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**DEPARTMENT OF THE NAVY
SUPPORTING DATA FOR FISCAL YEAR 1984
BUDGET ESTIMATES DESCRIPTIVE SUMMARIES (U)**



SUBMITTED TO CONGRESS JANUARY 1983

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**RESEARCH, DEVELOPMENT, TEST AND EVALUATION, NAVY
BOOK 2 OF 3 BOOKS**

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TACTICAL PROGRAMS

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DESCRIPTIVE SUMMARIES PEDS RESEARCH, DEVELOPMENT, TEST & EVALUATION RDTYPE TACTICAL PROGRAMS		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
THIS VOLUME CONTAINS JUSTIFICATION MATERIAL SUPPORTING THE PRESIDENT'S FISCAL 1984 BUDGET PRESENTATION TO CONGRESS CONCERNING RESEARCH, DEVELOPMENT, TEST & EVALUATION.		

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24134N Title: A-6 Squadrons
DoD Mission Area: 232 - Amphibious, Strike, And Antisurface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,978	4,725	6,701	10,720	Continuing	Continuing
W0975	A-6 All Weather Standoff Attack Control System	9,978	0	0	0	0	20,906
W1638	A-6E Weapons Integration	0	4,725*	6,701	10,720	Continuing	Continuing

*Previously funded in Program Element 64360N (HARM Missile).

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program is designed to enhance the offensive all-weather attack capability of the carrier battle group and the survivability of the A-6E. It provides for development associated with integration of a variety of standoff weapons (e.g., HARM, MAVERICK series, HARPOON IC, Air-to-Surface Weapon) into the A-6 aircraft, including development of an integrated missile panel for common control compatibility with all projected missiles.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Project W0975, A-6 All-Weather Standoff Attack Control System, was terminated during FY 1982. Project W1638, A-6E Weapons Integration, reflects an increase of 3,687 in FY 1984 due to inflation and acceleration of development and testing requirements to complete integration as near as feasible to the availability date of the weapons. In addition, HARPOON IC integration will commence in FY 1984.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,624	9,978	4,725	3,014	17,160	45,805
W0975	A-6 All-Weather Standoff Attack Control System	7,624	9,978	0	0	0	20,906
W1638	A-6E Weapons Integration	0	0	4,725	3,014	17,160	24,899

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Alternate Warhead LASER MAVERICK, Program Element 63313N; HARM Missile Development, Program Element 64360N; HARPOON Block IC HARPOON Weapon System, Program Elements 24229N, 24271N, and 24284d. These programs develop the weapons to be integrated into the A-6 aircraft in this Program Element.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Air Test Center, Patuxent River, MD; Pacific Missile Test Center, Point Mugu, CA; CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY; Texas Instruments Corporation, Dallas, TX; Hughes Aircraft Company, Culver City, CA; McDonnell Douglas Astronautics Corporation, St. Louis, MO.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1638, A-6E Weapons Integration: This project provides for the development of hardware and software, development flight testing and operational test and evaluation required for achieving the capability to utilize new standoff weapons with the A-6E aircraft. Such weapons include HARM, the MAVERICK series and HARPOON IC.

Program Element: 24134N

Title: A-6 Squadrons

(U) In FY 1982, initial integration efforts for the HARM missile with the A-6 were conducted in Program Element 64360N (HARM missile).

(U) The FY 1983 program will:

- o Continue development of mission computer software for HARM employment.
- o Develop integrated missile control panel and avionics interface unit.
- o Commence test bed aircraft modification for HARM integration.

(U) For FY 1984, it is planned to:

- o Commence initial HARM integration/software development.
- o Commence A-6/HARM flight testing and conduct Navy Technical Evaluation.
- o Commence software development and A-6 integration for LASER MAVERICK and HARPOON IC missiles.

(U) This is a continuing program.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24136N Title: F/A-18 Squadrons
DoD Mission Area: 232 - Amphibious, Strike, And Antisurface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	27,159	88,044	Continuing	Continuing
W166?	F/A-18 Improvements	0	0	27,159	88,044	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The F/A-18 Naval Strike Fighter is a twin engine, mid-wing, multi-mission tactical aircraft. The F/A-18 will be employed in both Navy and Marine Corps fighter and attack squadrons. A tactical reconnaissance version is also planned. The F/A-18 is missionized in fighter and attack squadrons through selected use of external equipment to accomplish specific fighter or attack missions. Commonality provides several benefits. Any aircraft can quickly be configured to perform either fighter or attack missions, as needed, offering the Operational Commander more flexibility in employing his tactical aircraft in a changing scenario. The primary design mission of the fighter application is fighter escort, with fleet air defense as a complementary mission. The attack missions are interdiction and close air support. Since the attack squadrons fly the same airframe, engine, and flight control system as the fighter squadrons, they will have excellent fighter and self-defense capability. 1366 aircraft are scheduled for production. As these aircraft become operational, a continuing capability is planned to conduct post-full scale development technical evaluations responding to fleet reported problems or suggested improvements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Not Applicable.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: Not Applicable.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN Funds	2,074,400	2,364,100	2,533,600	2876,700	Continuing	Continuing
Quantity	63	84	84	92	Continuing	Continuing
MILCON	12,900	5,600	13,300	1,000	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Engineering Center, Lakehurst, NJ; Naval Air Propulsion Center, Trenton, NJ; Naval Ordnance Station, Indian Head, MD; Naval Weapons Center, China Lake, CA; Naval Weapons Engineering Support Activity, Washington, DC; Pacific Missile Test Center, Point Mugu, CA; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: McDonnell-Douglas Corporation, St. Louis, MO (Airframe and Weapon System Integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (Center/aft fuselage subcontractor to McDonnell).

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not Applicable.

Program Element: 24136N

Title: F/A-18 Squadrons

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

1. (U) DESCRIPTION: The F/A-18 is missionized in fighter and attack squadrons through selected use of external equipment to perform either fighter or attack missions. A cornerstone of the weapon system's design is its ability to expand and adjust to new or enhanced weapons, as well as, advances in technology and its ability to respond to emerging threats. Continued development capability is required to successfully integrate the F/A-18 weapon system into the fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

(U) General

(U) The F/A-18 Naval Strike Fighter program will transition from full-scale engineering, development to operational systems development during FY 83. As F/A-18 squadrons report discrepancies and requirements, a continuing capability is needed to perform post-FSD technical evaluations, investigative flight testing and software support, and incorporate pre-planned capability enhancements to ensure the F/A-18's ability to fulfill assigned roles against emerging threats.

(U) Pre-Planned Product Improvement (P³I) was established by OSD in April 1981 as an acquisition strategy by which resources are identified and programmed to accomplish the orderly, continuous, cost effective phased growth/evaluation of a system's capability, utility and operational readiness. P³I is not intended to fund deficiency correction/baseline maintenance activities but to support the requirement for development of enhanced effectiveness stimulated by new and maturing technologies and growth in adversary effectiveness. The F/A-18 has been selected by the Navy to incorporate P³I in its acquisition strategy.

a. (U) FY 1982 Program: Not Applicable.

b. (U) FY 1983 Program: Not Applicable.

c. (U) FY 1984 Planned Program: (NEW START) Planned Flight Testing at Naval Air Test Center, Patuxent River, MD; Naval Weapons Center, China Lake, CA; and Pacific Missile Test Center, Point Mugu, CA is to be centered around Fleet-reported problems and recommended operational improvements. In concert with the flight testing, field activity effort in analytical test and evaluation of resulting data and support for flight testing will also be conducted.

d. (U) Program to Completion: This is a continuing program. Planned for the remainder of the program is near term continued Navy Flight Testing and concomitant field activity technical analysis of resulting data. This effort will center around input from deployed squadrons. Also planned in later years is a capability to respond to advances in technology, integration of evolving weapons, and expansion of the weapons clearance activity.

e. (U) Milestones

<u>MILESTONE</u>	<u>DATE</u>
1. Release of Presolicitation Notice	June 1974
2. Response to Presolicitation Notice	Jul 1974
3. Release of Request for Quotation	Oct 1974
4. Selection of F-18	May 1975
5. Completed Advanced Engineering Contracts	Aug 1975
6. Full Scale Development Contract	Nov 1975
7. Defense Systems Acquisition Review Council II	Dec 1975
8. Full Scale Development Contract (McDonnell-Douglas)	Jan 1976

Program Element: 24136N

Title: F/A-18 Squadrons

<u>MILESTONE</u>	<u>DATE</u>
9. Radar Subcontractor Selection	Aug 1976
10. F-404 First Engine to Test	Jan 1977
11. F-404 Preliminary Flight Rating Test	Jun 1978
12. First Flight	Nov 1978
13. F-404 Qualification Test Completion	Jul 1979
14. Defense Systems Acquisition Review Council IIIA - Redesignated Program Review	Mar 1980
15. OSD Program Review for Defense Systems Acquisitions Review Council Principals	Apr 1980
16. Fighter Missions Initial Operational Test and Evaluation	Feb 1981
17. Defense Systems Acquisitions Review Council (DSARC) Program Review (Fighter)	*Jun 1981
18. OSD Limited Program Review	Mar 1981
19. Defense Systems Acquisitions Review Council Program Review (Attack)	Dec 1982
20. Operational Evaluation Completion	(Aug 1982*) Oct 1982
21. End Attack Board of Inspection and Survey Trials	(Jul 1982*) May 1983
22. Initial Operational Capability	Dec 1982
23. Navy Support Date	To be Determined

* Date shown in FY 1983 Descriptive Summary for Program Element 64263N. The SARC review, rescheduled for February 1981 occurred on 17 March 1981 and confirmed the F/A-18 as a fighter, but the Defense Systems Acquisition Review Council wanted to review cost reduction efforts and scheduled a subsequent review on 18 June 1981. As a result of the 18 June 1981 review full production for the F/A-18 fighter was approved. The Defense Systems Acquisition Review Council III (Attack) was held in December.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24152N
DoD Mission Area: 353 - Naval Warfare

Title: Early Warning Aircraft Squadrons
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,066	52,205	54,405	44,638	Continuing	Continuing
W0463	Airborne Early Warning Carrier Based Aircraft E-2C	17,721	40,563	44,475	44,638	Continuing	Continuing
R1571	Special Evaluations/Techniques	345	11,642	9,930	0	0	23,847

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Project W0463 provides preplanned product improvements (P³) for the evolution of E2C aircraft capability in support of Naval warfare command and control requirements. It funds development for the modification/replacement of selected weapon replacement assemblies of currently installed subsystems of the E2C. These modifications will enable the E2C to operate in the presence of electronic countermeasures, to more completely exploit threat RF emissions, and to detect raid elements at greater range. These expanded capabilities will permit offensive weapons systems to be more effective in countering the tactical threat. Project R1571 is of a higher classification.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary for Project W0463 reflect an increase of 796 in FY 1982 and a decrease of 86 in FY 1983 as a result of refinement of cost estimates and for variations in inflation indices, and an increase of 7,644 in FY 1984 to correct an administrative error in budgeting radar detection range and electronic countermeasures improvements within the existing update program during the FY-1983 cycle. This program element is a continuing program, which is anticipated to require additional out-year funding. Detail of changes in funding profile for Project R1571 are of higher classification.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,756	18,925	52,291	47,008	Continuing	Continuing
W0463	Airborne Early Warning Carrier Based Aircraft E-2C	16,826	16,925	40,649	36,831	Continuing	Continuing
	Quantity (Total Units of 3 avionics improvements)						18
R1571	Special Evaluations/Techniques	1,930	2,000	11,642	10,177	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 62721N, Command and Control Technology for Data Processing Improvements, and Program Element 62712N, Surface/Aerospace Target, over-the-horizon targeting surveillance for Radar and Passive Detection System Improvements.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent, MD; Naval Research Laboratory, Washington, DC; Fleet Combat Direction Systems Support Activity, San Diego, CA. CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY.

Program Element: 24152M

Title: Early Warning Aircraft Squadrons

H. (U) PROJECT LESS THAN \$10 MILLION IN FY 1984:

Project R1571, Special Evaluations/Techniques - Is of a Higher Classification.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

Project W0463, Airborne Early Warning Carrier Based Aircraft F-2C

1. (U) DESCRIPTION: E2C is an all weather, carrier-based airborne early warning aircraft, with a crew of five. This weapon system extends the task force defense perimeter by providing early warning of approaching enemy units (surface and air), vectoring of interceptors into attack position, and providing air and surface situation data to other fleet elements. In addition, the E2C provides strike and traffic control, search and rescue control, communications relay, and automatic tactical data exchange. The E2C is projected to be a viable fleet unit through 2000. Based on analysis of projected ECM and target threat to United States Sea Control Forces, Research and Development program commenced in FY 1979 to provide (1) low sidelobe antenna for the APS-125 radar subsystems, (2) High Speed Processor for the OL-77/ASQ Central Computer Programmer, (3) signal processing extension for the ALR-73 Passive Detection System (4) APS-125 radar modifications to optimize surface and airborne target detection and (5) new software tactical program to fully integrate hardware improvements. RDT&E units are being procured for integration, qualification and reliability testing during Development Test and Evaluation and Operational Test and Evaluation (OT&E of the applicable weapon replaceable assemblies and software).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Complete full scale development test and evaluation of the TRAC-A antenna group. Construct engineering development models of the High Speed Processor weapon replacement assemblies and begin development test and evaluation. Commence modification of various radar weapon replaceable and design integration software to permit airborne development test and evaluation of the High Speed Processor expanded track capacity and improved surface surveillance (Group I functions).

b. (U) FY 1983 Program: Complete development and operational test and evaluation of Group I for approval for limited production (ALP). Commence design of tactical program software and development of engineering models of extended range, environmental processing and expanded radar electronic countermeasures capabilities (Group II functions).

c. (U) FY 1984 PLANNED PROGRAM: Fabricate and commence testing of radar weapon replaceable assemblies for extended range and electronic countermeasures capabilities. Integrate tactical program software with Group I hardware and test against operational scenarios.

d. (U) Program to Completion: Complete weapon system integration ground and flight testing. Conduct technical and operational evaluations. Modify tactical program software to acquire maximum capability from hardware and reduce flight crew operator workload.

e. (U) Milestones: Not applicable.

f. (U) Test and Evaluation: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24161N
DoD Mission Area: 235 - Naval Warfare Support

Title: Aviation Support Carrier Air Wing
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,357	7,968	7,050	3,099	1,959	20,276
W0431	Tactical Aircrew Combat Training System	1,942	*	*	*	*	*
W1414	Integrated Air Warfare Training Complex (FALLON)	7,215	*	*	*	*	*
W1633	Aerial Refueling Store	200	7,968	7,050	3,099	1,959	20,276

*For FY 83 and subsequent years W0431 and W1414 are to be reported under Program Element 24571N.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Existing Douglas D704 and Sargent Fletcher Model 31-300 Aerial Refueling Stores are marginally capable of satisfying current operational demands due to poor maintainability and reliability. These units, procured in the late 1950's and early 1960's, are nearing the completion of a useful service life as reflected in their inordinately low asset availability (50 to 70 percent non-ready for issue), high spare and repair parts demand and exceptional maintenance man-hours per flight hour. Poor inflight reliability has resulted in an increasing incidence of stores attrition, thereby creating a shortfall in total assets which is rapidly becoming critical. The design of these stores representing 30-year old technology, incorporates pyrotechnic components which are increasingly subject to failure with an attendant danger of fire or inflight explosion. The net effect of these problems is a reduced and declining stores readiness concurrent with increasing requirements for stores capability to support operational commitments such as the Indian Ocean presence; to respond to more capable threat systems such as the Soviet Backfire; and to meet the operational needs of future high performance aircraft. Aerial refueling extends the range and/or endurance of tactical aircraft for operational missions and provides a required margin of safety in day, night and adverse weather carrier operations by ensuring readily available fuel when needed. The existing state of stores readiness provides only marginal capability, will not meet projected needs, and creates a potential for tactical aircraft losses which may otherwise be avoided had fuel been available. The most practical solution to this problem is the development of a new store as soon as possible, employing current technology. The new store will be employed on carrier-deployed combat aircraft to supplement the refueling capability of dedicated tankers. Aircraft configured with the store will be capable of refueling all carrier-based tactical aircraft. They will be used to provide fuel on demand from normal carrier launch and recovery evolutions, either as airborne refuelers for cyclic operations or on deck alert for unplanned contingencies.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary result from the decision to relocate projects W0431 and W1414 to Program Element 24571N, Special Projects, beginning in FY 1983. Project W1633 was a new start in FY 1982. Contractors were competitively solicited and proposals were received for the design, development and testing of the aerial refueling store. A Test and Evaluation Master Plan is being formulated for Chief of Naval Operations approval. Internal reprogramming increased W1633 by 200 for FY 1982 to support Navy Laboratory participation in the competitive contractor proposal selection process. The increase of 5,139 in the FY 1984 program is due to a decision to accelerate the design, development and testing of new aerial refueling stores.

Program Element: 24161N

Title: Aviation Support Carrier Air Wing

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,384	7,957	7,968	1,911	Continuing	Continuing
W0431	Tactical Aircrew Combat Training System	1,924	1,942	*	*	*	*
W1414	Integrated Air Warfare Training Complex - Fallon	460	6,015	*	*	*	*
W1633	Aerial Refueling Store	0	0	7,968	1,911	2,167	12,046

* For FY 1983 and subsequent years W0431 and W1414 are to be reported under Program Element 24571N.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN-7	0	0	0	9,029*	86,480	95,500
*Long Lead Procurement	0	0	0	0	350	

F. (U) RELATED ACTIVITIES: Ongoing efforts in the aerial refueling area include KC-10A and KC-135 update programs. Each of these aircraft plan the incorporation of a hose reel assembly to facilitate aerial refueling of probe equipped receiver aircraft. These efforts are the following: Navy Aircraft Interoperability with the KC-10A, Aircraft Flight Test General Program, Program Element 25663N; and Navy Evaluation of KC-135 Prototype Hose and Drogue Aerial Refueling Stores, Aircraft Flight Test General Program, Program Element 25663N. The technology for the new aerial refueling store will draw from these ongoing efforts. A concurrent improvement program for the D-704 and 31-300 refueling stores is being developed with FY 1983 APN-7 War Consumables Line Item funds at the Naval Air Development Center. This program will provide for reliability and maintainability improvements to extend the life of the present store and will help sustain the inventory level until the new store enters the fleet.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Propulsion Center, Trenton, NJ; Naval Air Test Center, Patuxent River, MD; Air Test and Evaluation Squadron Five, China Lake, CA. CONTRACTORS: Unknown (Competitive Procurement in process.)

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1633, Aerial Refueling Store: These Aerial Refueling Stores have been in service for 25 years and their inventory level has reached a critical point. The current inventory level will no longer sustain deployed carriers, the pipeline and training requirements. This shortfall has been highlighted by increased blue water operations in the Indian Ocean. Requirements for airborne fuel will further increase with the threat. Aerial refueling store-equipped aircraft will be required to provide surge and backup refueling capabilities through the late 1990's. This element provides for a new store that will be compatible with all current store-equipped aircraft.

(U) In FY 1982: Procurement and Integration Logistic Support specifications completed. Request For Proposals (RFP) issued to thirty-one contractors, four competitive proposals received. Contractor proposals were being evaluated by Source Selection Evaluation Board at close of FY 1982.

Program Element: 24161N

Title: Aviation Support Carrier Air Wing

(U) FY 1983 Program Consists of:

- o Source selection process to continue, best and final offers requested, contract awarded. Commence initial design and development.
- o Test and Evaluation Master Plan drafted and forwarded to Chief of Naval Operations for approval.
- o Conduct component development tests.

(U) For FY 1984 it is planned to continue:

- o To establish system test plan.
- o To manufacture tooling and fabrication of prototype stores.
- o To initiate all contractor ground, functional, performance, development, reliability, maintainability and safety testing.

(U) Program to Completion:

- o Complete system test plan.
- o Complete manufacture tooling and fabrication of prototype stores.
- o Complete contractor ground, functional, performance, development, reliability, maintainability and safety testing.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 241(3N)
DoD Mission Area: 345 - Tactical Communications

Title: Fleet Telecommunications (Tactical)
Budget Activity: 4 - Tactical Program

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,007	20,604	41,963	76,869	Continuing	Continuing
W0661	Combination Radio	6,789	3,125	6,648	9,215	7,662	43,493
X0695	High Frequency Improvement Program	9,631	9,158	31,532	58,719	Continuing	Continuing
X0725	Communication Automation	2,834	5,147	3,783	6,975	Continuing	Continuing
X1511	Teleprinter Replacement Program	1,080	0	0	0	0	1,080
X1564	Near-Term Anti-Jam Communications	14,673	3,174	0	0	0	20,161
X1761	High Frequency Antenna Ashore	0	0	0	1,960	Continuing	Continuing

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for continuing projects and through completion for others.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element is comprised of projects which support evolutionary development of Navy Fleet Telecommunications. Additionally, it will provide replacement state-of-the-art equipments to maintain fleet readiness.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: (a) Combination Radio (W0661) FY 1982 decrease of 345 due to Navy reprogramming action (funds were programmed to Flight Deck Communication, PE 64510N, Project X0744); FY 1983 decrease of 12 due to inflation adjustment; FY 1984 increase of 5,734 is due to increase in program scope to fund start of HAVE QUICK - SINGARS V development, (b) The High Frequency Improvement Program (X0695): The FY 1984 increase of 23,290 was a result of increase in the scope of the program to meet the tactical mission needs, (c) Communications Automation (X0725): FY 1982 and FY 1983 decreases of 10 and 49 respectively for inflation adjustment. FY 1984 increase of 1,985 was to provide for full scale development of Navy Modular Automated Communications System (NAVMACS V5) and fund Operational Evaluation, (d) Teleprinter Replacement Program (X1511): FY 1982 increase of 1,080, FY 1983 decrease of 451, and FY 1984 decrease of 297 due to commencement of work on program in FY 1982 vice FY 1983 schedule start, (e) Near-Term Communications (X1564): FY 1983 decrease of 24 as a result of inflation adjustments. Funding for FY 1984 (22,705) and outyears (13,031) was deleted as a result of Navy decision.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15,381	34,282	21,140	33,956	26,724	163,871
W0661	Combination Radio	2,314	7,134	3,137	914	507	21,746
X0695	High Frequency Improvement	7,684	9,631	9,158	8,242	9,427	57,694
X0725	Communication Automation	3,044	2,844	5,196	1,798	2,813	26,998
X1321	Ultra High Frequency Radio Channel Conversion	25	0	0	0	739	764
X1511	Teleprinter Replacement Program	0	0	451	297	0	748
X1564	Near-Term Anti-Jam Communications	2,314	14,673	3,198	22,705	13,031	55,921

Program Element: 24163A

Title: Fleet Telecommunications (Tactical)

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

	<u>FY 1982</u> <u>Actual</u>	<u>FY 1983</u> <u>Estimate</u>	<u>FY 1984</u> <u>Estimate</u>	<u>FY 1985</u> <u>Estimate</u>	<u>Additional</u> <u>to</u> <u>Completion</u>	<u>Total</u> <u>Estimated</u> <u>Cost</u>
OPN						
333011(Shipboard High Frequency)	1,205	1,082	6,315	12,328	Continuing	Continuing ^{1/}
333012 (Shipboard Ultra High Frequency)	23,129	27,808	48,019	24,103	Continuing	Continuing ^{2/}
333050 (Shipboard Communications Automation)	10,540	6,459	10,536	19,955	Continuing	Continuing ^{3/}

1/ Planned procurement of miscellaneous High Frequency systems for ships.

2/ Planned procurement of AN/WSC-3, AN/URC-93, and ancillary Ultra High Frequency systems for ships.

3/ Planned procurement of Navy Modular Automated Communications Systems (NAVMACS) for shipboard message handling

F. (U) RELATED ACTIVITIES: The projects within this element are complementary to other Navy communications development or improvement efforts and to joint service efforts such as Tri-Service Joint Tactical Communications Program (PE 28010N), Joint Tactical Information Distribution System (PE 25604N). The Army Single Channel Ground and Airborne Radio System and the Air Force "HAVE QUICK" activities both provide basis and input to the Combination Radio Communications efforts. The Navy's High Frequency Improvement Program is the lead DoD High Frequency program and is coordinated with the Air Force Modern Modular (Adaptive High Frequency) radio and the Army Objective High Frequency radio programs, both of which are now in conceptual development.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington, DC; Naval Electronics Systems Engineering Centers, Portsmouth, VA, and Charleston, SC; Naval Air Systems Command, Washington, DC; Naval Research Laboratory, Washington, DC; Naval Ocean Systems Center, San Diego, CA; Naval Avionics Center, Indianapolis, IN; Naval Air Development Center, Warminster, PA; Pacific Missile Test Center, Pt. Mugu, CA; Naval Electronic Systems Engineering Activity, St. Inigo, MD; Naval Surface Weapons Center, White Oak, Silver Spring, MD. CONTRACTORS: Magnavox, Philadelphia, PA; SRI, San Francisco, CA; Litton Data Systems, Van Nuys, CA; Xetron, Inc., Cincinnati, OH; Grumman Aerospace Corp., Bethpage, Long Island, NY; Rockwell International Corp., Collins Telecommunications Products Division, Cedar Rapids, IA; E-Systems, ECI Division, St. Petersburg, FL.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0661, Combination Radio: The AN/ARC-182 Combination Radio provides tactical aircraft with low and high power Very High Frequency (VHF/FM), Very High Frequency (VHF/FM), Ultra High Frequency (UHF/FM), and Ultra High Frequency (UHF/FM) voice radios, aircraft frequency hopping filters and broadband aircraft antennas. [

the Air Force HAVE QUICK technology and Army Single Channel Ground and Airborne Radio System technology.

