGET ACTIVITY: 1 PROGRAM ELEMENT: 0604707 PROJECT NUMBER: X0798
PROGRAM ELEMENT TITLE: SEW Architecture Engineering Support PROJECT TITLE: OTH Targeting

(U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
a. Fleet Engineering	775	875	801	707
b. Interoperability Certification	775	858	852	850
c. OPTEMPO Projects	0	0	250	250
Total	1,550	1,733	1,903	1,807

FY 1996 RDT&E,N PROGRAM ELEMENT PROJECT COST BREAKDOWN DATE: Feb 1995

PROJECT PRIORITY: 1 PROGRAM ELEMENT:0604707 PROJECT NUMBER:X0798
PROGRAM ELEMENT TITLE:SEW Architecture Engineering Support PROJECT TITLE: OTH Targeting

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands) N/A

PERFORMING ORGANIZATIONS

Contractor Government Performing Activity	Contract Method Fund Type Vehicle	Award Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:											
Various		N/A	Cont.	Cont.	13,207	1,550	1,733	1,903	1,807	Cont.	Cont.
Support and Management		N/A	N/A	N/A	0	0	0	0	0		
Test and Evaluation		N/A	N/A	N/A	0	0	0	0	0		

GOVERNMENT FURNISHED PROPERTY Items

Item Description	Contract Method Fund Type Vehicle	Award Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0	Cont.	Cont
Support and Management				0	0	0	0	0	Cont.	Cont
Test and Evaluation				0	0	0	0	0	Cont.	Cont

FY 1996 TITLE,II PROGRAM ELEMENT PROJECT COST BREAKDOWN

DATE: Feb 1995

PROJECT NUMBER: X0798
PROJECT TITLE: OTH Targeting

PROGRAM ELEMENT: 0604707
PROGRAM ELEMENT TITLE:SEW Architecture Engineering Support

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
[illegible]	13,207	1,550	1,733	1,903	1,807	Cont.	Cont.
[illegible]	0	0	0	0	0		
[illegible]	0	0	0	0	0		
[illegible]	13,207	1,550	1,733	1,903	1,807	Cont.	Cont.

[illegible] FUNDING PROFILE: N/A

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support

(U) COST (Dollars in thousands)

PROJECT NUMBER / TITLE	FY 1994 ACTUAL	FY 1995 ESTIMATE	FY 1996 ESTIMATE	FY 1997 ESTIMATE	FY 1998 ESTIMATE	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X2111 SEW Engineering	3,713*	3,213	3,813	3,859	4,023	5,099	5,141	5,292	Cont.	Cont.

* Amount reflects $2.3M reprogrammed (DTP #94-6 dtd 11 April 1994) to Project X2144 from PE 0604574N, Project X1775. The budget justification below reflects the Project as restructured by the reprogramming.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Space and Electronic Warfare (SEW) Engineering is a non acquisition systems engineering effort, the objective of which is to ensure that: naval command, control, communications, computers and intelligence (C4I), surveillance, and command and control warfare (C2W) components of SEW are effectively integrated; the composite operational capabilities of the SEW system (not the individual component systems) conform to the changing goals and objectives of the new National Defense Strategy and evolving joint war fighting doctrine such as "...From the Sea" and C4I For the Warrior; and SEW systems and systems integration reflect leading-edge information transfer and information processing technologies, where appropriate, to enhance operational capability or reduce cost.

(U) The SEW Engineering project (X2111) supports the following activities in achieving a fully integrated, interoperable naval C4I system:

- (U) Identify operational opportunities (joint and Fleet exercises, deploying Battle Groups, demonstrations, and tests) where systems integration or technology developments can be brought to bear to meet operational objectives, and address prioritized CINC issues;
- (U) Integrate Naval C4I system developments, including developments from other services and commercially developed products in support of these operational opportunities;
- (U) Develop interface and connectivity architectures to support the enhanced operational capabilities;

FY 1996 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 1995

BUDGET ACTIVITY: 1 PROGRAM ELEMENT:0604707 PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support PROJECT TITLE: SEW Engineering

- (U) Use RLBTS to validate interoperability of C^4I Surveillance and C2W enhancements;
- (U) Extract lessons learned for feedback to research, development, and acquisition programs to support further development efforts or more extensive implementation.
- (U) Perform high-level systems architecture engineering to support long-range planning for C^4I For the Warrior, Theater Battle Management (in conjunction with the Air Force), Theater Ballistic Missile Defense, Mine Warfare, Amphibious Warfare and integration into DII and coalition force architectures.