(U) In FY 1982:

- o Continued development and test on low power radios and broadband aircraft antennas.
- o Conducted Technical Evaluation at Naval Avionics Center, Naval Air Development, Naval Surface Weapons Center, and Naval Air Test Center.
- o Prepared for Operational Evaluation.
- o Supplied radios for AV-8B aircraft development.
- o High power radio and aircraft frequency hopping filter began development to meet HAVE QUICK Rapid Deployment Capability equipment requirements and deployment schedules.

Program Element: 24163N

Title: Fleet Telecommunications (Tactical)

(U) The FY 1983 program consists of:

- o Operationally testing Combination Radio in support of the Milestone III decision.
- o Commencing Government Furnished Equipment production and Full Scale Development of the broadband antenna.

(U) For FY 1984, it is planned to:

- o Continue production of the Combination Radio.
- o Commence broadband antenna production deliveries.
- o Produce as Government Furnished Equipment the Combination Radio, broadband antenna, frequency hopping filter and HAVE QUICK.
- o Initiate development of combined HAVE QUICK and Single Channel Ground and Airborne Radio System, J devices
including modification of radios for Single Channel Ground and Airborne Radio System compatibility.

(U) Program to completion, development will continue through program completion of combined HAVE QUICK and Single Channel Ground and Airborne Radio System (J devices) including first phase of laboratory Technical Evaluation.

(U) Project X0725, Communications Automation: This project provides a family of modular shipboard message processing systems tailored to the requirements of various hull types. Selected degrees of automated capabilities for various surface platforms will be provided. Five configurations of systems are in various stages of development (Navy Modular Automated Communications Systems) V1, V2, V2 with Message Preparation Device, V3, and V5). A future integrated replacement program will be developed that will supplant, in an evolutionary manner, the current Naval Communications Processing and Routing System.

(U) In FY 1982, development continued on the Navy Modular Automated Communications System (NAVMACS V5) through a series of tests as part of a multi-phase shore Technical Evaluation. Many new functions, added to the Navy Modular Automated Communications System (NAVMACS V3) software baseline, have been demonstrated during this testing including processing in three computers and interfacing with dual disks.

(U) The FY 1983 program consist of:

- o Completing basic design and functional integration of the Navy Modular Automated Communications System (NAVMACS V5). This will be accomplished through the completion of multi-phase technical testing ashore.
- o Proceeding with Navy Modular Automated Communications System (NAVMACS V5) development and establishment of functional baseline in shipboard Technical Evaluation in USS MOUNT WHITNEY.
- o Submitting Navy Modular Automated Communications System (NAVMACS V5) for Operational Evaluation.

(U) For FY 1984, it is planned to continue:

- o Development of functional enhancements to the baseline Navy Modular Automated Communications System (NAVMACS V5).
- o Enhancements include: automated relay of messages to ships in company, automated relay of messages to shore, automated transmission of messages to shore, diversification of channel assignments, on-line hook-up to message reproduction and additional remote units.

Program Element: 24163N

Title: Fleet Telecommunications (Tactical)

(U) Program to completion: This is a continuing program. Planned efforts include:

- o Continue above efforts to completion and develop additional enhancements including: total fallback programs, local area ship-ship broadcasts and establishment of additional message files.
- o Commence development of integrated replacement program to supplant Naval Communications Processing and Routing System, Common User Digital Information Exchange System, and Navy Modular Automated Communications.

1. (U) PROJECTS-OVER \$10 MILLION IN FY 1984:

Project X0635, High Frequency Improvement Program

1. (U) DESCRIPTION (Requirement and Project): Existing high frequency systems are comprised of outdated equipment and generate extensive electromagnetic interference/radio frequency interference, are manpower intensive, do not have automatic tuning capabilities, and require increasingly expensive logistics support. Changes and improvements to these systems require extensive alteration by shipyards and aircraft rework facilities. The High Frequency Improvement Program develops and procures conventional High Frequency Communications systems to meet tactical, strategic and shore tactical voice, data and radio teletype requirements. It will provide anti-jam protection of critical links in all Naval applications, improved availability, automation and efficiency. Conventional systems within the High Frequency Improvement Program are: (1) Selective Antenna Coupler Group which reduces shipboard electromagnetic interference/radio frequency interference and efficiently uses the high frequency spectrum; and (2) a programmable High Frequency Digital Modem (AM/USQ-83) to readily permit introduction of improved waveform.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed advanced development and validation of the High Frequency Digital Modem (USQ-83). At Secretary of the Navy direction, awarded two competitive advanced development contracts. Awarded one advanced development contract for the wideband power amplifier. Based on Phase I "fly-off" of three previous contracts, awarded advanced development contract.

b. (U) FY 1983 Program: Complete Full-Scale Engineering Development and Technical Evaluation of the Selective Antenna Coupler Group (SACG) and begin Operational Evaluation. Continue advanced development.

c. (U) FY 1984 Planned Program: Complete Operational Evaluation in support of Milestone III decision for the Selective Antenna Coupler Group. Begin Full-Scale Engineering Development of the High Frequency Digital Modem (USQ-83). All necessary experimental work has been performed and the High Frequency Digital Modem is ready for full-scale development. Complete advanced development.

Program Element: 24163N

Title: Fleet Telecommunications (Tactical)

d. (U) Program to Completion: This is a continuing program. Planned efforts include: Initiate production of the Selective Antenna Coupler Group. Complete development, service testing, and initiate production of the High Frequency Digital Modem (USQ-83). Initiate full-scale engineering development for shipboard, aircraft, [] and shore-based [] systems and complete service testing. Initiate production of the High Frequency [] systems for ships, submarines, aircraft, [] and shore-based applications.

e. (U) Milestones: Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24281N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Submarines
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,429	6,432	7,442	6,631	Continuing	Continuing
S0239	Mine Detection and Avoidance Sonar (Quantity-Engineering Development Model)	6,425 (*)	5,691	4,507	3,691	0	28,584 (1)
S1307	Submarine Transducer Engineering Improvement	1,004	741	2,935	2,940	Continuing	Continuing

* Development/Operational Test and Evaluation

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: S0239, Mine Detection and Avoidance Sonar - This program will provide an improved mine detection and avoidance capability to the SSN 637/688 Classes and future submarines. The improved offensive capability of mines poses a future threat to the submarine forces. The improvement program provides the capability to detect the mines and provide advanced warning so that the submarines can take evasive action and navigate the minefields safely. S1307, Submarine Transducer Engineering Improvement - This program will provide for engineering development of improved sonar transducers and will reduce transducer radiated and self noise and improve transducer and reliability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are a decrease of 32 in FY 1983 due to revised cost estimates including inflation and a decrease of 2,054 in FY 1984 resulting from budget constraints. Other appropriations were inadvertently omitted on the FY 1983 Descriptive Summary.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,429	6,464	9,496	Continuing	Continuing
S0239	Mine Detection and Avoidance Sonar (Quantity-Engineering Development Model)	6,425 (*)	5,723	4,570	3,708	28,696 (1)
S1307	Submarine Transducer Engineering Improvement	1,004	741	4,926	Continuing	Continuing

* Development/Operational Test and Evaluation

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project No.	Title	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
S1307	OPN (Sonar Switches and Transducers, BA 2, C2PU)	36,589	54,026	37,234	Continuing	Continuing

Program Element: 24281N

Title: Submarines

F. (U) RELATED ACTIVITIES: Project S0239 - The capabilities of the improved mine detection/avoidance sonar will be incorporated in the AN/BQ7-5 Submarine Sonar Improvements (Program Element 64503N) and Submarine Advanced Combat System (Program Element 64524N). Advanced development of the Submarine Active Detection Sonar is being conducted in Program Element 63504N, Project S0223, Submarine Sonar Systems Advanced Development. Project S1307 - Submarine Transducer Engineering Improvements will develop new and improved transducer design technology for numerous existing systems and for current and future sonar development programs.

G. (U) WORK PERFORMED BY: IN-HOUSE: S0239 - Lead laboratory is Naval Underwater Systems Center, Newport, RI. OTHERS: Naval Ocean Systems Center, San Diego, CA; Operational Test and Evaluation Force, Norfolk, VA. CONTRACTORS: International Business Machines, Federal Systems Division, Manassas, VA, is the prime contractor. OTHERS: EG&G, Washington Analytical Service Center, Rockville, MD; TRACOR, Rockville, MD; Applied Research Laboratory, University of Texas, Austin, TX; and Raytheon Company, Submarine Signal Division, Portsmouth, RI. S1307 - IN-HOUSE: Lead laboratory is Naval Research Laboratory, Orlando, FL; Naval Weapons Support Center, Crane, IN; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, New London, CT; CONTRACTORS: NONE.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0239, Mine Detection and Avoidance Sonar Improvements: This program was initiated in FY 1979 to improve the mine detection and avoidance capability of the SSN 637/688 Class Submarines. The improved offensive capabilities of recently developed enemy mines pose a serious threat to submarines. The improvement program provides the capability to detect these mines and provide advanced warning so that SSN 637/688 Class and future submarine classes can take evasive action or traverse a mine field safely. The Mine Detection and Avoidance Sonar development is being pursued using hardware elements in common with the Submarine Active Detective Sonar and AN/BQ7-5. It will be introduced to the fleet as an upgrade, integrated with the AN/BQO-5 and as part of the Submarine Advanced Combat System. This system will be a replacement for, rather than improvement to, the AN/BQR-15. One Engineering Development Model will be provided for developmental testing and evaluation.

(U) In FY 1982, fabrication of the Mine Detection and Avoidance Sonar continued. Sea test planning was initiated.

(U) The FY 1983 program consists of:

- o Continue development of Mine Detection and Avoidance Sonar sea test model.
- o Complete preparations for developmental at-sea testing.

(U) For FY 1984, it is planned to:

- o Complete development of Mine Detection and Avoidance Sonar sea test model.
- o Install and test Mine Detection and Avoidance Sonar sea test model on test platform (SSN-687).
- o Conduct at-sea testing.
- o Evaluate sea test changes.

(U) Program to completion will consist of incorporation and testing of changes resulting from at-sea test. Design documentation will be finalized. The Mine Detection and Avoidance Sonar function will be introduced to the fleet as an improvement to the AN/BQO-5 and later combat systems.

Program Element: 24281N

Title: Submarines

(U) Project S1307, Submarine Transducer Engineering Improvement: This project provides for the engineering development of improved sonar transducers to reduce transducer radiated and self noise and improve transducers' reliability.

(U) In FY 1982, this was a new start. Investigation of ceramics, elastomers, and other materials for transducers and hydrophones began. Transducer problem definitions were initiated.

(U) The FY 1983 program consists of:

- o Development of product fabrication specifications for sonar transducers and hydrophones.
- o Materials development.
- o Component development.

(U) For FY 1984, it is planned to continue:

- o Transducer problem definition.
- o Transducer design improvements.
- o Performance and lifetime evaluation methods.
- o Transducer Engineering Development.

(U) Program to completion will consist of a continuation of efforts. This is a continuing program.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 TOTAL DESCRIPTIVE SUMMARY

Program Element: 24304N Title: Mines and Mine Support
 DoD Mission Area: 234 - Mine Warfare/Mine Countermeasures Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,480	10,418	15,909	4,632	Continuing	Continuing
S0268	CAPTOR Improvements	2,480	10,481	15,909	2,769	Continuing	Continuing
S1517	CAPTOR SEASIDE	0	0	0	1,863	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for development of improvements to maintain the MK 60 Mine as an effective deep water anti-submarine warfare weapon system throughout its service life. The EnCAPSulated Torpedo design, designated MK 60 Mod 1 Mine is now in production. Improvements include an enhanced functional capability against extended shelf life to improve readiness and to reduce maintenance costs, and increased minefield effectiveness through development.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary consist of the following: the FY 1982 reduction of \$450 is due to reduced FY 1982 developmental testing; the increase of 8,937 in FY 1983 and the increase of 14,786 in FY 1984 are due to Department of Defense direction. the program element has been reevaluated as a continuing program and Total Estimated Cost is no longer being provided.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,393	2,930	1,481	1,123	22,264	54,432
S0268	Mine MK 60 Improvements	6,393	2,930	1,481	1,123	11,754	43,922
S1517	CAPTOR SEASIDE	0	0	0	0	10,510	10,510

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
WPH BA3	121,500	106,200	115,400	174,700	403,900	1,289,600
Quantity (MK 60 Mine)	(400)	0	(300)	(475)	1	(3,718)
NILCON	-	300	1,300	1,300	3,300	10,500

F. (U) RELATED ACTIVITIES: None.

Program Element: 24304N

Title: Mines and Mine Support

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, White Oak, Silver Spring, MD (lead laboratory); Naval Coastal Systems Laboratory, Panama City, FL. CONTRACTORS: Goodyear Aerospace Corporation, Akron, OH; Bendix Electrodynamics Corporation, Sylmar, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project 30268, CAPTOR Improvements:

1. (U) DESCRIPTION (Requirement and Project): This project provides for the design and development of improved functional capability for the MK 60 Mine against the threat.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Design changes for enhanced capability were successfully tested in a minefield environment. The design (Mine MK 60 Mod 1) has been placed in production. Recent review of the enCAPsulated TORpedo program resulted in the convening of a "Blue Ribbon Panel" to address the operational suitability of enCAPsulated TORpedo. This panel concluded that although EnCAPsulated TORpedo Mod 1 is a useful ASW asset, further improvements to the system are possible and should be implemented, leading to a EnCAPsulated TORpedo Mod 2.

b. (U) FY 1983 Program: The program will address EnCAPsulated TORpedo improvements. Specific design areas which will be addressed include: Design analysis and system engineering performance criteria will be defined.

c. (U) FY 1984 Planned Program: The hardware and software changes will be implemented and tested in the form of advanced development models and engineering development models. Preliminary results of the performance increases arising from this research will be available for review.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24311N

DoD Mission Area: 237 - Naval Warfare Surveillance and
Reconnaissance

Title: Undersea Surveillance Systems

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	48,577	49,649	52,442	68,723	Continuing	Continuing
X0763	Integrated Undersea Surveillance System Design and Assessment	7,065	12,110	14,660	20,208	Continuing	Continuing
X0764	Integrated Undersea Surveillance System Localization and Tracking Development	22,797	7,901	6,134	8,541	Continuing	Continuing
X0765	Underwater Hardware/Installation Systems	5,011	9,537	9,314	13,011	Continuing	Continuing
X0766	Integrated Undersea Surveillance System Detection and Classification System Development	13,704	20,101	22,334	26,963	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the design and development of: shore based acoustic signal processing systems; intrasystem acoustic and data handling/transmission systems; and underwater electronic component and cable technology as they relate to improving Sound Surveillance System sensitivity and performance.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net decrease in total program cost of 21 in FY 1982 is due to revision of cost estimates including inflation; The FY 1984 total program estimate is decreased by 16,522 due to: a refinement in the Integrated Undersea Surveillance System development schedule, a delay in shore integration requirements, and a revision in subsystem development cost estimates. Projects are reduced as follows: 2,637 for Project X0763; 3,930 for Project X0764; 5,223 for Project X0765; and 4,732 for Project X0766.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	51,244	48,598	49,649	68,964	Continuing	Continuing
X0763	Integrated Undersea Surveillance System Design and Assessment	7,874	7,065	12,110	17,297	Continuing	Continuing
X0764	Integrated Undersea Surveillance System Localization and Tracking Development	21,120	22,808	7,901	10,064	Continuing	Continuing
X0765	Underwater Hardware/Installation Systems	4,096	5,021	9,537	14,537	Continuing	Continuing
X0766	Integrated Undersea Surveillance System Detection and Classification System Development	18,154	13,704	20,101	27,066	Continuing	Continuing

Program Element: 24311N

Title: Undersea Surveillance Systems

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional* to Completion	Total Estimated Cost
Other Procurement, Navy		120,640	109,752	88,676	130,320	377,663	Continuing
Quantity		(various)					
Military Construction		280	7,720	3,010	21,630	4,860	37,500

*Costs through FY 1988

F. (U) RELATED ACTIVITIES: Anti-Submarine Warfare Surveillance, Program Element 63784N; Rapidly Deployable Surveillance System, Program Element 63788N; Surveillance Towed Array Sensor System, Program Element 24313N: These programs provide research and development for additional fixed system and mobile/deployable sensors for the Integrated Undersea Surveillance System. Long Range Acoustic Propagation, Program Element 63785N, provides environmental acoustic support through at-sea measurements and acoustic modelling.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (lead laboratory); Naval Research Laboratory, Washington, DC; Naval Electronic System Engineering Activities, St. Inigoes, MD. CONTRACTORS: Bell Telephone Laboratories, Whippany, NJ; TRW Systems, McLean, VA; ENSCO, Springfield, VA; General Electric Co., Syracuse, NY; UNIVAC, St. Paul, MN; Western Electric Co., Greensboro, NC; Computing Devices Company, Ottawa, Canada.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0764, Integrated Undersea Surveillance System Localization and Tracking Development: This project provides for the development of improved systems for tracking, reporting and localizing targets which, with gains realized by ongoing sensor system improvement programs, will increase target handling capacity, improve the timeliness of target locating data reports to support the Navy's Anti-Submarine Warfare operations and offset the effects of ☐ increased ambient noise.

(U) In FY 1982, development continued on improvements to the Target Data Processor, Universal Communication Processor and Integrated Communication System software. Development of hardware and software for Interarray Processor II, Wideband Acoustic Recall System, Integrated Acoustic Display and Acoustic Display Console continued.

(U) The FY 1983 program consists of:

- o Continuing FY 1982 subsystem developments
- o Completing Target Data Processor revision nine improvements
- o Conducting Interarray Processor II interface testing

(U) The FY 1984 planned program will continue software developments for:

- o Target Data Processor
- o Universal Communication Processor

Program Element: 24311N

Title: Undersea Surveillance Systems

o Integrated Communication System

(U) Program to Completion: This is a continuing program. Complete software enhancements to Interarray Processor II, Target Data Processor and Integrated Communication System.

(U) Project X0762, Underwater Hardware/Installation Systems: This project provides for near-term development of underwater electronic component and cable technology improvements.

(U) In FY 1982, development continued on exploiting new technologies for the installation and repair of underwater system components. Fabrication of the engineering development model of the digital acoustic survey system was completed. Acoustic assessments and experiments were performed. Application of fiberoptic transmission systems was investigated.

(U) The FY 1983 program consists of:

- o Continuing development of new technologies for installation and repair of underwater systems components
- o Continuing development of digital acoustic survey system
- o Continuing acoustic assessments and experiments
- o Initiating development of Deep Ocean Cable Burial System
- o Completing fiberoptic transmission system definition and program plan

(U) The FY 1984 planned program consists of:

- o Completing development of and applying new technologies for installation and repair of underwater system components
- o Evaluating digital acoustic survey system
- o Continuing development of Deep Ocean Cable Burial System
- o Developing shipboard cable-laying equipment improvements
- o Developing fiberoptic transmission system

(U) Program to completion: This is a continuing program. Efforts will increase in fiberoptic transmission system development.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project X0763, Integrated Undersea Surveillance System Design and Assessment:

1. (U) DESCRIPTION: The Sound Surveillance System, [

This project provides near term development support of the Sound Surveillance System operations with the following specific objectives: (1) continue Evaluation Center/Naval Facility software development and software commonality efforts for the Sound Surveillance System

Program Element: 24311N

Title: Undersea Surveillance Systems

backfit program; (2) continue a two-phase program of performance evaluation, array characterization and performance assessment to establish an improved Sound Surveillance System performance baseline and identify sensitivity parameters; (3) provide continuing systems engineering support related to the overall Integrated Undersea Surveillance System; and (4) provide for the central maintenance of government-furnished research and development equipment installed at Evaluation Center and Naval Facility Laboratory sites.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Performance evaluation, predictions, generation of system performance contours and Sound Surveillance System performance assessment efforts continued. Software diagnostic and operating systems development, and operation of the Integrated Undersea Surveillance Test and Integration facility continued. Phase 2 backfit development, operational tests and evaluation and deficiency corrections continued. Training courseware plans for Phase 2 backfit equipments were developed. Development of the Integrated Functional Test System I and II and the Unified Diagnostic Test System I continued. Development of training courseware for the Interarray Processor II and Target Data Processor continued.

b. (U) FY 1983 Program: Phase 2 backfit development and operational tests and evaluations continue with the completion of major subsystem Test and Evaluation Master Plans. Training support activities continue, including on-site operational training for the Interarray Processor II subsystem and development of the Real-Time Signal Processor/Computer Alerted Surveillance System functional trainer for the Readiness Training Facilities. Performance prediction, operational performance assessment and array characterization will continue. Software standardization, verification and integration of the various systems to attain an Integrated Undersea Surveillance System continue. Major milestones for accomplishments during FY 1983 are: Interarray Processor II full-scale development test and technical evaluation tests, Programmable Signal Processor software acceptance test, systems engineering and integration contract award, and virtual architecture extension software acceptance test in support of Interarray Processor II improvements.

c. (U) FY 1984 Planned Program: Continue Phase 2 training and Integrated Undersea Surveillance System integration efforts. Software developments will be dictated by fleet usage and evaluation and changes in system parameters. Continue system performance assessment, evaluation and array characterization. Conduct technical evaluations of the Adaptive Beamformer subsystem, and fleet operational test and evaluation of the Target Data Processor and Interarray Communications subsystems. Plan for technical and operational evaluations of the Wide-Band Acoustic Recall and Integrated Acoustic Display subsystems.

d. (U) Program to Completion: This is a continuing program. Efforts will focus on the integration of the Adaptive Beamformer in the Integrated Undersea Surveillance System.

e. (U) Milestones: Not applicable.

(U) Project X0766, Integrated Undersea Surveillance System Detection and Classification System Development:

1. (U) DESCRIPTION: This project provides for the application of state-of-the-art computer and display technology to the development of improved signal and data processing techniques directed towards improved detection and classification of targets. Efforts are focused in the following areas: (1) real time signal processing (including beamforming and spectrum analysis) as well as the manipulation and transfer of data from collection subsystems to processing subsystems; (2) recall and follow-up processing for post analysis of collected data; (3) development of improved displays to aid and improve operator processing techniques; and (4) development of new signal processing algorithms to improve detection and classification. Currently under development in this project are algorithms for automatically alerting operators of possible threat targets, Computer Alerted Surveillance System, Adaptive Beamformers which improve surveillance detection capabilities,

and post processors.

Program Element: 24311N

Title: Undersea Surveillance Systems

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued development on Phase 2 of Computer Alerted Surveillance System and Adaptive Beamformer and discrimination algorithm research test bed. Field installation and operational evaluation were completed; efforts for application to other sites continued. Highband and new threat discriminator algorithm developments, searchlight improvements, broadband and Integrated Acoustic Display developments continued, as well as site tailoring of wideband compressed data remoting for the west coast consolidation. Increased effort has been directed toward the development of Integrated Acoustic Display and the Adaptive Beamformer. The testing and selection of a wide bed writer was completed and other development activity in support of the Fixed Distributed System continued.

b. (U) FY 1983 Program: Development of broadband algorithms, Wideband Acoustic Recall System, Real Time Signal Processor improvements, Adaptive Beamformer and the Integrated Acoustic Display will continue. Emphasis will be placed on the integration and interfacing of subsystems under development. Midband detection algorithms development begins. Major testing milestones for accomplishments during FY 1983 are: Wideband Acoustic Recall System factory acceptance test, Interarray Communications System to Wideband Acoustic Recall System interface test, Interarray Communications System to Interface, and Interarray Communications System to Integrated Acoustic Display System Interface Test.

c. (U) FY 1984 Planned Program: Continue development of Adaptive Beamformer, Wideband Acoustic Recall, Real Time Signal Processor II, midband and new threat discrimination algorithm, and evaluation of the Adaptive Beamformer. The scope of efforts will include factory acceptance testing, fleet installation, integration testing, full scale development testing and evaluation, site tailoring and integration of these subsystems in a field environment using engineering development models. Development efforts will also be directed toward determining the specific requirements for these emerging modular subsystem capabilities as they are integrated into the different facilities of varying capacities and threat processing loads.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24313N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Surveillance Towed Array Sensor
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,364	7,070	3,478	3,675	2,657	138,438
X0758	Surveillance Towed Array Sensor	6,364	7,070	3,478	3,675	2,657	138,438

The above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for improvements to the Surveillance Towed Array Sensor and the capability for positioning a sensor as needed to detect and maintain contact with submarines in ocean basins worldwide. The Surveillance Towed Array Sensor will provide a mobile, long range, passive surveillance capability against current and projected threat submarines in ocean areas of national interest.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: increases of 3,478 in FY 1984, 3,675 in FY 1985 and 2,657 in cost to completion (9,810 increase in total estimated cost) are due to an increase in the scope of the program of a Surveillance Towed Array Sensor follow-on product improvement program.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,769*	6,364	7,070	0	0	128,628
X0758	Surveillance Towed Array Sensor	6,769	6,364	7,070	0	0	128,628

*Funding from PE 64789N, (Anti-Submarine Warfare) in FY 1981.