I. (U) FY 1994 ACCOMPLISHMENTS:

- (U) ($910) Developed plans for the integration of Naval C4I system developments in operational exercises to demonstrate enhanced C4I capabilities. Specifically, supported: the demonstration of enhanced capabilities such as increased speed and quality of imagery transmission, increased data transfer capability, use of video teleconferencing, expanded secure telephone service afloat, and improvements in the IITCS-A common tactical picture in Agile Provider 94, RIMPAC 94, and the Joint Warrior Interoperability Demonstration (JWID) 94; demonstration of enhanced submarine connectivity via SHF; extension of C4I enhancements to Mine Warfare (MIW); enhanced C3 interoperable circuits for common picture in South American Navy improvement (SOSAI).

- (U) ($1,060) Developed interface and connectivity architectures to meet operational objectives of the above exercises. Extracted lessons learned for feedback to research, development, and acquisition programs to support further development efforts.

- (U) ($772) Utilized the Reconfigurable Land Based Test Site (RLBTS) to verify and validate the interfaces and architecture of C4I enhancements prior to use in the above exercises.

2. (U) FY 1995 PLAN:

• (U) ($2,728) Develop plans for the integration, in Combined, Joint and Fleet exercises and Joint Warrior Interoperability Demonstration (JWID), of maturing system developments, and military and commercial technologies that support enhanced operational capability in key CINC priority areas and Joint Mission Area (JMA) Assessment thrust areas such as high capacity communications, improved Command and Control Warfare (C2W) integrated landfight architecture, multi-level security, improved sensors/strike planning, common tactical picture, theater air defense/force protection, and combat identification. Utilize the Reconfigurable Land Based Test Site (RLBTS) to verify and validate the interfaces ensuring interoperability and compatability. Extract lessons learned for feedback to research, development, and acquisition programs to support further development efforts. Specific enhancements include: C3 to support Joint Forces Air Component (JFACC) on the aircraft carrier; CJTF command transition ship-to-shore; high capacity line-of-sight communication to support Marine landing forces and command elements transitioning ashore; integration of mine warfare data into shared common tactical picture; and improvements in the interfacing of distributed modeling and simulation with C2 decision support systems. Exercise/demonstration opportunities include: Tandem Thrust 95, Kernel Blitz 95, JTF95, Strong Resolve, Unified Endeavor 95, Joint Warrior Interoperability Demonstration (JWID) 95, and Tempo Brave.

• (U) ($485) Develop high level systems architecture engineering to support long range planning for C4I for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with Air Force), Theater Ballistic Missile Defense, Mine Warfare, and Amphibious Warfare.

3. (U) FY 1996 PLAN:

• (U) ($2,446) Develop plans for the integration, in Combined, Joint and Fleet exercises and Joint Warrior Interoperability Demonstration (JWID), of maturing system developments, and military and commercial technologies that support enhanced operational capability in key CINC priority areas and Joint Mission Area (JMA) Assessment thrust areas such as high capacity communications, improved Command and Control Warfare (C2W), integrated landfight architecture, trusted systems/multi-level security, improved sensors/strike planning, common tactical

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- picture, theater air defense force protection, and combat identification. Utilize the Reconfigurable Land Based Test Site (RLBTS) to verify and validate the interfaces ensuring interoperability. Extract lessons learned for feedback to research, development, and acquisition programs to support further development efforts. Develop and evaluate architecture to facilitate tracking of small Navy ship, aircraft and vehicles.

- (U) ($1,393) Develop high-level systems architecture/engineering to support long range planning for C4I for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Theater Ballistic Missile Defense, Mine Warfare, Amphibious Warfare and integration into the DII.

I. (U) FY 1997 PLAN:

- (U) ($2,560) Develop plans for the integration, in Combined, Joint and Fleet exercises and Joint Warrior Interoperability Demonstration (JWID), of maturing system developments, and military and commercial technologies that support enhanced operational capability in key CINC priority areas and Joint Mission Area (JMA) Assessment thrust areas such as high capacity communications, improved Command and Control Warfare (C2W), integrated landfight architecture, trusted systems multi-level security, improved sensors/strike planning, common tactical picture, theater air defense force protection, and combat identification. Utilize the Reconfigurable Land Based Test Site (RLBTS) to verify and validate the interfaces ensuring interoperability and compatability. Extract lessons learned for feedback to research, development, and acquisition programs to support further development efforts.