E. (U) OTHER APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
SCN (T-AGOS)	153,700	0	0	135,800	261,400	*737,400
Quantity	(4)	(0)	(0)	(2)	(4)	(18)
OPN	15,693	13,665	11,043	4,142	21,669	**90,325

*PE 24313N (excludes outfitting and post delivery)

**PE 24313N (excludes interim/initial spares)

Program Element: 24313N

Title: Surveillance Towed Array Sensor

F. (U) RELATED ACTIVITIES: Program Element 24311N, Undersea Surveillance System, provides shore signal and information processing. Program Element 63785N, Long Range Acoustic Propagation, provides acoustic data and modelling support and testing of modified arrays. Program Element 33109N, Satellite Communications, provides for the development of the satellite terminal. A reduced diameter surveillance towed array will be developed under PE 64789N, Surveillance Towed Array Sensor, commencing in FY 1985.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (Lead Laboratory). CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; and TRW Systems, McLean, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0758, Surveillance Towed Array Sensor: This project will develop improvements in signal processing for the Surveillance Towed Array Sensor to provide increases in the capability for long range passive surveillance against threat submarines. These improvements will provide an improved capability as well as the satellite relay for increased flexibility at the shore facility.

(U) In FY 1982, operational systems development commenced. At-sea testing of the production array and electronic components continued along with development of refinements for the AN/UYS-1 Advanced Signal Processor software.

(U) The FY 1983 program consists of:

- o Continuing product improvements.
- o Completing test and evaluation, of deficiencies correction, and introducing corrections into production line.

(U) For FY 1984, it is planned to:

- o Commence a follow-on product improvement program to develop system improvements. This includes a dual Advanced Signal Processor (AN/UYS-1) and capabilities to improve acoustic detection and classification, and increase system operational availability.

(U) Program to completion: Complete efforts under the follow-on product improvement program including designing, coding and unit testing computer software, installing hardware, and field testing the dual Advanced Signal Processor.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24571N
DoD Mission Area: 235 - Naval Warfare Support

Title: Special Projects
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,157*	6,660	16,051	16,478	Continuing	Continuing
W0431	Tactical Aircrew Combat Training System	1,942*	2,541	2,584	3,552	Continuing	Continuing
W1414	Integrated Air Warfare Training Complex - Fallon	7,215*	4,119	13,467	12,926	Continuing	Continuing

*Funded under PE 24161N, Aviation Support Carrier Air Wings in FY 1982.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Further development of the Tactical Aircrew Combat Training System is required to extend the current training capability in air-to-air combat to other phases of air warfare; e.g., air-to-surface and defense suppression, to provide comprehensive interface with additional tactical aircraft, and to include realistic electronic warfare simulation in all training exercises. A complementary development employing the advanced technology was initiated in FY 1982 to provide a modern instrumented range at Naval Air Station, Fallon, Nevada for graduate training of Navy and Marine Corps Squadrons ranging from single aircrews to full carrier air wing exercises. This project has been identified by the Tactical Air Commanders as their priority training range requirement.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The increase in FY 1982 results from a reprogramming in the amount of 1,200 into Project W1414. The decreases of 16 in Project W0431 and 44 in Project W1414 in FY 1983 result from Navy's application of a general Congressional reduction. The decision to increase FY 1984 funding in project W1414 in the amount of 4,340 is to complete manufacturing, factory test and on-site equipment installation. The decrease of 139 in Project W0431 in FY 1984 is the result of budget adjustments including inflation.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,384*	7,957*	6,720	11,850	Continuing	Continuing
W0431	Tactical Aircrew Combat Training System	1,924*	1,942*	2,537	2,723	Continuing	Continuing
W1414	Integrated Air Warfare Training Complex - Fallon	460*	6,015*	4,163	9,127	Continuing	Continuing

*FY 1982 and prior funding is reported under PE 24161N.

Program Element: 24571N

Title: Special Projects

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	<u>FY 1982 Actual</u>	<u>FY 1983 Estimate</u>	<u>FY 1984 Estimate</u>	<u>FY 1985 Estimate</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
OPN	760	7,766	2,990	18,200	Continuing	Continuing
APN	2,952	4,900	5,500	13,500	Continuing	Continuing

F. (U) RELATED ACTIVITIES: The first Tactical Aircrew Combat Training System was originally developed as an Air Combat Maneuvering Range in the period FY 1970 through FY 1974 and is now operational at Yuma, AZ. A second system has been installed on the East Coast off Cape Hatteras. Similar systems have been procured by the Navy and United States Air Force and installed at Nellis Air Force Base, NV; Tyndall Air Force Base, FL; Luke Air Force Base, AZ; Holloman Air Force Base, NM; and in the Mediterranean. At Fallon, NV, the existing range instrumentation systems with which the Tactical Aircrew Combat Training System will interface, including the Electronic Warfare Training equipment.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Air Development Center, Warminster, PA; Fleet Analysis Center, Corona, CA; Naval Air Test Center, Patuxent River, MD; Air Test and Evaluation Squadron Four (VX-4), Point Mugu, CA; Air Test and Evaluation Squadron Five (VX-5), China Lake, CA. CONTRACTORS: Cubic Corporation, San Diego, CA; SRI International, Menlo Park, CA; Systems Engineering Technology Associates Corporation, Newport Beach, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0431, Tactical Aircrew Combat Training System: This project provides for the design and development of an advanced state-of-the-art Tactical Aircrew Combat Training System to include: (1) full strike capability for advanced tactical training, (2) the capability of interfacing the F-18 weapon system data bus to the Tactical Aircrew Combat Training System Aircraft Instrumentation Subsystem, (3) the capability to present realistic electronic warfare signals and evaluate aircrew performance in the electronic warfare environment, and (4) the implementation of simulation models for additional air-to-air and air-to-ground weapon systems and defense suppression.

(U) In FY 1982 a flight test demonstration of the electronic warfare/radar warning receiver interface was conducted and final fabrication of development units of the F/A-18 internal aircraft instrumentation subsystem for Tactical Aircrew Combat Training System was completed.

(U) The FY 1983 program consists of:

- o Development testing of the F/A-18 internal aircraft instrumentation subsystems will be completed.
- o Continue development of the electronic warfare and radar warning receiver interface.
- o Development of a PHOENIX interface with the F-14A aircraft.

Program Element: 24571N

Title: Special Projects

(U) The FY 1984 program consists of:

- o Continued development of the electronic warfare/radar warning receiver/Tactical Aircrew Combat Training System training interface.
- o Continued development of the F-14A aircraft/PHOENIX/Tactical Aircrew Combat Training System training interface.
- o Development of a HARM/Tactical Aircrew Combat Training System training interface.

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

1. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W1414, Integrated Air Warfare Training Complex-Fallon

1. (U) DESCRIPTION: The Fallon Integrated Air Warfare Training Complex is a state-of-the-art, computer-driven, advanced technology range instrumentation system designed to provide advanced tactical training for operational aircrews. Training will be provided for either simultaneous or individual operations in Air Combat Maneuvering, Tactical No Drop Bomb Scoring, Defense Suppression and Electronic Warfare. The system is comprised of four basic subsystems: (a) Airborne Instrumentation Subsystem Government Furnished Equipment to Fallon, (b) Computation and Control Subsystem, (c) Display and Debrief Subsystem, (d) Tracking and Instrumentation Subsystem. These subsystems, with appropriate communications, microwave links, and remote operated master station radios, are integrated to provide an instrumentation system capable of tracking 16 high-activity aircraft and 20 low activity (position only) aircraft.

(U) The Airborne Instrumentation Subsystem is provided as Government Furnished Equipment to Fallon and consists of P3, P4, or P4A pod-mounted equipment and/or the internally-carried Airborne Instrumentation Subsystem on F/A-18 aircraft.

(U) The Computation and Control Subsystem equipment is based on state-of-the-art Perkin-Elmer 3250 computers and supporting peripheral equipment; e.g., printers, bulk storage, etc. This equipment is established to be three times faster, have more capability and provide for easier expansion over any other existing Tactical Aircrew Combat Training System type system.

(U) The Display and Debrief Subsystem utilizes advanced technology multicolored, multifunction large screen display and consoles. These consoles provide three dimensional displays, engineering data and aircraft launch modes for weapons delivery and combat maneuvering. All consoles will be capable of being used for live or debrief exercises and can accommodate viewing by small or large aircrew groups (up to 50).

(U) The Tracking and Instrumentation Subsystem is comprised of solar powered, remote data collection and relay stations strategically located through the 30 X 50 nautical mile range area. These devices communicate data to and from properly equipped participant aircraft and relay the transmitted data via the remotely controlled master station and microwave link to the Computation and Control Subsystem and Display and Debrief Subsystem.

(U) Communications Radio subsystems complete the installation to provide for maintenance and range safety operations. The advanced Tactical Aircrew Combat Training System installation planned for Fallon integrates, for the first time, functions of aircrew training which to date have only been demonstrated in the laboratory. With these advanced training scenarios, the United States Navy will have an instrumented training range which will provide realistic tactical training both for defended area attack and/or point defense. The system will have essentially all new computers, displays and software accommodating large groups of aircraft and multiple threat systems. The system further provides for system expansion and/or modification to meet known and/or anticipated fleet requirements.

Program Element: 24571N

Title: Special Projects

(U) The Fallon Tactical Aircrew Combat Training System will be the prototype for all future Navy Tactical Aircrew Combat Training System ranges to be procured with Navy OPN funds commencing in FY 1985.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The development contract was awarded in August 1982. Under this contract, preliminary design reviews will be accomplished and long lead items procured.

b. (U) FY 1983 Program: Develop contract equipment, conduct critical design review and initiate the manufacture of the equipment.

c. (U) FY 1984 Planned Program: Complete equipment manufacture, factory test, and prepare for on-site installation.

d. (U) Program to Completion: Conduct Technical and Operational Evaluation of the Fallon Tactical Aircrew Combat Training System.

e. (U) Milestones

MILESTONE

1. Contract Award
2. Operational Test
3. Initial Operational Capability

DATE

August 1982
February 1984
March 1986

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24573N
DoD Mission Area: 374 - Multi-Mission, Technology and Support

Title: Navy Cover and Deception Program
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING) (Dollars in Thousands):

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
X0805	Integrated Cover and Deception System	13,305	14,312	12,644	5,951	Continuing	Continuing
X0849	Offboard Deception Devices	5,288	5,955	4,425	1,894	Continuing	Continuing
		8,017	8,357	8,219	4,057	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Cover and Deception Program is concerned with

The approach is to []
[] System using devices developed under the Integrated Cover and Deception System and Offboard Deception Devices projects described herein.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands): The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: RDT&E, an increase in FY 1984 of 33 in Project X0805, Integrated Cover and Deception, and a decrease of 183 in Project X0849, Offboard Deception Devices, are due to refined cost estimates including inflation.

OPN:

(U) Project X0805, Integrated Cover and Deception System: The increase in funding is a result of restructuring driven by the increased cost per unit, requiring additional funding in the budget years. The AN/SLQ-34 Radar Countermeasures Generator was programmed at \$325 per copy; however, actual production costs from the manufacturer have gradually escalated the costs to \$653.3 per unit. To stay within established funding lines the buy was reduced from 19 to 18 in FY 1981, reduced from 25 to 18 in FY 1982, increased from 0 to 15 in FY 1983, and increased from 0 to 12 in FY 1984 to complete the inventory objective of []. The [] which was estimated at \$825 per unit has escalated to \$1,250 and the [] from \$725 per unit to \$1,380. The [] was programmed for procurement of 2 each year starting in FY 1984. This project has been restructured for a one year buy of 6 [] in FY 1985 and 6 [] in FY 1986. The high power amplifier for the AN/SLQ-34 has increased from an estimated \$125 per unit to \$241 but will still be procured as planned. The AN/SLQ-33 Ship-Towed Acoustic Deception Device, which achieved Approval for service use in FY 1981 but lost the OPN funding, is included in the FY 1984 budget.

(U) Project X0849, Offboard Deception Devices: The variance in the X0849 funding profile is the result of an increase in the cost of the High Frequency simulator from \$87 to \$111 per copy which forced a two year buy - FY 1983 and FY 1984 vice FY 1981. The Jammer VI increased from \$12 to \$21 forcing it into a similar 2-year buy. The [] have been delayed two years to accelerate the Hybrid which is an []. The Cover and Deception Scenario Generator, which will be used to both [] has been added. The Offboard Deception Devices program has been restructured to show an achievable profile.

Program Element: 24573N

Title: Navy Cover and Deception Program

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,798	13,305	14,312	12,794	Continuing	Continuing
X0805	Integrated Cover and Deception System	2,121	5,288	5,955	4,392	Continuing	Continuing
X0849	Offboard Deception Devices	5,677	8,017	8,357	8,402	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

OPN

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
332340 Integrated Cover and Deception	9,843	14,435	26,736	35,047	Continuing	Continuing
AN/SLO-34, Radar Countermeasures Generator	5,228	10,611	8,630	7,486	0	TBD
(Quantity)	(8)	(18)	[]	[]	0	[]
AN/SLO-22, Countermeasures Receiver	4,000	-	-	-	0	TBD
(Quantity)	(27)	-	-	-	0	[]
Acoustic Synthesizer for STADD	615	-	-	-	0	615
(Quantity)	(6)	-	-	-	0	[]
AN/SKR-7 Telemetric Data Receiver	-	4,117	6,404	3,009	0	13,530
(Quantity)	-	(5)	-	(8)	0	(32)
(Quantity)	-	-	-	7,491	0	7,491
(Quantity)	-	-	-	[]	0	[]
(Quantity)	-	-	-	-	7,494	7,494
AN/SLO-34, Improvements-High Power Amplifier	-	-	4,821	7,981	0	12,802
(Quantity)	-	-	[]	[]	0	[]
Processor Upgrade	-	-	-	1,908	0	1,908
(Quantity)	-	-	-	[]	0	[]
Ship-Towed Acoustic Deception Device	-	-	7,116	7,458	0	14,574
(Quantity)	-	-	[]	[]	0	[]
332342 Offboard Deception Devices	-	6,682	5,175	22,381	Continuing	Continuing
Communication Simulator	-	9,018	3,262	-	0	12,280
(Quantity)	-	(85)	[]	-	0	[]
Radar Jammer II	-	4,500	2,372	-	0	6,872
(Quantity)	-	(215)	[]	-	0	[]
Cover and Deception Scenario Generator	-	-	1,186	1,243	TBD	TBD
(Quantity)	-	-	[]	[]	(2)	[]
HYBRID	-	-	-	2,323	TBD	TBD
(Quantity)	-	-	-	[]	(700)	[]

*2 units are refurbished units used for test and evaluation.

F. (U) RELATED ACTIVITIES: None.

Program Element: 24573N

Title: Navy Cover and Deception Program

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; Naval Ocean Systems Center, San Diego, CA.
CONTRACTORS: Honeywell, Inc., Seattle, WA; Raytheon Co., Waltham, MA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0805, Integrated Cover and Deception System: This project addresses the mission need of [] Four separate hardware systems, the AN/SSQ-74(V) [] the AN/SLQ-33, the AN/SLQ-34, and the AN/SLR-22 are developed. The AN/SSQ-74(V) electronic deception system is configured in two separately deployable components (vans) enclosing separate groups of [] One van, the AN/SSQ-74(V)1 [] Major items of its equipment are the long-range (A-band) radar simulator and long-range communications Navy Tactical Data System simulator. The other van, the AN/SSQ-74(V)2, [] includes equipment to simulate the shorter range (high frequency) radar and communications transmissions. The AN/SLQ-34 provides a jamming capability against threat aircraft radars and the SLR-22 is a threat warning device. The AN/SLQ-33 ship-towed acoustic deception device, [] includes shipboard electronics, winch assembly, and a towed body containing acoustic transducers. Future efforts involve the development of [] the AN/SLQ-33, development of new radar simulators to augment AN/SSQ-74 capabilities [] and development of a high power amplifier and processor upgrade for the AN/SLQ-34 radar countermeasures generator.

(U) The FY 1982 program includes:

- o Continuing the engineering development of the []
- o Complete engineering development of high power amplifier for the AN/SLQ-34 jammer;
- o Initiate development of the portable Cover and Deception equipment; and,
- o Obtain Approval for Service Use for the AN/SKR-7, telemetric data receiver.

(U) The FY 1983 program consists of:

- o Complete engineering development and obtain Approval for Service Use for the [] and the high power amplifier for the AN/SLQ-34 radar countermeasures generator; and,
- o Initiate development of a Processor upgrade for the AN/SLQ-34 []

(U) The FY 1984 program consists of:

- o Initiating development of the [] upgrades, which will provide [] increased power and frequency agility.

(U) Program to completion will:

- o Obtain Provisional Approval for Service Use for portable Cover and Deception equipment, []

Program Element: 24573N

Title: Navy Cover and Deception Program

(U) Project X0849, Offboard Deception Devices: This project represents a family of expendable and reusable devices [] degrading the effectiveness of the Soviet command and control system. The Offboard Deception Devices planned for development include: a high frequency simulator; [] and acoustic signature simulators.

(U) The FY 1982 program included:

- o Initiating development of the Hybrid, [] acoustic and auxiliary equipment (programming and testing);
- o Continued development of the []
- o Completing development and obtaining Provisional Approval for Service Use of the High Frequency Simulator and Jammer II.

(U) The FY 1983 program will continue development of:

- o The shipboard []
- o The [] to complete the deception effort; and
- o The portable and installed programming and test devices which will be used by the Cover and Deception planners to []

Funds will also be used to initiate development of a []

(U) The FY 1984 program will:

- o Initiate development of Jammer II upgrades;
- o Continue development of systems initiated in FY 1982 and FY 1983; and,
- o Obtain Provisional Approval for Service Use for [] Hybrid Simulators.

(U) Program to completion will:

- o Complete development and obtain Provisional Approval for Service Use []
- o Obtain Provisional Approval for Service Use []

1. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24575N
DoD Mission Area: 374 - Multimission, Technology and Support

Title: Electronic Warfare Support
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING) (Dollars in Thousands):

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15,074	8,014	9,529	21,386	Continuing	Continuing
X0668	Electromagnetic Performance of Aircraft and Ship Systems	5,334	3,881	2,259	10,276	Continuing	Continuing
X0898	Fleet Electronic Warfare Support Group	4,651	3,703	6,357	9,649	Continuing	Continuing
R1015	Long Range Electronic Warfare Planning	398	430	*	*	*	*
X1370	Command, Control and Communications Countermeasures Development	4,691	**	**	**	**	**
X1742	Electronic Counter Countermeasures	0	0	913	1,461	Continuing	Continuing

*Project R1015 is funded in program element 65858N in FY 1984 and out.

**Project X1370 is funded in program element 24576N in FY 1985 and out.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Develop the capability to assess the performance of airborne and shipboard electromagnetic systems such as communications, radars, and electronic countermeasures; this capability supports both research and development and operational ships and aircraft. Develop operational systems that simulate hostile electronic countermeasures and other selected electronic weapons to exercise fleet capabilities in command and control, anti-air warfare, anti-surface warfare and electronic warfare; this capability supports both research and development and fleet readiness by providing a realistic hostile electromagnetic environment during technical and operational evaluations of developmental systems as well as during large fleet exercises. Develop the capability to assess the performance of electronic counter countermeasures (both hardware fixes and training effectiveness) techniques during system development and operational employment. Support planning in electronic warfare areas leading to formulation of operational concepts and identification of future deficiencies and requirements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY (Dollars in Thousands): The changes between the funding profiles shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows:

(U) Project X0668, Electromagnetic Performance of Aircraft and Ship Systems: The decrease of 109 in FY 1982 results from an adjustment for actual costs and inflation. The decrease of 1,142 in FY 1984 represents more accurate cost data.

(U) Project X0705, Communication Security Assessment Program: The decrease of 988 in FY 1982 is due to cancellation of this project and reprogramming that amount to program element 64566N Project S0252.

(U) Project X0898, Fleet Electronic Warfare Support Group: The decrease of 18 in FY 1982 results from an adjustment for actual costs and inflation. The decrease of 398 in FY 1984 represents a more accurate pricing of the program.

(U) Project R1015, Electronic Warfare Master Plan: The 425 decrease in FY 1984 is due to this project being transferred to program element 65858N in FY 1984.

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Program Element: 24575N

Title: Electronic Warfare Support

(U) Project X1370, Command, Control and Communications Countermeasures Development: This program has been transferred in FY 1983 to program element 24576N. The decrease of 320 in FY 1982 is due to more accurate actual cost data.

(U) Project X1742, Electronic Counter Countermeasures: The increases in FY 1984 and beyond are due to this project being a FY 1984 new start.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,431	15,509	8,014	10,581	Continuing	Continuing
X0668	Electromagnetic Performance of Aircraft and Ship Systems	1,087	5,443	3,881	3,401	Continuing	Continuing
X0705	Communication Security Assessment Program	502	988	0	0	0	6,870
X0898	Fleet Electronic Warfare Support Group	3,345	4,669	3,705	6,755	Continuing	Continuing
R1015	Electronic Warfare Master Plan	497	398	430	425	Continuing	Continuing
X1370	Command, Control and Communications Countermeasures Development	0	5,011	*	*	*	*

*Project is funded in program element 24576N in FY 1983 and out.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
X0898 Fleet Electronic Warfare Support Group						
APN (BA5)	25,900	34,100	31,400	27,400	Continuing	Continuing
APN (BA4)	-	-	26,400	-	Continuing	Continuing
Quantity	-	-	(1)	-	Continuing	Continuing
OPN (BA2) (332345)	7,561	6,647	5,750	1,645	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Fleet Electronic Warfare Group: Surface Electronic Warfare (Advanced) (PE 63521N), Surface Electronic Warfare (Engineering) (PE 64554N), Shipboard Electronic Warfare Improvements (PE 64573N), and Communications Security (PE 33401N), are all related to this project since the systems developed for the Fleet Electronic Warfare Support Group are used to exercise and evaluate systems developed under the above listed program elements. Electromagnetic Performance of Aircraft and Ship Systems: This project relates to shipboard and aircraft systems which radiate electromagnetic energy (radar, communications, electronic warfare, etc.). Electronic Counter Countermeasures: Strike Warfare Weaponry Technology (PE 62332N) and all shipboard and aircraft systems which are potentially susceptible to enemy electronic operations.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is Naval Avionics Center, Indianapolis, IN; Naval Electronic Systems Engineering Center, Portsmouth, VA; Naval Research Laboratory, Washington, D.C. OTHERS: Air Test and Evaluation Squadron One, Naval Air Station, Patuxent River, MD; and Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Bendix Field Engineering Corporation, Columbia, MD; McDonald Douglas, Tulsa, OK; Raytheon, Goleta, CA; SYSCON, Virginia Beach, VA; Microwave Power Devices, Hauppauge, NY; Watkins-Johnson, San Jose, CA; Space Microwave Inc., Santa Rosa, CA; Scientific Communications Inc., Garland, TX; Hewlett Packard, Inc., Rockville, MD; and Amherst Research, Buffalo, NY.

Program Element: 24575N

Title: Electronic Warfare Support

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0668, Electromagnetic Performance of Aircraft and Ship Systems: This project provides for improvements in the present system and development of a replacement lightweight airborne system capable of meeting emitter measurement requirements through the 1980's.

(U) In FY 1982, development continued by expanding coverage to [] and upgrading existing avionics.

(U) The FY 1983 program consists of:

- o Extending frequency measurement capabilities to keep pace with operational and development systems;
- o System engineering and design of a new lightweight avionics measurement system; and,
- o Major procurement of new system components, including computer software.

(U) For FY 1984 it is planned to continue:

- o Acquisition of the new lightweight avionics measurement system;
- o Perform system integration, installation, and acceptance testing; and,
- o Continue upgrading the existing system.

The increase of 1,406 over FY 1983 is due to obtaining the initial requirements of support equipment and repair parts, preparing and publishing the documentation needs, and developing the ruggedization design of the off-the-shelf commercial equipment.

(U) Program to completion will:

- o Replace the current system with the lightweight avionics measurement system;
- o Continue improvements in out-years to keep pace with weapon systems introduction; and,
- o Continue efforts to reduce manpower intensiveness of data collection and reduction.

(U) Project X0898, Fleet Electronic Warfare Support Group: This project provides equipment for the Fleet Electronic Warfare Support Group to perform its mission of providing a hostile electronic warfare environment for research and development managers and fleet exercises. Equipment includes: []

(U) In FY 1982, development of the [] was completed and development of the [] continued. Development also continued on the generic missile simulator.

Program Element: 24575N

Title: Electronic Warfare Support

(U) The FY 1983 program consisted of:

- o Completing development of the [];
- o Initiating development of the [] and,
- o Design and test of the generic simulator will be completed.

(U) For FY 1984 it is planned to continue:

- o Development of product improvements; and,
- o Development of variant simulators.

The increase of 2,654 over FY 1983 is due to initiating development of: (1) a portable electronic threat simulator; and (2) hostile command, control and communications simulators.

(U) Program to completion will continue:

- o The airborne jammer system improvements; and
- o The development, procurement, and installation of generic simulators and variants, the portable electronic simulator, standoff adversary targeting radar simulator, and new threat simulation devices.

(U) Project XI742, Electronic Counter Countermeasures: This project provides for (1) electronic counter countermeasures susceptibility testing to determine airborne and shipborne electronic systems weaknesses early in the acquisition cycle in order to take appropriate corrective action and (2) development of electronic counter countermeasures technology to fix or harden electronic systems against advanced and sophisticated countermeasures.

(U) In FY 1982 and FY 1983 limited funding in program element 62332N, Strike Warfare Weaponry Technology, has been and will be used in exploratory development.

(U) In FY 1984, in program element 24575N - Electronic Warfare Support, it is planned to:

- o Complete the electronic counter countermeasures susceptibility analysis, and
- o Acquire and prepare a special electronic counter countermeasures van which will provide the appropriate instrumentation and test equipment, as well as the required electrical, mechanical and environmental support.

This is a new start for this program element.

(U) Program to completion will include:

- o Design, fabrication, test and evaluation of electronic counter countermeasures fixes and
- o Completion of all required software integration efforts.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 24576N
DoD Mission Area: 372 - Escort, Stand-Off and Counter C3

Title: Counter Command Control Communications Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,691*	11,533	15,240	44,361	Continuing	Continuing
X1370	Command, Control and Communications Counter-measures Development	4,691*	5,933	5,874	17,323	Continuing	Continuing
X1794	Command, Control and Communications Counter-measures Prototyping	-0-	5,600	9,366	27,038	Continuing	Continuing

* Funded under PE 24575N, Electronic Warfare Support, in FY 1982.

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program is a continuing effort to develop countermeasures to Soviet shipboard, airborne, and land-based command, control, and communications systems which are used for surveillance, reconnaissance, targeting, and communications.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows:

(U) RDT&E,N: The Countermeasures development program consisted of one project (X1370) in FY 1982 in program element 24575N. In FY 1983 the program was transferred to program element 24576N and divided into two projects (X1794 and X1370) for evaluation of operational feasibility and full-scale development, respectively. The decrease of 320 in FY 1982 represents more accurate cost data. The decrease in project X1370 of 5,600 in FY 1983 and 12,026 in FY 1984 represents the transfer of sub-projects from X1370 to X1794. The program element decrease in FY 1984 is the result of refined cost estimates in the amount of 660 and a transfer of 2,000 into Extremely Low Frequency (ELF) Communications, PE 11401N.

(U) OPN: The OPN appropriation funding of 7,900 in FY 1985 represents acceleration of a first year production and did not appear in the FY 1983 Descriptive Summary.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	5,011*	11,533	17,900	Continuing	Continuing
X1370	Command, Control and Communications Countermeasures Development	0	5,011*	11,533	17,900	Continuing	Continuing

* FY 1982 project funding is under Program Element 24575N Electronic Warfare Support.

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Program Element: 24576N

Title: Counter Command Control Communications Development

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement Navy (BA 2) (332343) (Quantity)	-0-	-0-	-0-	7,900*	Continuing	Continuing
	-0-	-0-	-0-	3,200	Continuing	Continuing

*Procurement of [] one sub-program of X1370.

F. (U) RELATED ACTIVITIES: Offboard Deception Devices and Integrated Cover and Deception/Ship-Towed Acoustic Deception (PE 24573N) provides technology to the development of equipment in Project X1370. The High Frequency Improvement Program (PE 24163N) is developing common equipment in concert with the countermeasures prototyping program. OUTBOARD and COMBAT DF (PE 35885G) are Electronic Support Measures (ESM) resources which must be coordinated for effective use of countermeasures.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is Naval Research Laboratory, Washington, D.C. OTHERS: Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA; Naval Surface Weapons Center, White Oak Laboratory, Silver Spring, MD; Naval Ordnance Station, Indian Head, MD. CONTRACTORS: HYCOR, Woburn, Mass.; GTE Sylvania, Mountain View, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X1370, Command, Control and Communications Countermeasures Development: This project provides for full-scale development, Technical Evaluation, Operational Evaluation and Approval for Service Use of programs initiated in Project X1794 below.

(U) In FY 1982, advanced development of the [] were accomplished.

(U) The FY 1983 program consists of:

o Initiation of full-scale development of the []

(U) The FY 1984 program consists of:

o Full-scale development will be finished; and,

o Technical Evaluation, Operational Evaluation and Approval for Service Use will be accomplished for the []

(U) Program to Completion:

o Continue to develop countermeasures initiated under X1794; and,

o Ready them for operational use.

(U) Project X1794, Command, Control and Communications Countermeasures Prototyping: This program provides for the design, development and test of new countermeasures to deceive, disrupt and degrade critical links and sensors in the Soviet command, control and communications network, including its shipborne, airborne and land-based elements.

Program Element: 24576N

Title: Counter Command Control Communications Development

(U) In FY 1982, all sub-projects in X1794 were contained in X1370 in PE 24575N, Electronic Warfare Support. A contract was competitively awarded for the development of Shipboard Communications Countermeasures.

(U) The FY 1983 program consists of:

- o Advance development of the Shipboard Communications Countermeasures System;
- o Initial threat studies will be made for [] Countermeasures; and,
- o Underwater Communications Countermeasures feasibility will be assessed.

(U) The FY 1984 program consists of:

- o Phase I developmental testing on the Shipboard Communications Countermeasures System;
- o Initial development on a [] Countermeasures System; and,
- o The feasibility of low-probability-of-intercept communication countermeasures will be examined.

(U) Program to completion:

- o This program will continue to develop new countermeasures and test their operational feasibility; and,
- o Decisions will be made on promising systems to transfer them to project X1370.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25601N Title: High Speed Anti-Radiation Missile Improvement
 DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983* Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		0	0	11,793	4,883	10,018	26,694
W01780	High Speed Anti-Radiation Missile Improvement	0	0	11,793	4,883	10,018	26,694

* FY 1983 and prior were funded under Project W0553, Program Element 64360N, High Speed Anti-Radiation Missile.

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: HARM (High Speed Anti-Radiation Missile) will enter full scale production in FY 1983. A joint Navy/Air Force Preplanned Product Improvement program will be initiated in FY 1983 that will address cost reduction, near term performance improvements, and studies that address far term threat reactive improvements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: Not Applicable. NEW START in FY 1984.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: Not Applicable. NEW START in FY 1984.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: High Speed Anti-Radiation Missile, Program Element 64360N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Weapons Center, China Lake, CA. CONTRACTORS: Texas Instruments, Incorporated, Dallas, TX.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not Applicable.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W1780, HARM Improvement Program: (NEW START)

1. (U) DESCRIPTION: This program is a joint Navy/Air Force Preplanned Product Improvement program which will reduce missile costs and enhance capabilities against expected threat changes in the late 1980's and early 1990's.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Not applicable.

b. (U) FY 1983 Program: In FY 1983, improvements to the High Speed Anti-Radiation Missile System are funded under Program Element 64360N, Project W0553, High Speed Anti-Radiation Missile.

Program Element: 25601N

Title: High Speed Anti-Radiation Missile Improvement

c. (U) FY 1984 Planned Program: FY-1984 will be the first year of funding for this element. The major objectives will be: to conduct follow-on testing of software and fuzing corrections, /

d. (U) Program to Completion: (Other threat reaction and cost reduction improvement tasks will be performed throughout the life of this project.

e. (U) Milestones: Not Applicable.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation

a. (U) Advanced Development (Government) 1972-1974. The High Speed Anti-Radiation Missile was initiated in 1972 under the program management of the Naval Air Systems Command. The initial advanced development effort was conducted at China Lake, California, to determine significant design features and to select alternate missile and avionics component approaches capable of achieving performance objectives. Throughout the government advanced development period, the following hardware was tested to evaluate the missile baseline configuration and validation performance characteristics: thirteen missiles, one with a full scale HARM development motor, were launched to gather missile aerodynamic data, validate airframe control and stability and demonstrate guidance performance. Two avionics configurations were evaluated for threat identification, hand-off and reaction time capability. All test objectives were met. Problems noted and corrected are listed below.

Problem

Reduced roll control subsonic speeds.

Unacceptable reaction time.

Corrective Action

Wing deflection limitation at subsonic speeds.

Flight tested successfully.

Incorporation of parallel processor.

b. (U) Advanced Development (Contractor) 1974-1978. In 1974, Texas Instruments was selected as the Weapon System Integration Contractor and was awarded a contract for development of the HARM Weapon System. During this phase of the program, Texas Instruments delivered 16 missiles and 4 avionics units to the government for test and evaluation. The development, test and evaluation program conducted by the Naval Weapons Center successfully demonstrated missile aerodynamic stability, reduced smoke motor, guidance capability, flex logic operation, avionics hand-off/interface and system reaction time. All advanced development test objectives were met. Problems noted and corrected are listed below.

In March 1977, Texas Instruments was directed to initiate a program to

Problems noted and corrected are listed below.

Program Element: 25601N

Title: High Speed Anti-Radiation Missile Improvement

c. (U) Full Scale Engineering Development (1978-1981).

Prototype Missiles - [

The prototype hardware was subjected to ground engineering tests, captive flight tests and firing tests.

A satisfactory preliminary indication of operational effectiveness and suitability was obtained from the Navy and Air Force operational testing organizations.

Program Element: 25601N

Title: High Speed Anti-Radiation Missile Improvement

Pilot Production Missiles

] Navy Technical Evaluation, which began on 4 May 1981 at the Pacific Missile Test Center, evaluated pilot production missiles, avionics and peculiar ground support equipment and certified readiness of the system to enter operational evaluation. A first article configuration inspection validated the contractor's competitive production data package. Pilot production hardware is representative of the production missile configuration fabricated with low rate production tooling and test equipment.

2. (U) Operational Test and Evaluation

a. (U) Joint Initial Operational Testing began in January 1979 with Navy and Air Force independent test agencies participating in combined developmental testing/operational testing - IIA. This early involvement of operational testing with developmental testing was to offset the risks involved in a concurrent program.

] All data from developmental and operational testing to date are shared in a common data base.

An assessment of HARM's potential operational effectiveness and operational suitability was presented at Department of the Navy Systems Acquisition Review Council IIA on 7 November 1980. The readiness to proceed into FY 1981 initial production was concurred in by the principals and by subsequent Office of the Secretary of Defense review.

b. (U)

Commander, Operational Test and Evaluation Force and Air Force Test and Evaluation Command will provide independent assessments of the operational effectiveness and operational suitability of the HARM missile and support avionics for the Defense Systems

Program Element: 25601N

Title: High Speed Anti-Radiation Missile Improvement

Acquisition Review Council III production decision. Test ranges at Naval Weapons Center, Pacific Missile Test Center, White Sands; Naval Air Station, Fallon; and Nellis Air Force Base will be used.

c. (U) Phase I testing was completed in May 1982 with an interim report presented to provide data required by Chief of Naval Operations to determine advisability of increasing production rate. Results of phase I testing are reflected in paragraph 3 within the column headed "Demonstrated", except as noted.

Conclusions and recommendations contained within the interim report are:

(1) (U)

(a) (U) Modifications planned for deficiencies noted in phase I are incorporated and prove adequate in operational testing.

(b) (U) Carrier I - level repair capability for Command Launch Computer, ALR-45P, APR-43, and Interface Switching Box is demonstrated in operational testing.

(c) (U)

(d) (U) ALQ-126B interoperability is demonstrated.

(e) (U) Training and documentation for O-Level personnel is improved.

(2) (U) Recommendations:

(a) (U) Complete Navy phase I firing matrix to provide an evaluation of baseline missile in self protect and pre-brief modes.

(b) (U) Proceed with phase II testing to evaluate Equations of Motion software Target of Opportunity Display, ALQ-126B interoperability, and correction of phase I deficiencies.

Type Missile

Number of Missiles

Pilot Production Operational Testing-IIB/C

32 missile firings (16 Operational Evaluation - 16 Air Force Initial Operational Testing and Evaluation)

Production (Final Operational Testing and Evaluation)

5 Navy and 5 Air Force firings

(c) (U) Phase II Air Force Initial Operational Testing and Evaluation/Navy Operational Evaluation (Operational Testing-IIC) will evaluate a product improvement to increase target specificity (an Air Force requirement only) and Navy jam fire compatibility.

(d) (U) Follow-on operational testing and evaluation may be conducted by Commander, Operational Test and Evaluation Force with the first block of production missiles and avionics to verify correction of deficiencies, if necessary, and to refine tactical doctrine.

Program Element: 25601N

Title: High Speed Anti-Radiation Missile Improvement

3. (U) System Characteristics

Operational	Milestone IIB Threshold	Milestone III Threshold	Demonstrated
(U) Frequency Coverage (Band) Range (NMI) level launch (U) from 5000' AGL (U) from 15,000' AGL (U) from 30,000' AGL			
Carriage/Launch Envelope (U) Altitude (MSL) (U) Speed (Mach) (U) Pitch (Degrees) (U) Off-Axis (Degrees)			
Lethality (U) Median CPA (Ft)			
Environments (U) ECM (U) Multi-path			
Reliability (U) System (U) Avionics (U) Missile (U) Captive (U) Free Flight			
(U) dIT (U) System			

NOTE: (1) (U) GM 213 demonstrated acceptable performance.

* Point Estimate

** Developmental Testing/Operational Testing-IIA

4. (U) Test Program Documentation

Date	Title	Serial No.
6 October 1980	AGM-88A Quick Look Final Report	AFTEC
January 1981	HARM (AGM-88) Air Force Preliminary Evaluation	AFTEC Final Report, January 1981
14 May 1981	HARM DSU-19/B Target Detector Countermeasures Field Test Report	OTD-TR-3-81 JT&E, White Sands
14 July 1981	OPEVAL Report (J217-OT-IIA)	COMOPTEVFOR ltr ser S33 of 14 July 1981

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25604N
DoD Mission Area: 343 - Theater Communications

Title: Joint Tactical Information Distribution System
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
X0519	Joint Tactical Information Distribution System	48,069	91,163	121,200	115,545	Continuing	Continuing
X1743	Command Control (C2) Processor	-	-	4,873	5,877	Continuing	Continuing
X1753	LINK II Improvements	-	-	4,873	4,893	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through 1985 only and through completion for Project X0519.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Distributed Time Division Multiple Access family of Joint Tactical Information Distribution System terminals will alleviate operational deficiencies in U.S. Navy/Marine Corps tactical air and surface units by providing crypto-secure, jam-resistant, low-probability-of-intercept communications at a high data rate, with the additional required capabilities of common-grid relative navigation, positive identification, relay and tactical air navigation (in aircraft application). Distributed Time Division Multiple Access terminals are planned for installation in most Navy combatant ships and aircraft. The Class I terminal provides the highest level of capability and is designed to satisfy the requirements of major shipboard and land-based command and control centers. The Class IA Distributed Time Division Multiple Access terminal is similar in capability to the Class I except that it provides for fewer simultaneous voice channels. The Class 2 terminal also provides capabilities similar to Class I except that two voice channels and a lower level of Radio Frequency power output and throughput are required. The program will result in Full Scale Development and Production Class I, Class IA and Class 2 airborne, shipboard and land-based terminals. The Distributed Time Division Multiple Access terminals will be compatible and interoperable with the Time Division Multiple Access terminals to be deployed by the Air Force and Army. The Command and Control Processor provides interoperation of dissimilar communication links and information processing systems. The Improved Link II project corrects technical deficiencies and increases operational capabilities of the existing Link II.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a decrease of 10 in FY 1982 due to budget adjustments; a net decrease of 9,167 in FY 1983 due to Navy's application of a general Congressional reduction and a specific Congressional reduction of 9,000. The FY 1984 program element increase of 33,801 results from the following changes: a 17,655 increase for escalation, Navy budget adjustments and increased costs of full scale development of approved terminals. A 6,400 increase for a program scope change to develop a less costly terminal for use by STRIKE and Anti Submarine Warfare platforms not presently included in the program and a 9,746 increase for projects X1743 and X1753; Link II Improvements and the Command and Control Processor.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
X0519	Joint Tactical Information Distribution System	31,251	48,079	100,330	87,399	623,700	942,477

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

Program Element: 25604N

Title: Joint Tactical Information Distribution System

F. (U) RELATED ACTIVITIES: The bit-oriented message standard, Tactical Digital Information Link J is being developed under the Joint Interoperability of Tactical Command and Control System, Program Element 64779N as the future common message standard for the Joint Tactical Information Distribution System. The other individual services' efforts to develop the Joint Tactical Information Distribution System are: Program Element 64754F, Joint Tactical Information Distribution System; Program Element 64702A, Army Joint Tactical Information Distribution System; Program Element 63713A, Army Joint Tactical Information Distribution System hybrid with Position Location Reporting System; Program Element 64719M, Project C0053, Marine Corps Joint Tactical Information Distribution System. These efforts are under the joint lead of the Air Force and are fully interoperable. Service unique requirements are accommodated by the use of differing architectures which achieve interoperability through the use of common frequency, bandwidth and waveform standards and use of the basic Time Division Multiple Access operating mode.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Ocean System Center, San Diego, CA; Fleet Combat Direction System Support Activity, San Diego, CA, and Dam Neck, VA. CONTRACTORS: TADCOM, Nutley, NJ; ITT Avionics Division, Nutley, NJ; Hughes Aircraft Company, Fullerton, CA; Grumman Aerospace, Bethpage, NY; McDonnell Douglas Aircraft Corporation, St. Louis, MO.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X1743, Command and Control (C2) Processor: (New Start) The Command and Control Processing provides interoperation of dissimilar communications links and information processing systems. Current and planned systems are generally not compatible and interoperable in terms of message format, speed, frequency-of-operation and dispersal to Navy, Joint and Allied units for rapid, on-line, exchange of tactical information. The Command and Control Processor development is essential for effective battle force operations.

(U) The FY 1982 program was not funded.

(U) The FY 1983 program was not funded.

(U) For the FY 1984 program, it is planned to:

- o Begin system engineering tasks in the areas of expansion of the Joint Tactical Information Distribution System Platform Adapter Group, analysis of evolving Joint Interoperability of Tactical Command and Control Systems message standards, and means for translating and supplementing existing message standards for interoperation.

(U) The FY 1985 program to completion consists of:

- o Initial implementation through the Joint Tactical Information Distribution System Platform Adapter Group in FY 1985, with fully capable units available during FY 1992-1996.

(U) Project X1753, Link 11 Improvements: (NEW START) The Improved Link 11 program corrects technical deficiencies and increases operational capability of the existing Link 11. This tactical data link is required for Navy, Joint and NATO operations. Survivability, responsiveness, information throughput and reliability will be corrected by Improved Link 11 equipment replacements or upgrades.

(U) The FY 1982 program was not funded.

(U) The FY 1983 program was not funded.

(U) For the FY 1984 program, it is planned to:

Program Element: 25604N

Title: Joint Tactical Information Distribution System

b Initiate investigations of optimum anti-jam techniques and methodologies, and Gateway requirements for network interoperability of Link II, Military Satellite Relay, and Joint Tactical Information Distribution System.

(U) The FY 1985 program to completion consists of:

o Developing and testing improvements in networking and signal processing which will be implemented during FY 1986-1996 with later improvements to provide jam and intercept resistance.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project X0519, Joint Tactical Information Distribution System

1. (U) DESCRIPTION (Requirement and Project): Combat experience gained during the Southeast Asia conflict and Mideast incidents exposed several significant deficiencies in United States tactical communications, navigation, and identification systems. Extensive analyses of these combat situations indicate that a reliable, rapid access, high capacity, secure and jam resistant communication link, with low probability of intercept/exploitation and execution can substantially reduce losses to hostile action. These capabilities would be critical in the hostile electronic environment envisioned for a NATO-Warsaw Pact conflict. The need to upgrade tactical communications led to the initiation of the Navy's Integrated Tactical Air Control System/Integrated Tactical Navigation System development programs to provide secure, anti-jam communication and precision relative navigation. At the same time, the Air Force was attempting similar developments through the SEEKBUS program. Both programs selected the 960-1215 MHz frequency band and employed time division multiple access techniques. The similarities between the technology being employed by both programs led the Office of the Secretary of Defense to merge these developments into a joint program. Accordingly, the Joint Tactical Information Distribution System program was established in 1974, with the Air Force as executive service. This will be an Integrated Communications, Navigation, Identification System which will provide reliable and secure, jam-resistant digital data and voice communications and precision relative navigation in support of naval air, surface, and submarine combat operations, and is interoperable with other Services and Allies using this system. Over-the-Horizon capabilities are to be provided through the use of relay capabilities inherent in the equipment. Additionally, the system will provide the aircraft Tactical Air Navigation function. Several classes of terminals will be developed to satisfy the needs of various user platforms: A Class 1 command terminal for use on large command and control platforms (e.g. Cruisers, Carriers, Amphibious Command and Control Ships); a Class 1A for use on Airborne Early Warning aircraft and Marine Corps operations centers (e.g., E-2C, Tactical Air Operations Center); and Class 2 tactical terminal for use on tactical aircraft and small ships (e.g., F-14, EP-3, F/A-18, LHA, FFG-7, LHDX).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Defense System Acquisition Review Council II B held in January 1982 approved the Full Scale Engineering Development program and contract was awarded in January 1982. Continued development of system interfaces, implementation plans and integration work. Continued planning and analysis for logistics support factors, including maintainability, reliability and life-cycle cost trade-offs. A developmental (Stage 3) frequency allocation for the Distributed Time Division Multiple Access waveform was issued in September 1982.

b. (U) FY 1983 Program: Continue the full scale development of the Distributed Time Division Multiple Access technology. Continue analysis for logistics support to include maintainability, reliability and life cycle costing tradeoffs. Continue interface development and ship modification designs for carriers; award E-2C and Fighter Integration contracts. Commence laboratory preparation for testing full scale development terminals. Commence preparation for technical and operational evaluation of the family of Distributed Time Division Multiple Access terminals. Develop documentation required for Joint Tactical Information Distribution System fleet introduction. Continue efforts to obtain a Stage 4 frequency allocation. Continue development of integration planning.

Program Element: 25604N

Title: Joint Tactical Information Distribution System

c. (U) FY 1984 Planned Program: Receive Block 1 delivery of full scale development terminals. Commence laboratory testing of full-scale development terminals. Integrate Class 1A Distributed Time Division Multiple Access terminals in the E-2C and the Class 2 terminal in the fighter for contractor flight testing. Continue preparation for technical and operational testing of the family of Distributed Time Division Multiple Access terminals. Continue documentation development for fleet introduction of Joint Tactical Information Distribution System. Continue development of integration designs for designated Joint Tactical Information Distribution System platforms. Continue efforts to obtain a Stage 4 frequency allocation. The increase in FY 1984 funding over FY 1983 funding results from budget decisions to restore 7,500 for full-scale development from the FY 1983 program reductions. The increase is also due to commencement of ET and F-18 aircraft integration.

d. (U) Program to Completion: Complete development with appropriate hardware/software modifications of first system prototype. Complete integration plans for other host designated platforms. Complete operational test and evaluation of engineering development model equipment to include interoperability, weapon control functions, and backward compatibility with Time Division Multiple Access terminals. Obtain Stage 4 frequency allocation. Obtain approval for service use. Finalize logistic support requirements. Refine Net Management concepts to meet evolving Joint Tactical Information Distribution System joint service requirements for tactical command and control nets.

e. (U) Milestones

MILESTONE	DATE
1. Program Initiated (Joint Operational Requirement issued)	Mar 1976
2. Class 2 Time Division Multiple Access Advanced Development Model Terminal Delivered to Navy/Air Force	Aug 1978
3. Class 1 Distributed Time Division Multiple Access Advanced Development Model Terminal Delivered to Navy	May 1980
4. Class 2 Distributed Time Division Multiple Access Advanced Development Model Terminal Delivered to Navy	May 1980
5. Design Analyses and Commonality Awarded	Dec 1980
6. Defense System Acquisition Review Council IIB	Jan 1982
7. Full Scale Development Contract Awarded	Jan 1982
8. Block 1 Full Scale Development Terminal Deliveries Commence	Jun 1984
9. Block 2 Full Scale Development Terminal Deliveries Commence	Jul 1985
10. Limited Production Decision	Sep 1985
11. Navy Preliminary Evaluation Complete	Dec 1985
12. Technical Evaluation Complete	Jul 1986
13. Operational Evaluation Complete	Apr 1987
14. Production decision	Sep 1987
15. Initial Operational Capability	Sep 1987
16. Defense System Acquisition Review Council III	Nov 1987
17. First Full Rate Production Award	Jan 1988
18. First Limited Production Terminal Delivery	Jan 1988

*Milestones revised from FY 1983 Program Element Descriptive Summary to agree with Selected Acquisition Report.