- (U) ($1,229) Develop high-level systems architecture/engineering to support long range planning for C4I for the Warrior, Joint Air Operations Functional Process Improvement, Theater Battle Management (in conjunction with the Air Force), Theater Ballistic Missile Defense, Mine Warfare, and Amphibious Warfare and integration to DII and coalition architecture.

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BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707
PROGRAM ELEMENT TITLE:SEW Architecture Engineering Support
PROJECT NUMBER: X2144
PROJECT TITLE: SEW Engineering

B. (U) PROGRAM BUDGET DOLLARS:

	FY 1994	FY 1995	FY 1996	FY 1997
(U) FY 1995 President's Budget:	450	3,282		
(U) FY 1995 Appropriated:		3,282		
(U) Adjustments from Appropriated AMOUNTS:	+2,292	-769		
(U) FY 1996 OSD OMB Budget Submit:	2,742	3,213	3,839	3,859

(U) OTHER SUBMIT EXPLANATION:

(U) Funding: FY 94 +2,292 PIF -1.6 of 1.11.94 for integration planning for Naval C4I system developments and technologies in joint exercises; demonstration of joint battle space management, including the exchange of track information and management with other services, in JSID 94; development and validation of interfaces and architecture to meet exercise demonstration objectives. FY 95 was decreased 762P, 731F to reflect undistributed reductions for Travel, Consulting Services, Federally Funded Research Centers and University Research and 18F to accommodate Small Business Innovative Research.

(U) Schedule: This is a continuing, non-acquisition systems engineering program. Impact on acquisition milestone schedules is not applicable.

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: (U) Dollars in Thousands (U.S.)

(U) RELATED RDT&E: Not applicable.

D. (U) SCHEDULE PROFILE: Not applicable.

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PROGRAM ELEMENT:0604707
PROGRAM ELEMENT TITLE:CE Architecture Engineering Support

PROJECT NUMBER: X2144
PROJECT TITLE: SEW Engineering

[illegible] ($ in Thousands)

Project Cost Categories	FY 1994	FY 1995	FY 1996	FY 1997
[illegible] Information and Technology Integration	3,743	2,728	2,446	2,560
[illegible] Architecture Development	0	485	1,393	1,299
Total	3,743	3,213	3,839	3,859

BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support
PROJECT NUMBER: X2144
PROJECT TITLE: SEW Engineering

B. [illegible] BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

[illegible] SPECIFICATIONS

Contractor Government Performing Activity	Contract Method Fund Type Vehicle	Award Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development:											
Marine Corp Work Project		N A	Cont.	Cont.	0	0	1,500				
[illegible]		N A	Cont.	Cont.	0	1,589	1,176	2,227	2,238	Cont.	Cont.
Various		N A	Cont.	Cont.	0	1,160	537	1,612	1,621	Cont.	Cont.
Support and Management		N A	N A	N A	0	0	0	0	0	0	0
Test and Evaluation		N A	N A	N A	0	0	0	0	0	0	0

C. [illegible] PUBLISHED PROJECT: None

Item Description	Contract Method Fund Type Vehicle	Award Oblig Date	Delivery Date	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Product Development				0	0	0	0	0		
Support and Management				0	0	0	0	0		
Test and Evaluation				0	0	0	0	0		

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BUDGET ACTIVITY: 4 PROGRAM ELEMENT:0604707 PROJECT NUMBER: X2144
PROGRAM ELEMENT TITLE:SEW Architecture/Engineering Support PROJECT TITLE: SEW Engineering

	Total FY 1993 & Prior	FY 1994 Budget	FY 1995 Budget	FY 1996 Budget	FY 1997 Budget	To Complete	Total Program
Subtotal Product Development							
	0	2,742	3,213	3,839	3,859	Cont.	Cont.
Subtotal Support and Management: N/A							
Subtotal Test and Evaluation: N/A							
Total Project:							
	0	2,742	3,213	3,839	3,859	Cont.	Cont.

C. (U) FUNDING PROFILE: N/A

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