J. (U) TEST AND EVALUATION DATA

1. (U) The U.S. Navy, as part of the Joint Program Office, has developed and tested both Time Division Multiple Access and Distributed Time Division Multiple Access Advanced Development Model Terminals. The Navy Joint Tactical Information Distribution System Test and Evaluation Master Plan No. J357 dated 11 December 1981 (Rev 2-8 January 1982) identified all testing accomplished

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to date as well as all testing to be accomplished through Full Scale Development. This plan will be revised annually. Joint Tactical Information Distribution System terminals tested by the Navy to date include:

a. (U) Class 2 Time Division Multiple Access Advanced Development Model terminal (AN/URQ-28) manufactured by International Telephone and Telegraph.

b. (U) Class 1 Distributed Time Division Multiple Access Advanced Development Model terminal (AN/USQ-72) manufactured by International Telephone and Telegraph.

c. (U) Class 2 Distributed Time Division Multiple Access Advanced Development Model terminal (AN/USQ-75) manufactured by International Telephone and Telegraph.

2. (U) Test and Evaluation of the AN/URQ-28 terminals was conducted by Naval Air Development Center and Naval Ocean Systems Center with Commander Operational Test and Evaluation Force personnel monitoring the AN/URQ-28 bench, flight and system laboratory testing. This testing was completed in December 1979. L

Testing focused on terminal specification performance, proof of concept, and demonstrating and validating the capability to be integrated into operational Combat Direction System equipment. Flight tests were conducted with a Class 2 terminal installed in a P-3 aircraft. Flight tests were designed to test the Joint Tactical Information Distributed System Distributed Time Division Multiple Access functions in a dynamic environment. Performance tests conducted have demonstrated the ability to implement a Distributed Time Division Multiple Access Communications Navigation and Identification system architecture in hardware/software, provide message processing, Anti-Jam performance and Time Division Multiple Access backward compatibility consistent with both stated requirements and analytic predictions. The following functions have been demonstrated: net entry, relative navigation, voice, Link 11 relay, Time Division Multiple Access backward compatibility, Tactical Aid to Navigation and Anti-Jam performance. The concepts of NETWAY and BIWAY as well as the interface of the Joint Tactical Information Distribution System with the Navy Tactical Data Systems, Air Tactical Data Systems and F-14 were successfully demonstrated. Mixed simulation and flight tests demonstrated that Distributed Time Division Multiple Access is capable of meeting operational requirements of net control, restructuring of nets, merging nets of independently operating Task Forces, and of interoperating with Time Division Multiple Access. Future Development Test of the TADCOM manufactured Full-Scale Development Distributed Time Division Multiple Access terminals is divided into four phases: (1) DT-IIA (contractor plant testing); (2) DT-IIB (Aircraft Carrier integration and Joint Tactical Information Distribution System laboratory testing); (3) DT-IIC (Aircraft integration testing); and (4) DT-IID Technical Evaluation. DT-IIA testing will ensure that computer programs and hardware meet all specified technical, performance and operational requirements, and acceptance criteria. Tests will be conducted at TADCOM facilities. DT-IIB and DT-IIC will be accomplished by each of the platform integration agencies. Each of the platform integration agencies will verify full system integration on the Aircraft Carrier, E-2C and F-14. Joint Tactical Information Distribution System impact on existing platforms will be assessed as well as Electromagnetic Compatibility/Electromagnetic Interference, TEMPEST and safety of flight requirements. The Aircraft Carrier integration testing will be accomplished by Naval Ocean Systems Center and TADCOM. The E-2C and F-14 integration testing will be accomplished by the Naval Air Systems Command and Grumman Aircraft Company. DT-IID (Technical Evaluation) (April 1986-July 1986) testing will exercise test platforms in representative mission scenarios sufficient to permit certification of readiness for Operational Evaluation. Technical Evaluation will be conducted in the Southern California Operation Area and will consist of 1 Aircraft Carrier, 4 E-2C's and 4 F-14's. Testing between Air Force and Navy Joint Tactical Information Distribution System units will be conducted. Conventional Link 4A and Link 11 units will be utilized to test BIWAY and NETWAY, respectively. Technical services from Fleet Electronic Warfare Support Group and Naval Security Group will be required to test jam-resistance, as well as Low Probability Intercept/Low Probability Exploitation vulnerability. Throughout Technical Evaluation all testing, operation and maintenance of equipment will be performed by fleet personnel assisted by TADCOM, Naval Ocean Systems Center, and other Naval engineering organizations.

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3. (U) Operational Test and Evaluation:

a. (U) Operational Testing to Date. Operational testing to date has concluded that the Joint Tactical Information Distribution System has the potential to be operationally effective and suitable. Operational testing was conducted with terminals interfaced with laboratory fleet combat direction system equipment, and a P-3A aircraft with an installed terminal operated by fleet experienced personnel. Electronic countermeasures threat simulators were used to realistically stress the Joint Tactical Information Distribution System in representative threat scenarios. Based on operational testing to date, Distributed Time Division Multiple Access was recommended to proceed to full scale development by Commander Operational Test and Evaluation Force. Commander, Operational Test and Evaluation Force recommended improvement of operational effectiveness and suitability through more emphasis on software development, improved Tactical Air Navigation function implementation, improved reliability and availability of voice and data function channels, and by incorporating an increased built-in test capability for real-time performance monitoring.

b. (U) Future Operational Test and Evaluation: In order to accomplish OT-II test objectives, Operational Test and Evaluation Force will utilize the combined Developmental Test and Evaluation and Operational Test and Evaluation to make efficient use of resources. The type of Operational Test and Evaluation Force combined participation planned includes coordination of test plans, observing development tests and providing an independent evaluation of test results, if required. The level of Commander, Operational Test and Evaluation Force participation will be increased during the latter phases of testing with two dedicated operational testing periods during FY 1985 and FY 1987. Initial Operational Test and Evaluation during FY 1985 will be conducted to obtain an early estimate of the operation effectiveness and operational suitability sufficient to support a full production decision. The use of a variety of mission scenarios including Anti-Air Warfare, Surface Sub-Surface Surveillance Coordination, and joint operations, conducted in a representative environment, will enable Commander, Operational Test and Evaluation Force to evaluate the contribution of Joint Tactical Information Distribution System to the Carrier, E-2C, and Fighter Aircraft more than just the 7-14 host platform combat effectiveness and survivability. During this phase, the Joint Tactical Information Distribution System engineering development model terminals will be operated and maintained by fleet personnel. Reliability, maintainability, availability, training, manning logistics, supportability and compatibility will be evaluated. Electronic countermeasures assets will be scheduled for operational testing to realistically stress Joint Tactical Information Distribution System in representative threat scenarios.

4. (U) System Characteristics

Joint Tactical Information Distribution System, Distributed Time Division Multiple Access Terminals:

	<u>Requirements</u>	<u>Thresholds</u>	<u>DT&E Results</u>
Minimum User Capacity			
Maximum User Capacity			
Formatted Data Rate (1 net)			
Ant. Jam Margin of Basic Link			
Range (line of sight)			
TOA ranging accuracy @ 150 nm			
Relay Range			
System Capacity			
Minimum Independent Simultaneous Nets			
Interoperability with Time Division Multiple			
Access Terminals and Joint Tactical Information			
Distribution System			

Program Element: 25604N

Title: Joint Tactical Information Distribution System

5. (U) Program Documentation

a.

2 September 1981

OPTEVFOR Evaluation Report

Initial Operational Evaluation of the Joint Tactical Information Distribution System
(O:NAV Report Symbol 3960-12)

b.

1 April 1982

WOSC Test Report

Joint Tactical Information Distribution System Phase II (Distributed Time Decision Multiple Access Terminals) System Laboratory
Test Report Vols I, II

c.

August 1982

NADC Technical Report

Joint Tactical Information Distribution System Distributed Time Decision Multiple Access Terminals Final Status AN/USQ-72 and
AN/USQ-75

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25620N

Title: Anti-Submarine Warfare Combat System Integration

DoD Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	20,866	15,993	15,551	18,577	53,456	156,311
S0896	Anti-Submarine Warfare Combat System Integration	20,866	15,993	15,551	15,047	30,837	130,162
S1634	Anti-Submarine Warfare Control System/Underwater Fire Control System Improvement	0	0	0	3,530	22,619	26,149

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Introduction of the AN/SQQ-89(V), Underwater Sensor Suite (composed of the AN/SQR-19 Tactical Towed Array Sonar, the AN/SQS-53B Surface Ship Sonar, and the Lightweight Airborne Multi-Purpose System MK III Acoustic Processor (AN/SQQ-28) systems) in surface ships will generate large numbers of passive and active contacts. An integrated ASW Control System is required to effectively correlate, classify, track, etc., contacts

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary result from the following: FY 1982 shows no change. The decrease in FY 1983 of 142 results from Navy application of a general Congressional reduction. The 962 increase in FY 1984 results from a requirement to accommodate expanded land-based test and evaluation plus an inflation adjustment. The increase of 36,343 in the program element Total Estimated Cost results from the FY 1985 initiation of Project S1634 (26,149) and an overall increase of 10,194 in Project S0896 (820 already noted for in FYs 1983 and 1984 and another 9,374 to accommodate projected requirements for completion of non-DD-963 class ASW combat system upgrade).

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14,184	20,866	16,135	14,589	36,510	119,968
S0896	Anti-Submarine Warfare Combat System Integration	14,184	20,866	16,135	14,589	36,510	119,968

Program Element: 25620N

Title: Anti-Submarine Warfare Combat System Integration

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	<u>FY 1982 Actual</u>	<u>FY 1983 Estimate</u>	<u>FY 1984 Estimate</u>	<u>FY 1985 Estimate</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
OPN			41,354	36,890	146,151	225,012
Quantity			(10)	(10)	(36)	(56)

O&MN and SCN funding has been requested for FFG-7, DD-963, DDG-593, CG-47 and CGN-38 ship classes.

F. (U) RELATED ACTIVITIES: Program Element 64212N, Project W0474, Light Airborne Multi-Purpose System MK III - Development of an Anti-Submarine Warfare helicopter for deployment from surface ships. Program Element 64713N, Project S0234, Tactical Towed Array Sonar - Development of towed array sonars for surface ship tactical use. Program Element 25623N, Project S0217, AN/SQS-538 - Modernization of the surface ship hull-mounted AN/SQS-53A sonar.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; Naval Underwater Systems Center, New London Laboratory, New London, CT; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: SC&G Hydrospace Challenger Group, Rockville, MD; Tracor, Inc., Rockville, MD; Hughes Aircraft Company, Fullerton, CA; General Electric Company, Syracuse, NY; Sciences Application Incorporated, San Diego, CA; Sperry-Univac, Minneapolis, MN; Systems Consultants Inc., San Diego, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) PROJECT S0896 ASW COMBAT SYSTEM INTEGRATION

1. (U) DESCRIPTION (Requirement and Project): Acoustic sensor integration efforts were initiated during FY 1976 under Program Element 25623N, Surface Ship Sonar Modernization, to define an approach for sharing common hardware among the following programs: AN/SQR-19 Tactical Towed Array Sonar AN/SQS-538 sonar, and AN/SQ-28 Light Airborne Multi-Purpose System Shipboard electronics system. These efforts provided a basis for developing integration to make maximum use of the increased quantity and quality of target data which will be available from anti-submarine warfare surface ship sensors currently in development, i.e., AN/SQR-19, Light Airborne Multi-Purpose System MK III, and AN/SQS-538. These studies have resulted in the definition of a display sharing development effort which provides for a reduction in the number of sensor system display consoles (from 5 to 4) required for the conduct of coordinated multi-sensor operations. The need to manage, classify, and correlate vast quantities of contact data which will be generated by the new or improved sensor systems resulted in the definition of the MK 116 Mod 5/6 Underwater Fire Control System (Anti-Submarine Warfare Control System) to provide necessary computer and display resources for passive data management while interfacing with, but having minimal functional impact on, the Combat Direction System programs. Both display-sharing and Anti-Submarine Warfare Control System capabilities are being developed under this project.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Development of ASW Control System Model 1.0 was completed. Installation of AN/SQR-19 towed array sonar, AN/SQS-538 surface sonar, and Anti-Submarine Warfare Control System Model 1.0 on a DD-963 class test ship was accomplished. The Model 1.0 System successfully completed technical and operational at-sea evaluation phases and an Approval for Production request was initiated. Completed development of AN/SQR-19 towed array sonar and main simulators for land-based integration test site. Developed some of the AN/SQ-89(V) Anti-Submarine Warfare Combat Suite logistic documentation and operational guidelines.

Program Element: 25620N

Title: Anti-Submarine Warfare Combat System Integration

b. (U) FY 1983 Program: Obtain Anti-Submarine Warfare Control System Model 1.0 Approval for Production and initiate life-cycle support phase for Model 1.0 system. Continue development of Anti-Submarine Warfare Control System Model 2.0 (compatible with all sensors of the Anti-Submarine Warfare Combat Suite, AN/SQQ-89(V), vice only the AN/SQS-53B surface sonar as is Model 1.0) software and certify land based test site operational/simulation capabilities. Develop preliminary AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite operational guidelines and logistics documentation. Perform AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite operability test and evaluation at land-based integration test site. Accomplish Model 2.0 System Design Review, complete Program Performance and Program Design Specifications and negotiate Model 2.0/CG-47 class Combat System Interface. Begin Model 2.0 software coding and initiate Anti-Submarine Warfare Control System design effort applicable to CG-47 class ships.

c. (U) FY 1984 Planned Program: Accomplish acceptance testing of Anti-Submarine Warfare Control System Model 2.0 software and deliver to combat system test sites. Verify integration of Anti-Submarine Warfare Control Model 2.0 software and hardware with combat direction system and AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite in test sites representing DD-963 and CG-47 class ASW combat systems.

d. (U) Program to Completion: Install Anti-Submarine Warfare Control System Model 2.0 capability on DD-963 class test ship to support integrated Anti-Submarine Warfare Combat System operational testing. Conduct Anti-Submarine Warfare Control System Model 2.0 software operational evaluation with full AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite sensor capabilities and begin ASW Control System (ASWCS) installations on DD-963/DDG-993/CG-47 class ships concurrent with installation of AN/SQR-19, AN/SQS-53B and AN/SQQ-28 Light Airborne Multi-Purpose System MK III shipboard electronics systems. Conduct Anti-Submarine Warfare Control System Model 2.0 life cycle support. Maintain the AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite baseline system at land based integration test site. Establish Anti-Submarine Warfare Combat System training capabilities concurrent with AN/SQQ-28 Light Airborne Multi-Purpose System MK III shipboard electronics, AN/SQR-19 towed array, and AN/SQS-53B surface sonar training, resulting in AN/SQQ-89(V) Anti-Submarine Warfare Combat Suite coordinated shore training.

e. (U) Milestones: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25623N
DuD Mission Area: 233 - Anti-Submarine Warfare

Title: Surface Ship Sonar Modernization
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15,973	5,976	5,773	9,550	Continuing	Continuing
S0217	AN/SQS-53B	15,973	5,961	3,422	-	-	72,952
S1595	AN/SQR-19 Improvement	-	-	-	5,970	Continuing	Continuing
S1637	AN/SQS-26 Improvement	-	15	2,351	3,580	26,436	32,382

As this is a continuing program consisting of finite projects, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through completion of individual projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Surface Ship Sonar Modernization Program incorporates proven technology into fleet sonar systems. It is currently composed of improvement efforts to the AN/SQS-53A and the AN/SQS-26CX and will add improvements to the AN/SQR-19 in FY 1985. The AN/SQS-53B project (phase I of the AN/SQS-53 improvement effort) results in the AN/SQS-53A being modernized and redesignated the AN/SQS-53B. This modernization will improve system performance, reliability and operability through replacement of existing analog displays which are difficult to operate and maintain, and will permit integration of AN/SQS-53 sonar data with that of the AN/SQR-19 Tactical Towed Array Sonar and Light Airborne Multi-Purpose System MK III in the AN/SQQ-89(V) Underwater Sensor System which is being integrated under Program Element 25620N, Anti-Submarine Warfare Combat System Integration. The AN/SQR-19 improvement project will improve performance and maintainability and will ensure that the system adapts to the emergent threat, is upgraded to Navy standard building block components, implements newly developed algorithms and other performance improvements. The AN/SQS-26 improvement project will provide both a system reliability improvement and subsystem performance improvement for FF-1052 and CGN-36 class ships not scheduled to receive the more extensive AN/SQS-53 modernization changes. The AN/SQS-26CX changes will encompass numerous improvements and technology modernization which will result in increased system performance, operability, reliability and maintainability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary result from the following: the 2,000 added in FY 1982 was for proper interfacing between Project S0217 AN/SQS-53B and Program Element Program 64575N AN/SQS-53C; the 2,027 decrease in FY 1983 resulted from a Navy application of a general Congressional reduction; the 4,169 decrease in FY 1984 resulted when 2,279 for future changes to the AN/SQS-53B was deleted, the start of Project S1595 (a reduction of 1,765) was delayed to FY 1985 and a combined reduction of 125 was made in Projects S0217 and S1637 due to revised inflation indices. In addition, the total cost of Project S1637 has been revised downward by 6,283 through repricing of the intended work scope and adjustment of inflation indices and a Total Estimated Cost of 72,952 has been established for Project S0217.

Program Element: 25623N

Title: Surface Ship Sonar Modernization

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	19,151	13,973	8,003	9,942	Continuing	Continuing
S0217	AN/SQS-53B	19,151	13,973	6,013	5,775	Continuing	Continuing
S1595	AN/SQR-19 Improvement	-	-	-	1,765	Continuing	Continuing
S1637	AN/SQS-26 Improvement	-	-	1,990	2,402	34,273	38,665

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN AN/SQS-53B	0	0	73,250	77,769	Continuing (49)	Continuing (73)
Quantity	0	6,326	18,978	18,978	Continuing	Continuing
SCN AN/SQS-53B*	0	(1)	(3)	(3)	Continuing	Continuing
Quantity	0	0	-	1,800	Continuing	Continuing
OPN AN/SQS-26/53						

* Improvement portion only (not whole system)

F. (U) RELATED ACTIVITIES: Program Element 64518N, Project S0251, Combat Information Center Conversion/Data Display System - Development of standard surface ship data display consoles; Program Element 64212N, Project W0474, Light Airborne Multi-Purpose System MK III - Development of Anti-Submarine Warfare helicopter for deployment from surface ships; Program Element 64713N, Project S0234, AN/SQR-19 Tactical Towed Array Sonar - Development of towed array sonars for surface ship tactical use; Program Element 25620N, Project S0896, Anti-Submarine Warfare Combat System Integration - Development of an integrated anti-submarine warfare control system for coordinated employment of anti-submarine warfare sensor, fire control, and acoustic warfare systems; Program Element 63589N, DDG-51 - funded initial start of AN/SQS-53C; and Program Element 64575N, AN/SQS-53C - continuation of effort started in Program Element 63589N, DDG-51.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London Laboratory, New London, CT (lead laboratory); Naval Sea Systems Detachment, Norfolk, VA (In-Service Engineering Agent); Naval Personnel Research and Development Center, San Diego, CA; and Naval Weapons Support Center, Crane, IN. CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; General Electric Company, Syracuse, NY; CID/Gould, Glen Burnie, MD; Sperry-Univac, Saint Paul, MN; EG&G, Rockville, MD; TRACOR, Austin, TX, and Groton, CT.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0217, AN/SQS-53B: The AN/SQS-53 (series) sonar will be the principal anti-submarine warfare sensor for more than sixty of the Navy's most modern battle group escorts. This sonar provides long-range submarine detection, classification, localization, and tracking under various environmental conditions using direct (surface duct), bottom-reflected, or convergence zone acoustic paths. However, since the AN/SQS-53A sonar is, in effect, an AN/SQS-26CX sonar with a modified digital fire control interface, it uses outmoded electronic technology dating from the early 1960's. By current standards, the AN/SQS-53A sonar system is deficient in performance under unfavorable environmental conditions and is difficult to maintain because of the requirement for numerous, time-consuming, and complex adjustments which contribute to poor system performance. The sonar exceeds size and weight

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Title: Surface Ship Sonar Modernization

requirements of the CG-47 and DDG-51 classes, demands an excessive number of operators, and is not directly compatible with modern digital Combat Direction Systems or new acoustic sensor and weapon control systems under development. This modernization effort will improve sonar operability and maintainability through use of modern digital technology. A stand-alone passive detection/tracking capability will be provided which will double the amount of area which can be covered and eliminate the dependence on other sensors for processing. Active detection and classification will be improved by additional processing gain, increased coverage, improved/colocated display formats and independent search and track capability. Shipboard space, weight, and manpower requirements will be reduced by employing modular construction and packaging. This modernization effort is required to ensure AN/SQS-53 integrability with the AN/SQR-19 Tactical Towed Array Sonar and Light Airborne Multi-Purpose System MK III in the AN/SQQ-89(V) Underwater Sensor System. It will further ensure the ability of the AN/SQS-53 to interface with the planned Anti-Submarine Warfare Control System (an active/passive fire control and contact classification/management system) in DD-963, CG-47, and DDG-993 class ships. This effort will incorporate standard Navy AN/UYK-44 computers, AN/UYQ-21 acoustic display consoles, and AN/UY5-1 acoustic processors and necessary interface equipment. This emphasis on general purpose digital architecture will permit full sonar integration with new acoustic sensor and command and control systems. Two engineering development models have been fabricated: one is being used for testing at the Land Based Integration and Test Site at the Naval Underwater Systems Center, New London, and one has been installed for testing on board the USS MOOSBRUGGER (DD-980).

(V) In FY 1982, shipboard installation and test and evaluation, including technical evaluation and operational evaluation, were successfully completed and work commenced on the transition to the Navy standard computer AN/UYK-44.

(U) The FY 1983 program consists of the following:

- o Preparation of the Approval for Production request and its submission
- o Attainment of a production decision
- o Completion of AN/UYK-44 transition design effort
- o Transition effort to Navy standard mass memory (AN/UYH-3)
- o Investigation and resolution of all recommended changes resulting from technical/operational evaluations.

(V) For FY 1984, it is planned to complete all technical/operational evaluation revisions, final prove-out of the AN/UYK-44 imbedded design and final prove-out of AN/UYH-3 switchover. This will complete all planned effort for Phase I of the AN/SQS-53 Improvement Program.

(U) In the outyears, the program will complete transition to Phase II of the AN/SQS-53 Improvement Program (AN/SQS-53C). Initial operational capability will be attained for the AN/SQS-53B in FY 1986.

(U) Project S1637, AN/SQS-26 Improvement: The AN/SQS-26CX sonar is the principal anti-submarine warfare sensor for 48 of the Navy's FF-1052 and CGN-36 class ships, most of which will be in the active fleet through the late 1990's and beyond. The sonar provides long-range submarine detection, classification, localization, and tracking under various environmental conditions using direct path (surface duct), bottom-reclassification, localization, and tracking under various environmental conditions using direct path (surface duct), bottom-reflected, or convergence zone acoustic paths. Although the AN/SQS-26CX is a highly capable sonar, it incorporates outmoded electronic technology dating from the early 1960's. By current standards, the AN/SQS-26CX sonar is deficient in performance under unfavorable environmental conditions and is difficult to maintain because of the requirement for numerous, time-consuming, and complex adjustments which contribute to poor system performance. Redesign of the displays and improvements in both passive and active areas would improve sonar maintainability and supportability and increase both active and passive performance, while reducing space and weight. Such improvements will enable this sonar to better cope with the emerging

Program Element: 25623N

Title: Surface Ship Sonar Modernization

Soviet submarine threat, characterized by reduced noise levels, high speed, (In addition, the display subsystem improvements will negate the degradation inherent in the installed analog circuits and replace hardware that is rapidly approaching obsolescence. Specifically, this project provides for the development of a number of engineering changes to the AN/SQS-26CX. Initial efforts are directed toward developing an improved passive broadband capability (better bearing accuracy, tracking capability, and automated target motion analysis). (

(U) In FY 1983, the project was to have been a new start and was to initiate full scale development for the design and fabrication of two engineering development models of the AN/SQS-26CX Broadband Passive Processor Improvement kit. Diversion of appropriated funding was required due to a revision in priorities.

(U) In FY 1984, the project will initiate full scale development for the design and fabrication of two engineering development models of the AN/SQS-26CX Broadband Passive Processor Improvement kit. In addition, the project will also initiate design definition on the other desired improvements and will initiate their development. The increase in the FY 1984 funding over FY 1983 is due to a reduction in FY 1983 from the Navy's application of a general Congressional reduction.

(U) In the outyears, the project will complete fabrication, test, and evaluation of the Broadband Passive Processor Improvement engineering development models and will complete development, fabrication, test and evaluation of the remainder of the AN/SQS-26CX improvement changes.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25624N

DoD Mission Area: 233 - Anti-Submarine Warfare

Title: AN/SQR-18 Tactical Towed Array Sonar

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,611	4,890	687	3,922	Continuing	Continuing
S1351	AN/SQR-18 Tactical Towed Array Sonar	6,611	4,890	687	0	0	17,568
	Quantity	(POT&E)	(POT&E)				(3)
S1646	AN/SQR-18 Operability Improvement	0	0	0	3,922	Continuing	Continuing

The above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for Project S1646 and through FY 1984 for Project S1351.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Congress directed the continued improvement of the AN/SQR-18A as a condition for releasing the AN/SQR-19 from the requirement to compete its development contract. This program element complies with that Congressional direction. The program element modifies the existing AN/SQR-18A Tactical Towed Array Sonar to replace the array with an improved version. In addition, there are
These platforms comprise
and it is considered prudent that they achieve their full ASW capability. The program element thus is also developing an interface with the AN/SQR-19 Tactical Towed Array Sonar Moist to permit installation on
in an appropriate force mix in support of surface ASW missions. Additionally, this program element will develop selected low cost, high payoff operational and performance improvements that have been recommended by the fleet and/or have become available through various advanced development efforts. In particular, this program element will provide a
in the Combat Information Center.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY. (Dollars in Thousands) The changes between the funding profiles shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: the decrease of 49 in FY 1983 results from the Navy's application of a general Congressional reduction and the total decrease (3,958) in FY 1984 results from a reduction of 27 due to a change in the inflation index coupled with a reduction of 3,931 caused by shifting the start of Project S1646 into FY 1985.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,380	6,611	4,939	4,645	Continuing	Continuing
S1351	AN/SQR-18 Tactical Towed Array Sonar	5,380	6,611	4,939	714	0	17,644
S1646	AN/SQR-18 Operability Improvement	0	0	0	3,931	Continuing	Continuing

Program Element: 25624N

Title: AN/SQR-18 Tactical Towed Array Sonar

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion Continuing	Total Estimated Cost Continuing
OPN (BA ?) (332232)	2,493	21,784	18,916	35,324		
Quantity (Array Backfit/Non-Variable Depth Sonar)	-	(9/0)	(16/0)	(0/7)	(0/5)	(25/12)

F. (U) RELATED ACTIVITIES: Program Element 64713N, Tactical Towed Array Sonar (AN/SQR-19) - OK-410/SQR hoist designed under this program is modified and used as the hoist for the AN/SQR-18A(V)2 to be installed on those platforms without a variable depth sonar and Program Element 63553N, Project S0229, Surface Ship Silencing - developing electronic improvements to the AN/SQR-18A to reduce the effects of own ship's noise

G. (U) WORK PERFORMED BY: IN HOUSE: Naval Underwater Systems Center, New London, CT (lead laboratory). CONTRACTORS: EDO Corporation, College Point, NY; Defense Electronics Division, Gould Incorporated, Glen Burnie, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S1351, AN/SQR-18 Tactical Towed Array Sonar: The AN/SQR-18A is currently being installed on FF-1052 Class ships with variable depth sonars. Installations will be completed in FY 1984. The House of Representatives' Committee on Appropriations letter of 15 March 1979 granted approval of the Navy's request to drop the requirement for competition of the AN/SQR-19 development contract with the condition that effort be continued to improve the AN/SQR-18A system as a backup. There was thus a twofold requirement for an AN/SQR-18A: to provide a backup for the AN/SQR-19 and to provide a cost-effective towed array capability and enable them to attain their full ASW potential. The AN/SQR-18A array currently relies on the AN/SQR-35(V) variable depth sonar hoist for deployment and retrieval. Therefore, a hoist had to be developed and it was decided to take advantage of the handling and storage group being developed as part of the AN/SQR-19 program. The AN/SQR-18A system modified for interface with the AN/SQR-19 hoist is designated AN/SQR-18A(V)2. Utilization of the AN/SQR-19 hoist will require a different towing configuration than that employed with the current Variable Depth Sonar hoist. To support this towing configuration, AN/SQR-19 state-of-the-art array construction techniques are being employed in this modular array design and thus are achieving better reliability and a higher performance array in the process. This will enable achievement of approximately the improved modular array will also be backfitted to all Variable Depth Sonar AN/SQR-18A's changing their nomenclature to AN/SQR-18A(V)1.

(U) In FY 1982, development of the AN/SQR-18A(V)1 was completed. Factory testing and shipboard installation of this improvement were also accomplished. Production prototype construction for the AN/SQR-18A(V)2 configuration commenced.

(U) The FY 1983 program consists of:

- o Conducting the Follow-on Test and Evaluation of the AN/SQR-18A(V)1,
- o Completion of construction and factory testing of the AN/SQR-18A(V)2 configuration, and
- o Completion of installation and the subsequent Follow-on Test and Evaluation of the AN/SQR-18A(V)2.

(U) For FY 1984 the program will be completed by correction of deficiencies noted during the Follow-on Test and Evaluation of each system.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25633N

Title: Aircraft Equipment Reliability and Maintainability Improvement Program

DoD Mission Area: 238 - Other Naval Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,231	7,067	6,839	7,597	Continuing	Continuing
W1041	Aircraft Equipment Reliability and Maintainability Improvement Program	7,231	7,067	6,839	7,597	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program was established to meet the need for a continuing product improvement program to enhance in-service tactical aircraft operational/material readiness through selected reliability and maintainability improvements. It provides the basis for upgrading the reliability of deficient avionics and non-avionic items, often Government-Furnished Equipment, frequently common to two or more aircraft models. Existing technology is used to design, fabricate and test prototype modification kits, or test and select available suitable materials, parts, components, modules or subsystems, calculated to improve reliability of Fleet aircraft equipment. The increasing number of total flight hours accumulated in the operational environment by new aircraft incorporating new technology equipment and materials will disclose unforecasted failures and undesirable effects. This program provides non-recurring prerequisites for many aircraft and equipment changes subsequently procured for in-service, in-production and spares inventories.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: An FY 1982 decrease of 1,000 due to a Navy decision to transfer this amount into a higher priority classified program. An FY 1984 decrease of 1,614 is due to a Navy budget adjustment.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,642	8,231	7,067	8,453	Continuing	Continuing
W1041	Aircraft Equipment Reliability and Maintainability Improvement Program	6,642	8,231	7,067	8,453	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN; Naval Weapons Support Center, Crane, IN; Naval Air Test Center, Patuxent River, MD; Naval Air Development Center, Warminster, PA; Naval Air Rework Facilities North Island, San Diego, CA; Norfolk, VA; Pensacola, FL; and Jacksonville, FL. CONTRACTORS: PRD Electronics, Westburg, Long Island, NY; Teledyne-Ryan Electronics, San Diego, CA; Boeing-Vertol Company, Philadelphia, PA; Kaiser Electronics, Palo Alto, CA; Sikorsky Aircraft, Stratford, CN; Singer Company, Little Falls, NJ; Charles Stark Draper Laboratory, Cambridge, MA; Texas Instruments, Inc., Dallas, TX; Marconi Avionics Limited, Rochester, UK; AIRSEARCH Manufacturing Company, Torrance, CA.

Program Element: 25533N

Title: Aircraft Equipment Reliability and Maintainability Improvement Program

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1041, Aircraft Equipment Reliability and Maintainability Improvement Program: This program was established in FY 1974 to achieve measured improvement in carrier aircraft operational readiness through carefully selected reliability and maintainability improvements. Scope was enlarged in 1975 to add land-based tactical aircraft. Documented experience shows that a serious deterrent to achieving desired levels of aircraft operational efficiency is the low Mean-Flight-Hours-Between-Failures of many aircraft systems. As items age in the operational environment, failure data accumulate which reveal a continuing series of newly identified requirements for product improvements affecting operational readiness rates. Over twenty items identified annually have low Mean-Flight-Hours-Between-Failures, and consume excessive replacement parts and maintenance man-hours. This program provides nonrecurring design, fabrication, and test of prototype modification kits and test and selection of industry available alternate replacement parts or materials. The increased number of aircraft service life extensions required during this time period will necessitate continued operation of many original equipment items. A major effort during FY 1984 and out-years is the continuing program of selected replacement of high-failure-rate portions of systems and equipments with highly reliable circuitry employing state-of-the-art components. Candidate avionics sets generally contain old electro-mechanical modules, vacuum tube circuitry, or early solid state components which have developed high failure rates or are no longer manufactured. They are usually high-cost, high-inventory items whose complete replacement with operationally equivalent, new production, state-of-the-art sets is economically impossible. Such modifications reduce piece-part count, provide better parts commonality, and reduce spares requirements. Program does not provide funds for modification kits or replacement equipment.

(U) In FY 1982, 17 separate tasks (four new starts) were funded. Completed tasks provided prototypes for budgeted procurements under the aircraft modification program. Included were: Low Voltage Power Supply PP-6043/APN-182 and Solid State Transmitters RT-908, 909, 1076/APN-182 Radar Navigation Set (SH-2F, SH-3, UN-3A, HH-46A); Stronger Structural Components in Detector Head TB-623/ASQ-181 Magnetic Anomaly Detector (SH-2F, SH-3D/H, SH-60B); New transmission mixbox one-piece input pinion gears (CH-46, EA-6B, A-7E, F-4, P-3B/C, V-8A/C); Multiple improvements to D-704 Air Refueling Store (A-4, A-6, A-7).

(U) The FY 1983 program continues ten prior year tasks. Nine are currently budgeted out-year procurements. Examples are: CV-1607/AVA-1 Radar Data Converter (A-6E); AN/ASN-50 Attitude Heading Reference Set (SH-2F, SH-3D, CH-46F, P-3A/B, E-2C, EA-6B); Power Supply PP-6141/ASN-90 Inertial Measuring Set (A-7E, TA-7C); OK-248/A1 Communications Control Group (S-3A, US-3A); Main Gearbox (H-3). There will be no new start improvements in FY 1983.

(U) For FY 1984 six prior year tasks will be continued, four to completion; i.e., H-3 Main Gearbox, CPU-140/A, 143/A Standard Central Air Data Computer, Power Supply PP-6141/ASN-90 Inertial Measuring Set, and Solid State Amplifier for RT-927/APN-190 Radar Navigation Set. The OK-248/A1 and S-3A/ASN-140 will conclude in FY 1985. New requirements will continue to be identified from Fleet maintenance data.

(U) This is a continuing program.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25634N

DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Submarine Silencing

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15,565	12,283	18,185	19,608	Continuing	Continuing
S0218	Submarine Silencing	15,565	12,283	18,185	19,608	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The purpose of this program is to identify acoustical deficiencies in operational nuclear submarines, to define the sources of noise, and to develop and evaluate corrective hardware, materials, designs, procedures, etc., necessary for nuclear submarines to remain acoustically undetectable by enemy sensor systems and to maintain own ship quiet enough to achieve maximum benefit from installed sonar systems. The quieted submarine allows the conduct of covert operations and, in times of hot war, increases the probability of mission success by lessening the ability of enemy forces to detect, track, localize, and destroy it. Submarine Silencing Program items are implemented into operational submarines principally through existing alteration programs as well as during the design stages of new submarine acquisition programs which are supported by other appropriations.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Increase of 202 in FY 1982 is due to inflation. A net increase of 3,000 in FY 1983 and of 7,479 in 1984 is due to increase in scope to support sonar dome quieting improvements and SSN 688 Class electrical and machinery quieting programs.

D. (U) FUNDING AS SELECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,190	15,363	9,283	10,706	Continuing	Continuing
S0218	Submarine Silencing	18,190	15,363	9,283	10,706	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Navy (Quantity)	12,326	11,765	13,768	17,178	Continuing	Continuing
(Various Small Items)						

F. (U) RELATED ACTIVITIES: Exploratory Development, Program Element 62543N, Subproject SF43-452, Acoustic Silencing and subproject SF43-434, Ship Propulsors, support the extension of basic scientific principles into applied technology, analytical and physical models to the stage where they are ready to be applied in the engineering, manufacture, and support of full scale hardware and/or practice.

Program Element: 25634N

Title: Submarine Silencing

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. OTHERS: Naval Underwater Systems Center, Newport, RI; Naval Ocean Systems Center, San Diego, CA; Philadelphia Naval Shipyard, Philadelphia, PA; Puget Sound Naval Shipyard, Bremerton, WA. CONTRACTORS: General Dynamics Corporation, Electric Boat Division, Groton, CT; Westinghouse Electric Corporation, Pittsburgh, PA; Raytheon, Goleta, CA; Bolt, Beranek, and Newman, Inc., Cambridge, MA; H.L. Thomas Company, Long Beach, CA; Powertronic Systems, Inc., New Orleans, LA; Applied Research Laboratory, Pennsylvania State University, State College, PA; Tracor, Inc., Austin, TX.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: None.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project 30218, Submarine Silencing

1. (U) DESCRIPTION (Requirement and Project): An acoustical advantage is a vital requirement for detecting, classifying, tracking, and destroying enemy submarines. (

Submarine silencing goals

The goals of the program cover identification of noise offenders aboard submarines, locating causes of noise generation, development of corrective procedures, designs, and materials, applications of silencing improvements, and operational evaluation of the extent of implementation. Results are applied during submarine design, construction, conversion, or backfit availabilities.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed full-scale evaluation of: (

b. (U) FY 1983 Program: Conduct full-scale evaluation of: (

c. (U) FY 1984 Planned Program: Conduct full-scale evaluation of: (

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25645N Title: Modular Glide Weapon Improvement Program
DoD Mission Area: 232 - Amphibious, Strike, Antisurface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,118	5,260	3,987	168	78	41,406
W0559	Modular Glide Weapon Improvement Program	2,117	960	0	0	0	30,872
W1750	Low Level Laser Guided Bomb	2,001	4,300	3,987	168	78	10,534

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Apply advances to increase the operational effectiveness of the WALLEYE and MK-80 series bomb inventories. Increase WALLEYE anti-jam capability by providing a countermeasure-resistant data link. Improve WALLEYE data link video through development of a silicon vidicon device. Provide five-channel operational capability for WALLEYE, along with extended range capability and required interface for the F/A-18 and A-6E TRAM aircraft. Provide propulsion, aerodynamic and guidance features required to increase the operational range of MK-80 series laser guided bombs. Evaluate the Air Force developed MK-82 Low Level Laser Guided Bomb for Navy/Marine Corps suitability. Develop a powered MK-83 Low Level Laser Guided Bomb for Navy/Marine Corps employment.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The differences between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: An increase of 2,001 in FY 1982 reflects the addition of project W1750. The transfer of 4,300 in FY 1983 from Project W0559 to Project W1750 more accurately reflects the purpose of the funding. 2,420 was added to Project W1750 in FY 1984 for development of a powered MK-83 Low Level Laser Guided Bomb. In addition, 1,567 was transferred from Project W0559 to Project W1750 in FY 1984 for MK-83 development. 78 additional to completion added for Project W1750. 2,953 additional to completion deleted for Project W0559, reflecting no expenditures beyond FY 1983. Total estimated cost increased by 1,714 as a result of net changes between FY 1982 and completion.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	799	2,117	5,260	1,567	2,953	39,692
W0559	Modular Glide Weapon Improvement Program	799	2,117	5,260	1,567	2,953	39,692

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (BA3) (334110)	24,620	12,912	6,889	57,450	Continuing	Continuing
Procurement Quantity, WALLEYE II	(444)	(200)	(80)	(366)	Continuing	Continuing
OPN (BA3) (334109)	20,000	9,805	9,913	19,338	Continuing	Continuing
WPN	0	0	0	35,000	Continuing	Continuing

Program Element: 25645N

Title: Modular Glide Weapon Improvement Program

F. (U) RELATED ACTIVITIES: The SKIPPER boosted MK-83 bomb program provides a technical base for rocket propulsion of the MK-83 Low Level Laser Guided Bomb. The Air Force MK-82 and MK-84 Low Level Laser Guided Bomb programs provide guidance controls and aerodynamic features which, with some modification, can be incorporated in the Navy's MK-83 Low Level Laser Guided Bomb effort. The Air Force MK-82 Low Level Laser Guided Bomb will be evaluated for Navy/Marine Corps suitability, and if demonstrated suitable, will be procured by the Navy without further development.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Weapons Center, China Lake, CA. OTHERS: Pacific Missile Test Center, Point Mugu, CA; Air Force Systems Command Armament Division, Eglin AFB, FL; CONTRACTORS: Texas Instruments, Dallas, TX, is the prime contractor. Principal subcontractors are not yet identified.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1750, Low Level Laser Guided Bomb: This project provides for evaluation of the Air Force-developed MK-82 Low Level Laser Guided Bomb against Navy/Marine Corps requirements, and for development of a MK-83 Low Level Laser Guided Bomb Extended range capability which is needed for MK-80 series weapons to reduce the vulnerability of delivery aircraft.

(U) In FY 1982, the rocket motor and airfoil trade study was completed, the airfoil design was finalized and wind tunnel studies were conducted on the airfoil group.

(U) The FY 1983 program consists of:

- o Navy/Marine Corps initial evaluation of MK-82 Low Level Laser Guided Bomb suitability.
- o Preliminary design study of the MK-83 Low Level Laser Guided Bomb Airfoil Group.
- o Preliminary design study of MK-83 Low Level Laser Guided Bomb propulsion system.
- o Preliminary design of seeker algorithms for MK-83 Low Level Laser Guided Bomb.
- o MK-83 Low Level Laser Guided Bomb prototype fabrication and wind tunnel testing.

(U) For FY 1984, program plans include:

- o Flight certification of MK-82 Low Level Laser Guided Bomb.
- o MK-82 Low Level Laser Guided Bomb carrier suitability evaluation.
- o MK-82 Low Level Laser Guided Bomb operational testing.
- o MK-82 Low Level Laser Guided Bomb procurement decision.
- o Fabrication of additional MK-83 Low Level Laser Guided Bomb prototypes for development testing.
- o MK-83 Low Level Laser Guided Bomb Test and Evaluation.

(U) Program to Completion: Complete Technical Evaluation and Operational Evaluation on MK-83 Boosted Low Level Laser Guided Bomb and award full production contract.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25658N
DoD Mission Area: 235 - Naval Warfare Support

Title: Laboratory Fleet Support
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,283	4,669	5,787	6,812	Continuing	Continuing
Z0834	Laboratory Fleet Support	4,283	4,669	5,787	6,812	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Laboratory Fleet Support program element is managed by the Navy Science Assistance Program which directs Navy Laboratory/Center assistance to the Fleet. Technical problems addressed relate to improvement of in-service systems whose effectiveness is degraded by changing threats or technology. Efforts complement the normal RDT&E system by serving as a catalyst to identify unaddressed operational needs, demonstrate feasible solutions, and propose operational requirements. This program enhances all Navy mission areas since it provides broad technology support to the Navy and Marine Corps operational commands.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary is as follows: The increase of 451 in FY 1984 recognizes the erosion of Laboratory Fleet Support funding during the past several years and is the initial move to correct this deficiency.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,273	4,283	4,669	5,336	Continuing	Continuing
Z0834	Laboratory Fleet Support	2,273	4,283	4,669	5,336	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Laboratory Independent Exploratory Development, Program Element 62766N, provided for short-term solution of fleet technical problems affecting readiness that are identified by the Navy Science Assistance Program.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Silver Spring, Maryland - Navy Science Assistance Program Management. OTHERS: Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI; Naval Air Development Center, Warminster, PA; Naval Training Equipment Center, Orlando, FL; Naval Research Center, Washington, D.C.; Naval Oceanographic Office, Bay St. Louis, MS; Naval Weapons Center, China Lake, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Civil Engineering Laboratory, Port Hueneme, CA; Naval Coastal Systems Center, Panama City, FL; Naval Surface Weapons Center, Dahlgren, VA; Office of Naval Research, Arlington, VA; Naval Personnel Research and Development Center, San Diego, CA; Naval Environmental Prediction Research Facility, Monterey, CA; and Naval Ocean Research and Development Activity, Bay St. Louis, MS. CONTRACTORS: None. OTHERS: Applied Research Laboratory, Pennsylvania State University, State College, PA.

Program Element: 25658N

Title: Laboratory Fleet Support

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project 20834, Laboratory Fleet Support: The primary goals of the Navy Science Assistance Program are: to achieve timely solutions to technical problems that impact the operational readiness of the Navy and Marine Corps and to improve communications between the technology producer (RDT&E community) and the technology user (Navy and Marine Corps operating forces).

(U) In FY 1982, typical tasks accomplished that had an impact on the operational readiness of the fleet were: a submarine navigation system for use under adverse conditions (currently being procured for full scale evaluation), enhancement of the potential fire power of the LVTP-7 Marine Corps amphibious assault vehicle by adding a universal weapons mount, investigation of the rapid clearing technique for mines (resulted in a draft Operational Requirement), and demonstration of a technique which vastly improved geospatial navigation information. During this period 25 scientists and engineers were placed on Fleet and Fleet Marine Force staffs as principal technical advisors and consultants.

(U) In FY 1983, respond to a continuing flow of requests from Fleet and Fleet Marine Forces through a group of 25-30 scientists and engineers at major Navy and Marine Corps operational commanders. Typical tasks being accommodated are to:

- o Modify existing equipment for shipboard demonstration of Adaptive Array for communications enhancement.
- o Determine feasibility of applying computer-assisted instruction technology to remedial training in reading skills.
- o Examine possible use of Satellite Navigation receivers and develop operational guidelines for use on board patrol craft.
- o Design rack to hold multiple Dragon rounds, provide with prototypes for field evaluation.
- o Develop an inexpensive Receive-Only Link 11 system for Non-Navy Tactical Data System ships.
- o Develop a low-cost/expendable threat emitter simulator to support war shot exercises.
- o Develop computer assisted scheduling system for logistics support of Mediterranean naval forces.

(U) For FY 1984, technical problem solution will continue on a quick-response basis (since the program is reactive in nature the actual tasks cannot be predicted). A field team of between 25 and 30 scientists and engineers is expected to be deployed to operational command staffs. The increase in funding for FY 1984 reflects an increasing need of fleet commanders to find short term solutions to operational problems, extension of the program to additional operational command staffs and correction for the erosion of Laboratory Fleet Support funding which occurred over the past several years.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: None

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25652N
DoD Mission Area: 238 - Other Naval Warfare

Title: Aircraft Propulsion Evaluation - General
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,000	2,835	3,106	3,658	Continuing	Continuing
W0598	Aircraft Propulsion Evaluation - General	2,000	2,835	3,106	3,658	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for test and evaluation of engine fuel system components, qualification of fuel and lubricants, and qualification of engine accessories. The program also provides for updating engine and component specifications to meet new developments in technology and to attain propulsion system standardization. The engineering effort enhances the operational capability of propulsion systems and the readiness of fleet aircraft.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary of -8 in FY 1984, is the result of refined cost estimates including escalation.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,693	2,000	2,835	3,114	Continuing	Continuing
W0598	Aircraft Propulsion Evaluation - General	2,693	2,000	2,835	3,114	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not Applicable.

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Propulsion Center, Trenton, NJ; Naval Research Laboratory, Washington, DC; Naval Air Weapons Engineering Support Activity, Washington, DC; Naval Ship Research Development Center, Carderock, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0598, Aircraft Propulsion Evaluation - General: Funds are provided for continuous engineering analysis and test in the area of fuels and lubricants, specifications and test definition, and engine auxiliary power unit, starter, and accessory testing. Fuels and fuel systems efforts are devoted primarily to investigation and solution of potential problems in field use of aircraft fuels and fuel systems. Proposed fuel modifications, additive and system components are investigated to determine their suitability for service use. Lubricant efforts are directed toward ensuring availability of oils at minimum price while monitoring required quality and developing test methods to evaluate the conformance of lubricants to oil specifications. Also included are updates/revisions of engine specifications to reflect current technology, promote flight safety, and provide impetus for developmental engine improvements.

PI

Program Element: 25662N

Title: Aircraft Propulsion Evaluation - General

(U) In FY 1982, work assignments included:

Fuels and Fuel Systems

- o Completed analysis for on-site fuel additive injection systems.
- o Initiated development of a data base on JP-5 physical/chemical properties.

Lubricants

- o Completed flight evaluation of corrosion-inhibited MIL-23699C oil.
- o Continued investigation of optimum lubricant for helicopter transmission applications and formulated preliminary specifications.
- o Completed test program to assess effectiveness of additives on gear scuffing at high temperatures.
- o Continued qualification of new and modified lubricating oils.

Specifications and Test Definitions

- o Continued development of rationales for requirements of MIL-E-5007D and MIL-E-8593A specification revisions for turbojet and turbofan engines.
- o Updated specifications for auxiliary power units and engine starters.

Engines/Auxiliary Power Units/Starter/Accessories

- o Conducted performance verification tests on Parker-Hannifin ATSCV-4 valve and Solar production T-62T auxiliary power unit.
- o Initiated development and evaluation program to determine effectiveness of vitreous enamel coatings on engine combustor liners.

(U) The FY 1983 program includes effort in the following areas:

Fuels and Fuel Systems

- o Maintain and update the JP-5 physical/chemical properties data base.
- o Continue work to develop capability for fuel pump and biocide additive.
- o Develop lubricity test capability for fuel pump evaluations.
- o Continue monitoring lubricity and contaminant identification for JP-5 at Naval Air Stations.

Program Element: 25662N

Title: Aircraft Propulsion Evaluation - General

Lubricants

- o Initiate development of new transmission lubricant specification.
- o Continue qualification of new or modified oils to ensure adequate supply to minimize costs.
- o Conduct evaluation of lubricant/gear material compatibility.

Specifications and Test Definitions

- o Continue tri-service coordination of revised MIL-E-5007D.
- o Determine possible applicable standards for warranty requirements for gas turbine engines.
- o Propose revised edition of "Propulsion Characteristics Summary Report."

Engines/Auxiliary Power Units/Starters/Accessories

- o Conduct infrared signature measurements on CH-53E.
- o Conduct testing and analysis of vitreous enamel coating used in high temperature areas.
- o Perform inlet distortion testing on TF 30 engine.

(U) For FY 1984, it is planned to:

Fuels and Fuel Systems

- o Continue work to develop JP-5 icing inhibitor and biocide additive.
- o Continue development of capability to conduct qualification programs for fuel system filters.
- o Continue monitoring lubricity and contaminant identification for JP-5 at Naval Air Stations.
- o Conduct laboratory testing and develop correlations on alternate methods for smoke point measurement.

Lubricants

- o Complete development of new transmission lubricant specifications.
- o Continue qualification of new or modified lubricating oils.
- o Conduct evaluation of lubricant/gear material compatibility.
- o Complete analysis for candidate corrosion-inhibited oil.
- o Initiate development of new transmission lubricating oil.

Program Element: 25662N

Title: Aircraft Propulsion Evaluation - General

Specifications and Test Definitions

- o Coordinate updates/revisions of MIL-P-8686 and MIL-S-19557C for starters and auxiliary power units.
- o Prepare revised December, 1983 edition of "Propulsion Characteristics Summary Report."

Engines/Auxiliary Power Units/Starters/Accessories

- o Conduct infrared signature measurements on CH-46E.
- o Continue engineering support for the vitreous enamel coating program.
- o Continue development of a computer model for E-2/C-2 aircraft dynamic simulation.

(U) This is a continuing program.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25663N
DoD Mission Area: 238 - Other Naval Warfare

Title: Aircraft Flight Test General
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	927	953	0	0	0	0
W0599	Aircraft Flight Test General	927	953	0	0	0	0

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides flight tests which were not a part of any aircraft development/production program, but were required for improvement of in-service Fleet aircraft operations/performance, and for unforecast evaluations of non-Navy aircraft and equipment. Resultant changes to Naval Air Training and Operating Procedures Standardization manuals and Shipboard Helicopter Operating Procedures (NWP 42), directly enhance the safety and mission effectiveness of Naval Aviation.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: In the interest of consolidation, this program element has been cancelled. Its functions will be assigned to other programs.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25667N
DoD Mission Area: 231 - Anti-Air Warfare

Title: F-14A
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	15,530	14,724	42,705	77,673	TBD	TBD
W0346	Alternate Fighter Engine	1,608	0	0	0	0	78,131
W1408	F-14 Radar Improvement/Avionics	5,288	14,724	41,338	70,294	TBD	TBD
W1503	F-14 Avionics	3,634	0	0	0	0	8,634
W1717	Seacat	0	0	1,367	7,379	TBD	TBD

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for operational improvement of F-14A squadrons in order to counter the projected threat through the year 2000 and aggregates former related elements as projects under one element. Requirements exist for very high performance, long endurance Fleet-Air-Defense aircraft with long range fire control/weapons system capability. The projected/

Improvements under this program in three major areas (Project W0846, Alternate Fighter Engine, Project W1408, F-14 Radar Improvement Avionics and Project W1503, F-14 Avionics) will significantly increase the effectiveness and operational readiness of the F-14A in countering this threat. This program element provides funding to increase F-14 capability to counter the threat until a follow-on fighter aircraft becomes operational.

(U) Project W1717, Seacat, is of higher classification with special access required.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1982, 260 was reprogrammed from Project W0846 (Alternate Fighter Engine) and 1,050 from Project W1408 (Radar Improvement) to fund other Navy programs. Also in FY 1982, 3140 was transferred from Project W1408 (Radar Improvement) to Project W1503 (F-14 Avionics) to more accurately reflect where funds will be expended, the other changes are the result of budget adjustments including inflation. In FY 1983 and subsequent, the Radar Improvement and Avionics Programs are combined into one project (W1408) and adds 23,883 in FY 1984 and 53,054 in FY 1985 for full scale development of both aspects of the project. Project W1717, the Seacat program, has been added with 1,367 in FY 1984 and 7,379 in FY 1985.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11,723	16,965	14,724	17,455	103,043	228,710
W0846	Alternate Fighter Engine	11,723	1,993	0	0	58,894	137,410
W1408	F-14 Radar Improvement Program	0	9,478	14,724	17,455	44,149	85,806
W1503	F-14 Avionics	0	5,494	0	0	0	5,494

Program Element: 25667N

Title: F-14A

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Development of Joint Tactical Information Distribution Systems (Program Element 25604N) and Airborne Self-Protection Jammer (Program Element 64226N) and the Advanced Medium Range Air-to-Air Missile Program (Program Element 64314N).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Propulsion Center, Lakehurst, NJ; Naval Air Test Center, Patuxent River, MD; Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Training Center, China Lake, CA; Naval Air Development Center, Warminster, PA. Contractors: General Electric, Lynn, MA; Grumman Aerospace Corporation, Long Island, NY; Hughes Aircraft Company, El Segundo, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1717, Seacat: Project of higher classification with special access required.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W1408, F-14 Radar Improvement/Avionics.

1. (U) DESCRIPTION: This project provides for the design and development of modifications necessary to upgrade the F-14 weapon system in the areas of radar performance in the electronic countermeasures environment and clear environments and in the avionics architecture for subsystem compatibility. These changes will yield significant improvements in capability and performance as well as reliability and maintainability, and facilitate the total integration and exploitation of related programs (i.e., Joint Tactical Identification System, Advanced Self-Protection Jammer and Advanced Medium Range Air-to-Air Missile).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Contracts were let for the pre-development engineering studies and the development of preliminary design specifications. The results of the FY 1982 efforts will enable the government to select the highest payoff configurations for development and more effectively control contractors through imposition of rigid performance specifications.

b. (U) FY 1983 Program: Design specifications, engineering design model investigations, competitive vendor selection, and independent cost validation of development proposals will be accomplished. Laboratory preparation, both government and contractor, will be specified during this fiscal year in preparation for full scale development.

c. (U) FY 1984 PLANNED PROGRAM: Full scale development will commence. Detail design requirements, development of software tactical programs for technical evaluation, laboratory integration and testing development and air vehicle installation design will commence. The increase in the FY 1984 estimate over the FY 1983 estimate is due to the consolidation of the Radar Improvement and Avionics Programs into one project.

d. (U) Program to Completion: Conduct final integration and testing through Technical Evaluation and Operational Evaluation and approval for service use. Transition from development to production with complete identification and provisioning for support in the operational environment.

Program Element: 25667N

Title: F-14A

e. (U) Milestones:

MILESTONE

1. Preliminary Design Contract Award
2. Pre-full Scale Development Contract Award
3. Full Scale Development Approval
4. Full Scale Development Contract Award
5. Contractor Development Testing (Start)
6. Navy Technical Evaluation
7. Operational Evaluation

	<u>DATE</u>
(Mar 82)*	April 1982
(Nov 82)*	April 1983

*Milestone dates shown in FY 1983 Descriptive Summary. Changes in milestones reflect restructured program.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25670N
DoD Mission Area: 323 - TIARA for Naval Warfare

Title: Tactical Intelligence Processing Support
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,721	1,942	2,413	2,059	Continuing	Continuing
W0521	Shipboard Tactical Intelligence Processing	2,721	1,942	2,413	2,059	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This project provides continuing updates to the Intelligence Centers aboard aircraft carriers, amphibious command ships, and amphibious assault ships in order to meet fleet requirements. These include developments in software and data base to support new intelligence readiness requirements for the Sea Control and Power Projection roles and hardware to replace the 20-year-old computers and peripherals now installed. The developments of this project benefit 26 different ships and shore stations.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary for FY 1984 is due to a transfer of 650 from procurement to this element to purchase the new Navy standard embedded computer for support of Shipboard Tactical Intelligence Processor developments and partially reduced by 40 due to inflation and improved cost estimates.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,317	2,721	1,942	1,809	Continuing	Continuing
W0521	Shipboard Tactical Intelligence Processing	1,317	2,721	1,942	1,809	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (BA 2) (332433)	10,422	9,872	10,260	6,689	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Marine Corps Command/Control/Communication System, Program Element 26626M, project C0062, Marine Air/Ground Intelligence System, uses same basic data and similar analysis as in the Aircraft Carrier Center. A close working relationship has been established with the Marine Air/Ground Intelligence System project to assure compatibility and nonduplication of development effort.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Engineering Activity Detachment, Philadelphia, PA; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Planning Research Corporation, McLean, VA; Aeronutronic-Ford, Palo Alto, CA; Martin Marietta, Denver, CO; Bendix Inc., Mishawaka, IN.

Program Element: 25670N

Title: Tactical Intelligence Processing Support

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0521, Shipboard Tactical Intelligence Processing: The Aircraft Carrier Intelligence Center, a subsystem of the Naval Intelligence Processing System, became operational in 1962 to provide intelligence required by the operational commander. Since fleet introduction in 1962 this Center has had little developmental improvement, while Commanders' demands for more and better intelligence have caused the Aircraft Carrier Intelligence Center's data base to expand ten-fold to 80 million characters to accommodate strike warfare information, amphibious intelligence, new reconnaissance systems and flag support for the sea control mission. Concurrent with data base expansion have come requirements to provide more timely intelligence in varied forms/formats to additional users throughout the task group. Multiple developments are required to satisfy these requirements and to maintain state-of-the-art performance in the Intelligence Centers. These developments include hardware, software and system developments oriented to the threat at sea.

(U) In FY 1982, continued development of a line-drawing plotter to replace the 17-year old plotter presently installed in aircraft carriers and software and data base to support message handling. Completed development of software for use with the AS-27A photo interpretation system, tested and evaluated computer programs to use a new intelligence data base (Baseline 80) and developed a change to the alpha-numeric terminals to display graphic data.

(U) The FY 1983 program consists of:

- o Completing development of line plotter, software, and data base to support message handling and graphic presentation of intelligence data.
- o Commencing development hardware/software to support RF-14 Tactical Aerial Reconnaissance Pod System.
- o Continuing development of software and data base to support sea control and flag requirements.
- o Preparing design specifications for utilization of standard Navy shipboard computer.

(U) For FY 1984, it is planned to:

- o Complete development of software and data base to support message handling, sea control and flag requirements.
- o Commence development of update to Naval Intelligence Processing System based on design specifications using standard Navy shipboard computer.
- o Continue software developments to process the DIA intelligence standards for Intelligence Data Base.
- o The increase in the FY 1984 estimate over the FY 1983 estimate is due to a transfer from procurement to purchase the new Navy standard embedded computer for support of Shipboard Tactical Intelligence Processor developments.

(U) Program to Completion: For FY 1985 it is planned to: Continue development of data processing system based on standard Navy shipboard computer; develop or adapt off-the-shelf new display capability; provide necessary testing and changes to provide Joint Interoperability of Tactical Command and Control System capability to the intelligence system; and adapt ship Closed Circuit Television system to store imagery and support dissemination of intelligence graphic data to key ship compartments. This is a continuing program.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25674N Title: Electronic Warfare Counter Response
DoD Mission Area: 372 - Escort, Stand-off and Counter C3 Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,716	12,653	23,800	31,608	Continuing	Continuing
W0556	Electronic Warfare Counter Response	10,716	12,653	23,800	31,608	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Funds the continuing development of electronic warfare equipment for tactical support aircraft (EA-6B) to provide countermeasures response to new generation of advanced threat emitters.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are: FY 1982 increase of 130 as a result of economic and budgetary adjustments. FY 1984 increase of 7,932 is required to perform the full-scale development of the Advanced Capability system.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,050	10,586	12,653	15,868	Continuing	Continuing
W0556	Electronic Warfare Counter Response	9,050	10,586	12,653	15,868	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None until FY 1988.

F. (U) RELATED ACTIVITIES: Air Force EF-111 program incorporates a variant of the ALQ-99 tactical jamming system. The ALQ-149, Tactical Communication, Command & Control Countermeasures System being developed under Program Element 63214N, Tactical Command and Control Communications Countermeasures, the [] being developed in Program Element 63206N, Airborne Electronic Warfare Equipment, and the Joint Tactical Integrated Data System being developed in Program Element 25604N are included in the EA-6B Advanced Capability. The integration of these systems is funded by this program element.

G. (U) WORK PERFORMED BY: CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY; Airborne Instrument Laboratory, Long Island, NY; Raytheon Corporation, Goleta, CA; Control Data Corporation, Minneapolis, MN; Litton Amcon, College Park, MD; Teledyne Systems, Northridge, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W0566, Electronic Warfare Counter Response

1. (U) DESCRIPTION (Requirement and Project): Provides for the development of Electronic Warfare equipment for tactical support aircraft (EA-6B) to provide improved countermeasures response to new generation threat emitters. This will be

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Program Element: 2567 IN

Title: Electronic Warfare Counter Response

accomplished by continuing development and testing of an evolutionary update to the on-board systems. This program also provides for integration of other updates to the EA-6B such as the Jammer, ALQ-149, Countermeasures System, Joint Tactical Integrated Data System and Global Positioning System. The EA-6B Weapon System was designed for airborne jamming of enemy radars associated with Surveillance, Anti-Aircraft Artillery, Surface-to-Air Missiles, and command and control systems associated with ground control intercept. The EA-6B will support carrier and advanced based tactical aircraft operating in dense, radar-controlled, anti-aircraft environments with the inherent flexibility and growth potential to maintain a significant advantage through the 1990s. Upgrades to the EA-6B tactical jamming system are necessary to respond to the growing complexity and numbers of electronic warfare threats.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Advanced capability investigation of follow-on improvements to the receiver/processor system completed. Improved capability - Phase II development and flight tests completed, provisional approval for service use obtained.

b. (U) FY 1983 Program: Complete Advanced Capability risk reduction phase. Perform full scale development of Advanced Capability.

c. (U) FY 1984 Planned Program: Commence production deliveries for Improved Capability Phase II aircraft. Continue Advanced Capability system development. The increase in the FY 1984 estimate over the FY 1983 estimate is required to perform the full-scale development of the Advanced Capability system.

d. (U) Program to Completion: Continue to develop Advanced Capability system. Commence integration of ALQ-149, transmitter, Joint Tactical Information Distribution System and Advanced Capability into EA-6B aircraft. Flight tests commence FY 1987; Operational Evaluation in FY 1989. First production deliveries in FY 1990. This is a continuing development program to improve Electronic Warfare equipment and capabilities.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 25675N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Operational Reactor Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,344	2,855	18,086	18,483	Continuing	Continuing
S1303	Operational Reactor Development	2,344	2,855	18,086	18,483	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: A growing amount of the Naval Nuclear Propulsion Program's research and development effort is directed toward modification and improvements to existing nuclear propulsion plants. This element provides for testing, evaluating, modifying and improving components and systems in operating reactor plants. This effort is necessary to ensure the continued safe and reliable operation of naval nuclear propulsion plants.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary is as follows: the 14,689 increase in FY 1984 results from a 430 decrease due to inflation and an increase of 15,119 resulting from the progression of work elements previously to be done under Program Element 63501N, Reactor Propulsion Plants, (priced at 5,783) and Program Element 63579N, D2W Nuclear Propulsion Reactor, (priced at 9,337) into this program element for FY 1984.

D. (U) FUNDING AS REFLECTED IN FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	2,344	2,855	3,397	Continuing	Continuing
S1303	Operational Reactor Development	0	2,344	2,855	3,397	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: The SSN 688 Class Selected Acquisition Report, which is updated quarterly, contains other appropriation funding provided in support of the S6G Nuclear Attack Submarine Propulsion Plant.

F. (U) RELATED ACTIVITIES: Work conducted under this program element is closely coordinated with other naval nuclear propulsion research and development projects and research and development work on nuclear plants conducted by the Department of Energy, Office of the Deputy Assistant Secretary for Naval Reactors.

G. (U) WORK PERFORMED BY: CONTRACTORS: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable

Program Element: 25675N

Title: Operational Reactor Development

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S1303, Operational Reactor Development

1. (U) DESCRIPTION (Requirement and Project): This project is a comprehensive program directed toward development, engineering, and testing of operational nuclear propulsion plants in the areas of primary plant systems and instrumentation and control systems.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed initial designs and technical specifications for modified control rod drive mechanism stator. Conducted engineering design efforts for modifications and improvements of reactor control and electrical equipment systems. Analyzed operational data from nuclear-powered ships to develop improved designs for fluid mechanical systems and plant arrangements.

b. (U) FY 1983 Program: Complete design layouts and detail drawings of modified stator. Continue to perform engineering design support for modifications and improvements of reactor control and electrical equipment systems. Continue analysis of operational data to develop improved designs for fluid mechanical systems and plant arrangements.

c. (U) FY 1984 Planned Program: Complete design and development and initiate testing of modified stator. Conduct design efforts for plant arrangements to incorporate the modified stator. Continue design effort. Areas of effort include engineering, component design compatibility, plant arrangements, fluid systems and instrumentation and control systems. Conduct wear testing of structural materials to ensure system reliability and integrity. Continue design effort for nuclear instrumentation, primary plant instrumentation and steam generator water level control equipment to increase the accuracy and reliability of existing S6G propulsion plant systems. Conduct tests and evaluations of advanced design fluid mechanical systems and plant arrangements to ensure system reliability and integrity. The increase in the FY 1984 estimate over the FY 1983 estimate results from the progression of work elements previously to be done under P.E. 63501N, Reactor Propulsion Plants, and P.E. 63579N, D2W Nuclear Propulsion Reactor, into this program element for FY 1984.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 2631M
DoD Mission Area: 345 - Tactical Communications

Title: Marine Corps Telecommunications
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,862	2,228	5,014	7,532	Continuing	Continuing
C0040	Satellite Communications Equipment	52	149	147	245	Continuing	Continuing
C0043	Landing Force Integrated Communications System Implementation (LFICS)	469	538	893	936	Continuing	Continuing
C0044	Electromagnetic Compatibility Analysis Center Support of the Marine Corps (ECAC)	99	124	143	199	Continuing	Continuing
C0048	Transmission Subsystems Improvements (TSI)	1,242	1,417	2,472	3,955	Continuing	Continuing
C1727	Communications Terminal Product Improvement	-	-	1,659	2,197	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year encumbrance and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the development and improvement of Marine Corps ground telecommunications items not being developed within the chartered responsibilities of the Joint Tactical Communications Office. Equipments developed within this program support the mission area of command and control and are those equipments upon which command and control is totally dependent.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Satellite Communications Equipment: FY 1982 funding decrease of 154 and the FY 1984 decrease of 2 were a result of a refinement in cost estimates. Landing Force Integrated Communication System Implementation: FY 1982 funding decrease of 44, the FY 1983 decrease of 28, and the FY 1984 decrease of 194 were due to a refinement in cost estimates to include a reduction in management support contracts. Electromagnetic Compatibility Analysis Center: The FY 1982 decrease of 91 was due to a decrease in actual contract costs, the FY 1983 decrease of 10, and the FY 1984 decrease of 9 are due to the reduction in management support contracts. Transmission Subsystems Improvements: FY 1982 actual increase of 438 above the estimate is due to the identification of additional R&D tasks; FY 1984 increase of 531 is due to a refinement of cost estimates on the scope of effort in multichannel communications systems development work and initiation of the test and evaluation phase.

Program Element: 2631M

Title: Marine Corps Telecommunications

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional Estimate	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,247	1,713	2,256	3,029	Continuing	Continuing
C0040	Satellite Communications Equipment	12	206	149	149	Continuing	Continuing
C0043	Landing Force Integrated Communications System Implementation (LFICS)	82	513	566	1,087	Continuing	Continuing
C0044	Electromagnetic Compatibility Analysis Center Support of the Marine Corps (ECAC)	78	190	134	132	Continuing	Continuing
C0048	Transmission Subsystems Improvements (TSI)	1,093	804	1,417	1,641	Continuing	Continuing
C0053	Joint Tactical Information Distribution System	5	*	*	*	*	*
C1074	Digital Communication Terminal	977	-	-	-	-	8,179

* Funded in PE 64719M, Command Control and Communications System in FY 1982 and beyond.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Procurement, Marine Corps	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Satellite Communications Equipment						
Terminal AN/TSC-93A (Telecommunications)	1,847	4,000	-	-	-	TBD
(Quantity)	(2)	(7)	-	-	-	TBD
Satellite Communications						
Terminal AN/TSC-85A (Telecommunications)	1,653	1,535	-	-	-	TBD
(Quantity)	(1)	(1)	-	-	-	TBD
Digital Communications Terminal						
AN/PSC-2	8,969	17,842	19,563	23,428	207,941	277,743
(Quantity)	(210)	(408)	(433)	(480)	(3,798)	(5,329)

F. (U) RELATED ACTIVITIES: U.S. Marine Corps project Tactical Satellite Communications Equipment is related to Navy PE 33109N Satellite Communications; Army PE 33142A, Satellite Communication Ground System and Air Force Program Element 63431F, Advance Space Communications. The Navy equipment was shelterized for use in the field and the Army project is being monitored and influenced to ensure USMC requirements are met. U.S. Marine Corps project Transmission Subsystems is related to Navy PE 33401N, Communication Security. The U.S. Marine Corps is participating jointly with each of the other Services and NSA in developing secure voice equipment.

G. (U) WORK PERFORMED BY: In-House: Electromagnetic Compatibility Analysis Center, Annapolis, MD; Naval Ocean Systems Center, San Diego, CA; Naval Avionics Facility, Indianapolis, IN; Naval Electronics System Security Engineering Center, Washington, D.C.; Contractors: Cincinnati Electronics Company, Cincinnati, OH; Hughes Aircraft, Fullerton, CA; Magnavox Company, Fort Wayne, IN; Litton Data Systems, Van Nuys, CA; National Security Agency, Fort Meade, MD; Harris Corporation, Rochester, NY; Collins Radio Group, Cedar Rapids, IA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

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Program Element: 2631M

Title: Marine Corps Telecommunications

(U) Project C0040, Satellite Communications Equipment: This project will monitor and influence the development of tactical Ultra High Frequency and Super High Frequency satellite communication terminals for the Fleet Marine Force.

(U) In FY 1982, this program:

- o Participated in the development of the Super High Frequency Demand Assigned Multiple Access and Anti-Jam Modems for the Super High Frequency Satellite Communications Terminals, AN/TSC-85A/93A.

- o Participated in the integration of the Satellite Communication Central, AN/TSC-96, with the Ultra High Frequency Demand Assigned Multiple Access Modem.

(U) The FY 1983 program consists of:

- o Participating in the Super High Frequency Satellite Communication Terminals, AN/TSC-85A/93A, Follow on Evaluation and Developmental Testing of the Harris Anti-Jam Modem.

- o Monitoring the development of the Army's single Channel Objective Tactical Terminal and Navy's Extremely High Frequency Satellite Program.

- o Providing input on the system design of the Single Channel Objective Tactical Terminal/Navy Extremely High Frequency Satellite Program as they affect the Marine Corps.

(U) For FY 1984, it is planned to conduct Development Test/Operational Test of the Satellite Terminals.

(U) Project C0043, Landing Force Integrated Communications System Implementation: This program is to design and document total tactical integrated communications system of the Marine Corps to provide a basis for audit/development and transition of ongoing and future equipment programs.

(U) In FY 1982, this program:

- o Developed an integrated system capable of ensuring that the communication system is responsive to the needs of the tactical commander.

(U) The FY 1983 program consists of continuing to:

- o Validate the capability to support the Marine Tactical Command and Control System through plans and architecture.

- o Integrate the development out-puts leading to a decision making simulation.

(U) For FY 1984, it is planned to:

- o Continue simulation capability to support examination of alternative solutions to satisfy long term requirements.

- o Provide documentation to allow system integration.

(U) Project C0044, Electromagnetic Compatibility Analysis Center Support of the Marine Corps: This program provides support for tasks not incorporated under ongoing projects. Insures that during development of communication-electronic equipment, precautions are taken to prevent the equipment from causing or being the victim of radio interference when deployed.

(U) In FY 1982, this program provided support for electromagnetic compatibility tasks not integral to communication-

Program Element: 2631M

Title: Marine Corps Telecommunications

electronic projects.

(U) The FY 1983 program consists of:

- o Conducting electromagnetic compatibility analysis of Ultra High Frequency (ground and airborne) communication links within the Marine Amphibious Force.
- o Expanding electromagnetic analysis of high frequency circuits within the Marine Amphibious Force.
- o Continuing to update equipment performance files.

(U) For FY 1984, it is planned to:

- o Provide electromagnetic compatibility support not directly attributable to any specific project.
- o Continue to identify potential problems and recommend corrective action.

(U) Project COO46, Transmission Subsystems Improvements: This program is to develop/monitor new items in the areas of High Frequency/Very High Frequency/Ultra High Frequency radio, tactical radio ancillaries, system integration, communication security multi-channel transmission systems.

(U) In FY 1982, this program:

- o Fielded the Manpacked High Frequency Radio (AN/PRC-104), Benchmounted High Frequency Radio (AN/GRC-193), Vehicular Mounted High Frequency Radio (AN/MRC-138).
- o Conduct Development Test/Operational Test Manpacked Radio (AM 6905/PRC-105) and Communications Shelter (TRA-()).
- o Monitored Single Channel Ground and Air Radio System (SINGARS-V) and Communication Security program.
- o Developed a Combat Radio Microphone.
- o Continued development of Air to Ground Ultra High Frequency Radio (AN/PRC-(113)) and the AN/VRC-83 Ultra High Frequency vehicle mounted radio.

(U) The FY 1983 program consists of:

- o Procuring AN/GRC-171A (V) 2 Ultra High Frequency manpacked portable amplitude modulated and frequency modulated radios.
- o Continuing to develop a system which includes a Conditional Diphasic Adapter and power supply.
- o Conducting Development Test/Operational Test II.
- o Initiating procurement of Manpacked Portable Ultra High Frequency Radio (AN/PRC-(113)).

(U) For FY 1984, it is planned to:

- o Test/evaluate/approve for service use the system.
- o Continue procurement of the AN/PRC-(113) Ultra High Frequency Radio.

Program Element: 2631M

Title: Marine Corps Telecommunications

(U) Project C1727, Communications Terminal Product Improvement Program: (New Start) This program is to develop/monitor new items of communications terminal equipment to support the communication of record and data traffic for all tactical users with emphasis on tactical communication centers. This is a new project in FY 1984.

(U) For FY 1984, it is planned to:

- o Examine the feasibility of modifying the Tactical Communication Central (AN/TYC-5A) to interface directly with an AN/UGC-74 Teletype.
- o Develop 2 test pre-production models of a tactical communication center to replace the AN/TGC-37 Teletype Van.
- o Develop and test a modification for the Tactical Facsimile (AN/GXC-7A) to provide interoperability with the TRI-TAC Tactical Digital Facsimile (AN/UXC-4) and a burst transmission capability.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 2662M
DOD Mission Area: 212 - Indirect Fire Support

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,873	2,981	22,358	33,353	Continuing	Continuing
C0018	Artillery Computer System	86	*	649	147	TBD	TBD
C6021	Landing Vehicle Tracked-7A1	*	*	3,981	4,195	TBD	TBD
C0027	Modular Universal Laser Equipment	*	-	488	-	TBD	TBD
C0085	Amphibious Reconnaissance Equipment	184	747	767	831	Continuing	Continuing
C1120	Air Defense Missile Systems	4,603	2,234	12,297	23,299	Continuing	Continuing
C1763	M-60 Series Tank Product Improvement	-	-	4,356	4,881	TBD	TBD

* Funded in PE 64657H Ground Combat/Supporting Arms Systems (Engineering).

The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides funds to ensure that modifications and improvements are initiated in response to field identified discrepancies and that capability enhancements are developed for existing ground combat and supporting arms weapons and equipment.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the program element funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Artillery Computer System: The FY 1982 increase of 86 indicates the start of this program. The FY 1984 decrease of 9 is due to cost refinement. Landing Vehicle Tracked-7A1: The increase of 1,133 in FY 1984 occurs because the program transitions into a preplanned product improvement effort designed to take advantage of technological advances that will increase the combat survivability of the vehicle during the ship to shore movement, and in subsequent operations ashore. Amphibious Reconnaissance Equipment: FY 1982 increase of 75 is due to completion and testing of the Inflatable Boat and Waterproof Bags and initiation of new equipment evaluations. The FY 1984 decrease of 24 is due to cost refinements including escalation. Air Defense Missile Systems: The FY 1982 increase of 3077 and the FY 1984 increase of 7610 is for the I-HAWK Product Improvement Program. The FY 1983 decrease of 112 is due to a reduction in management support contracts. M60 Series Tank Product Improvement Program: This is a new start in FY 1984. The purpose of this program is to upgrade the current M60A1 RISE/Passive tank to a state-of-the-art level through a product improvement effort.

Program Element: 26623M

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,583	1,635	3,093	9,289	Continuing	Continuing
C0018	Artillery Computer System	3	-	*	658	TBD	TBD
C0019	Landing Vehicle Tracked (LVTP7)	453	-	-	-	-	5,728
	Product Improvement						
C0021	Landing Vehicle Tracked-7A1	-	-	-	2,848**	TBD	TBD
C0061	Battlefield Surveillance Devices	-	-	-	305***	TBD	TBD
C0085	Amphibious Reconnaissance Equipment	247	109	747	791	Continuing	Continuing
C1120	Air Defense Missile Systems	88	1,526	2,346	4,687	Continuing	Continuing

* Funded in PE 64657M Ground Combat/Supporting Arms Systems (Engineering) in FY 1983.

** FY 1984 funds for C0021 Landing Vehicle Tracked-7A1, 2848, are described in PE 64657M, Marine Corps Ground Combat/Supporting Arms Systems (Engineering).

*** C0061, Battlefield Surveillance Devices, 305, is included in PE 64718M, Marine Corps Intelligence/Electronic Warfare Systems (Engineering) and is retitled Foliage Penetration Battlefield Surveillance Device (FOLPEN).

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Procurement, Marine Corps							
C1120	Air Defense Missile Systems						
	Improved HAWK	80,118	75,413	101,619	131,468	Continuing	Continuing
	Improved HAWK (Modification)	23,393	20,747	-	26,264	Continuing	Continuing
	Stinger Missile System	38,866	99,500	39,988	75,466	Continuing	Continuing
	(Quantity)	(488)	(1,560)	(706)	(954)	TBD	TBD
C0085	Amphibious Reconnaissance Equipment						
	Inflatable Boat, Small	-	200	400	400	Continuing	Continuing
	(Quantity)	-	(44)	(44)	(44)		

* Procurement funds are associated with C0021 Landing Vehicle Tracked-7A1, and are reflected in PE 64657M, Marine Corps Ground Combat/Supporting Arms Systems (Engineering).

F. (U) RELATED ACTIVITIES: The projects within this program relate to all similar existing and developing systems.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA; Marine Corps Tactical System Support Activity, Camp Pendleton, CA; Naval Electronics Systems Command, Washington, D.C.; U.S. Army Missile Command, Redstone Arsenal, AL; Naval Sea Systems Command, Washington, D.C.; Naval Coastal Systems Center, Panama City, FL; TACOM, Warren, MI; Contractors: Raytheon Company, Bedford, MA; General Dynamics, Pomona, CA; Brunswick Corporation, Costa Mesa, CA; FMC Corporation, San Jose, CA; Naval Weapons Center, China Lake, CA; Litton Industries, Van Nuys, CA.

Program Element: 26623M

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0018, Artillery Computer System: This program is to develop a computer system to replace the present primarily manual tactical and technical fire direction system that is augmented by the Field Artillery Digital Automatic Computer (FADAC). It will provide ballistic computations and application of non-standard ballistic data for individual weapons at the artillery battery level.

(U) In FY 1982, this program:

- o Commenced system development.
- o Memorandum of Agreement was signed with USA Communications and Electronics Readiness Material Command as Principal Development Activity.
- o Initiated preparation of technical specifications and Integrated Logistic Support plans.

(U) The FY 1983 program will:

- o Complete the software package for battery level system.
- o Conduct development testing of the ballistic programs.
- o Prepare/conduct Operational Test II.
- o Conduct a special In Progress Review.

(U) For FY 1984, it is planned to:

- o Complete software development.
- o Conduct In Progress Review III.
- o Prepare for a joint production contract with the Army.

(U) Project C0021, Landing Vehicle Tracked - 7A1: This program provides the Marine Corps with the capability to conduct surfaceborne amphibious assaults by extending the life of the present amphibian vehicle until a developmental follow-on vehicle becomes operational in 1994. This Preplanned Product Improvement Program will commence with the development and fabrication of applique armor kits and a vehicle Automatic Fire Detection/Suppression Kit. In addition, commence testing of Nuclear, Biological and Chemical monitor, survey and alarm system.

(U) In FY 1982, this program:

- o Awarded in two-year initial production contract.
- o Initiated delivery of production contract Government Furnished Material/Information/Equipment.

(U) The FY 1983 program consists of:

- o Publishing Detailed Test Plan III.

Program Element: 26623M

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)

- o Monitoring flow of vehicles from operational units to the contractor.
- o Issuing a competitive Request for Proposal for a follow-on production contract to conclude the Service-Life-Extension-Program and new production.
- o Commencing Developmental Test III.

(U) For FY 1984, it is planned to:

- o Commence pre-planned product improvement to include development and fabrication of applique arm kits and a vehicle Automatic Detection/Suppression Kit.
- o Commence testing of Nuclear/Biological/Chemical monitor, survey and alarm system.
- o Continue delivery of Government Furnished Material/Equipment.
- o Receive first vehicles for testing and evaluation.
- o Continue development of Automatic Fire Detection/Suppression System.

(U) Project C0027, Modular Universal Laser Equipment: This is a modular manportable, precision ground laser designator and rangefinder that provides the capability to locate targets accurately for conventional air and artillery munitions and designate of targets for laser guided projectiles.

(U) In FY 1982, this program (In Program Element 64657M):

- o Completed the engineering development contracts.
- o Initiated hardware improvements following Operational Test II.
- o Completed the Technical Data Package.

(U) The FY 1983 Program will:

- o Issue Request for Proposals.
- o Conduct Marine System Acquisition Review Council III.
- o Award Production contract.
- o Initiate production.

(U) For FY 1984, it is planned to:

- o Continue production.
- o Initiate product improvement effort.
- o Investigate training device alternative.

Program Element: 26623M

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)

(U) Project C0085, Amphibious Reconnaissance Equipment: The Marine Corps continuously monitors commercial and other Service developments in specialized equipment having potential reconnaissance applications. Present and projected development objectives include: Military Free Fall (HALO) equipment to provide a reconnaissance off-set insertion capability; an Inflatable Boat Small/Silenced Propulsion System (IBS/SPS) and Waterproof Bags (equipment and weapons) for surface reconnaissance team operations; a Small Unit Navigation System (SUNS) to allow accurate reconnaissance team navigation during airborne or waterborne operations; improved SCUBA equipment; a Helicopter Landing Zone Lighting System (HLZLS) for landing zone marking; and an Acoustic Detection System (ADS) to be employed by patrols to amplify ambient sound.

(U) In FY 1982, this program:

- o Completed modification/testing of design and material for Inflatable Boat Small/Silenced Propulsion System.
- o Completed work on waterproof bags.
- o Continued evaluation of off-the-shelf ram air parachutes.
- o Initiated development of military free fall techniques and equipment for off-set delivery.

(U) The FY 1983 program consists of:

- o Completing evaluation of ram air parachutes.
- o Continuing off-set delivery development.
- o Monitoring/testing of Small Unit Navigation System Prototypes.
- o Evaluating an Acoustic Detection System.

(U) For FY 1984, it is planned to:

- o Test/Evaluate Small Unit Navigation System.
- o Evaluate Helicopter Landing Zone Lighting System.
- o Continue testing of Acoustic Detection System.

(U) Project C1763, M-60 Series Tank Product Improvement: (New Start) The current Marine Corps tank (M60A1 RISE/Passive) has not been upgraded to a state-of-the-art level and is therefore vulnerable to the threat. This program will enable the Marine Corps to assess the various options for improving our armor capabilities through a minimal risk product improvement effort. Among those improvements which may be evaluated are improved fire control systems, improved suspension, and upgraded armor protection. This program will be a new start in FY 1984.

(U) For FY 1984 it is planned to commence test and evaluation on an improved fire control system the major components of which will be a thermal gunners sight, with an integrated laser range finder and a solid state ballistic computer. This system will employ off-the-shelf components, either from the M60A3 or M1. The test will demonstrate the integration of those components into a single system built around a new interface box which will have to be developed under a contract.

Program Element: 26623M

Title: Marine Corps Ground Combat/Supporting Arms
(Operational Systems)

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project C1120, AIR DEFENSE MISSILE SYSTEM:

1. (U) DESCRIPTION (Requirement and Project): This program provides for hardware and software improvements to the Improved HAWK (I-HAWK) surface to air missile system, and determine interface compatibility requirements with the elements of the Marine Air Command and Control System (MACCS) as well as other Services. Provide hardware and software improvements to increase the operational capabilities of the STINGER surface to air missile system replacement for the Improved HAWK.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

- a. (U) FY 1982 Program: STINGER passed Defense Systems Acquisition Review Council III and obtained Secretary of Defense approval for service use. STINGER commenced introduction to Fleet units in January 1982. Passive Optical Seeker Technique engineering development for STINGER is underway. STINGER Launch Simulator development and testing has been completed and STINGER Launch Simulator has been approved for service use. Operational testing of the Target Adjunct System was completed during 1981. Work began in the Mobile HAWK program where the multi-function radar may be a first step toward modular I-HAWK replacement.
- b. (U) FY 1983 Program: Continue effort to determine the feasibility of the multi-function radar to provide first step of Improved HAWK replacement. Identify requirements and commence work for incorporation of the Improved HAWK Phase III Product Improvement Program into USMC battery configuration. Commence software applications effort for the Digital Communications Terminal to create an Early Warning Pointing Device for Forward Area Air Defense Teams.
- c. (U) FY 1984 PLANNED PROGRAM: Evaluate Improved HAWK Reliability and Maintainability and optical tracking modifications. Continue effort to identify Improved HAWK replacement. Continue multi-function radar feasibility effort for Improved HAWK and conduct Marine Corps System Acquisition Review Council II. Continue Phase III I-HAWK Product Improvement Program.
- d. (U) Program to Completion: Program is a continuous effort to provide required mode for Stinger/Improved HAWK equipments to ensure survivability in high threat environment. This includes identification of third generation Stinger Missile System. Emphasis on Improved HAWK replacement. Commence Full Scale Engineering Development of multi-function radar.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 26624M
DoD Mission Area: 215-Land Warfare Support

Title: Marine Corps Combat Services Support
(Operational Systems)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Total Additional to Completion	Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	493	369	1,382	1,419	Continuing	Continuing
C0076	Combat Service Support Product Improvement	197	212	299	321	Continuing	Continuing
C0084	Marine Corps Combat Clothing and Equipment	290	115	425	435	Continuing	Continuing
C0869	Camouflage Technology	6	42	228	113	Continuing	Continuing
C1762	Tactical Motor Transport Vehicle Product Improvement	-	-	430	450	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: There is a continuing requirement to update and improve the performance capabilities of fielded combat service support equipment. The Research, Development, Test and Evaluation (RDT&E) funds will provide for the product improvement of engineering survey sets, office machines, earthmoving equipment, tool sets, maintenance shops and motor transport vehicles. State-of-the-art of advancements in individual clothing, equipment, and camouflage hardware and techniques will be monitored. Current equipment will be modified as appropriate.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are the result of refined estimates of cost including inflation, escalation, expansion of research and development efforts in individual clothing and equipment, and creation of a product improvement program for Tactical Motor Transport Vehicles. Combat Service Support Product Improvement: The FY 1982 decrease of 57 is due to less than anticipated costs, the FY 1983 decrease of 7 and the decrease of 4 in FY 1984 are due to cost refinements. Marine Corps Combat Clothing and Equipment: The FY 1982 increase of 182 is for additional costs associated with the development of individual combat apparel, including environmental clothing, and the FY 1984 increase of 302 is to support development and testing of a microclimate cooling suit for combat vehicle and helicopter aircrewmembers as well as new items of cold weather clothing; Camouflage Technology: The FY 1984 decrease of 3 is an inflation adjustment.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	407	368	376	657	Continuing	Continuing
C0076	Combat Service Support Product Improvement	167	254	219	303	Continuing	Continuing
C0084	Marine Corps Combat Clothing and Equipment	236	108	115	123	Continuing	Continuing
C0869	Camouflage Technology	4	6	42	231	Continuing	Continuing

Program Element: 266244

Title: Marine Corps Combat Services Support
(Operational Systems)

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Procurement, Marine Corps		FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
C0076	Combat Service Support Product Improvement						
	Shop Set No. 3	1,600	200	800			2,600
	(Quantity)	(54)	(7)	(20)			(81)
	Theodolite Survey Set	97					97
	(Quantity)	(30)					(30)
	Duplicating Machine Offset					362	362
	(Quantity)					(36)	(36)
	Survey Set, Topographic		1,005				1,005
	(Quantity)		(4)				(4)
	Shop Equipment General Purpose Repair			3,200	3,868		7,068
	Semi-Trailer Mounted, No. 1			(12)	(14)		(26)

F. (U) RELATED ACTIVITIES: Combat Service Support Product Improvement: U.S. Army Air Mobility Research and Development Command efforts Program Element (PE 64204A) with helicopter slings; U.S. Naval Civil Engineering Laboratories efforts (PE 63/19N) in Material Handling Equipment for Amphibious Logistics Support Ashore; Mobility Equipment Research and Development Command joint development of forklift modifications (PE 64713A). Marine Corps Combat Clothing and Equipment: U.S. Army Natick Laboratories developments in fabric/webbing material (PE 62723A); Joint Service efforts on the Battle/Dress Uniform (PE 64/13A). Camouflage Technology: Monitoring of Natick Laboratories efforts in visual signature reduction (PE 64713A).

G. (U) WORK PERFORMED BY: In-House: In all efforts performed by Marine Corps Development and Education Command, Quantico, VA. Combat Service Support Product Improvement: Naval Civil Engineering Laboratory, Port Hueneme, CA; Clothing and Equipment, U.S. Army Natick Laboratories, Natick, MA; Camouflage Technology, Mobility Engineering Research and Development Command, Fort Belvoir, VA; Tactical Motor Transport Vehicle Product Improvement, U.S. Army Tank-Automotive Command, Warren, MI.

H. (U) PROJECT LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0076, Combat Service Support Product Improvement: This program is to continually evaluate Approved for Service Use combat service support items of equipment for improvements which will extend useful service life, modifications which will improve efficiency, and for new state-of-the-art changes which will add to equipment capabilities.

(U) In FY 1982, this program:

- o Continued efforts at improving drafting and survey equipment.
- o Examined commercial office machines for possible field use.

(U) The FY 1983 program consists of:

- o Product improving various engineer tool kits, sets, chests, and other van mounted shop sets in use by the Marine Corps.
- o Complete component testing of the Engineer Survey Set prototype.

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Program Element: 26624M

Title: Marine Corps Combat Services Support
(Operational Systems)

(U) For FY 1984, it is planned to:

- o Continue evaluation of current combat service support equipment and alterations required for interface with dimensionally standard loads.
- o Continue evaluation of document destructors and visual graphics equipment.
- o Complete evaluation of photomapping and drafting equipment.

(U) Project C0084, Marine Corps Combat Clothing and Equipment: This program is to continue developmental coordination within DoD pertaining to modernization and product improvements of individual combat clothing and equipments.

(U) In FY 1982, this program:

- o Tested items of Canadian/Norwegian cold weather equipment on Marine Corps Operations.
- o Participated in joint testing of the new combat boot.
- o Evaluated state-of-the-art commercial designs in individual tents.

(U) The FY 1983 program consists of:

- o Continuing to test new combat boot designs and commercially available boots.
- o Continuing to test cold weather equipment.
- o Field testing of new one-man tents.

(U) For FY 1984, it is planned to:

- o Complete individual shelter testing.
- o Continue testing of cold weather clothing.
- o Begin evaluating prototype microclimate cooling suits for combat vehicle and helicopter crewmen.
- o Prototype items of cold weather clothing will be fielded and tested.

(U) Project C0869, Camouflage Technology: This program is to continue developmental coordination with other Services in their testing and standardization of camouflage requirements for individuals, weapons and equipment.

(U) In FY 1982, this program:

- o Monitored efforts of the U.S. and NATO Armies to develop camouflage techniques.
- o Continued to evaluate industry camouflage techniques.

(U) The FY 1983 program consists of:

- o Monitoring state-of-the-art camouflage techniques.

Program Element: 26624M

Title: Marine Corps Combat Services Support
(Operational Systems)

- o Procuring test items as appropriate.
 - o Beginning an investigation of decoy design options for the Landing Vehicle Tracked 7A1.
- (U) For FY 1984, it is planned to:
- o Procure/test prototype Landing Vehicle Tracked decoys.
 - o Continue to monitor/test state-of-the-art camouflage techniques.
- (U) Project C1762, Tactical Motor Transport Vehicle Product Improvement: (NEW START) This program is to continually evaluate Approved for Service Use tactical motor transport vehicles for improvements in extension of service life, enhancement of performance, mobility, reliability, safety and operational effectiveness/efficiency.
- (U) FY 1982/1983, this project did not exist.
- (U) For FY 1984, it is planned to begin mobility, maintenance and life cycle extension program for the 5 ton Heavy High Mobility Tactical Truck, Logistics Vehicle System and other in service vehicles.
- I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 26625H
DoD Mission Area: 374-Multimission, Technology and Support

Title: Marine Corps Intelligence/Electronic Warfare Systems (Operational Systems)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,014	714	583	10	Continuing	Continuing
C0060	Forward Pass	1,014*	714	583	10	Continuing	Continuing

*Funded under Program Element 64718M, Marine Corps Intelligence/Electronic Warfare Systems (Engineering)

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides RDT&E funds for the operational systems development of Marine Corps Intelligence/electronic warfare equipment that will complement current and future sensors required for the support of operating forces.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The FY 1983 decrease of 67 is due to a reduction in management support contracts, and the FY 1984 decrease of 7 is due to an inflation adjustment.

D. (U) FUNDING AS REFLECTED IN THE 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	471	0	779	590	Continuing	Continuing
C0060	Forward Pass	*	*	779	590	Continuing	Continuing
C1068	Signal Intelligence Product Improvement Program	383	**	-	-	Continuing	Continuing
C1648	Intelligence Equipment Support	88	-	-	-	-	88

* Transferred from 64718M, Marine Corps Intelligence/Electronic Warfare Systems in FY 1983.

** Funding for the Signal Intelligence Product Improvement project was transferred to the National Security Agency program element 35885G, Tactical Cryptologic Program in FY 1982.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: In-House: Naval Air Development Center, Warminster, PA, Naval Avionics Center, Indianapolis, IN.
Contractors: N/A

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Program Element: 26625H

Title: Marine Corps Intelligence/Electronic Warfare Systems (Operational Systems)

II. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0060, Forward Pass: Forward Pass is a sensor data storage and retrieval system that will complement current and future sensors, and will allow sensor employment and information retrieval in an amphibious objective area in advance of the assault. High speed aircraft will deliver sensors and an Air Delivered Storage Unit (ADSU) to the objective area. An aircraft equipped with an Interrogation Unit (IU) will periodically fly within 100 miles of the Air Delivered Storage Unit and receive the stored sensor data via a burst transmission data link. This data will be further relayed to the amphibious task force by data link, or down loaded after the mission. The sensor data is processed in specially equipped vans aboard ship or in the objective area.

(U) In FY 1982, Engineering Development Model fabrication was completed and Developmental Test/System integration was completed.

(U) The FY 1983 program consists of:

- o Preparing integrated system for Operational Test II.
- o Developing test plans for the integrated logistics support concept.
- o Evaluating interoperability requirements for the FA-18 and AV-8B.

(U) For FY 1984, it is planned to:

- o Modify Forward Pass to facilitate interface with the Remotely Monitored Battlefield Sensor System.
- o Prepare engineering design changes for compatibility with the FA-18 and AV-8B.
- o Receive Approval for Service Use.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 26626M
DoD Mission Area: 351-Land Warfare

Title: Marine Corps Command/Control/Communications Systems (Operational Systems)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,576	18,251	22,468	26,962	Continuing	Continuing
C0045	Tactical Systems Inter/Intraoperability Program	1,764	3,698	5,591	9,469	Continuing	Continuing
C0062	Intelligence Analysis Center Product Improvement Program	3,199	1,926	2,346	3,856	Continuing	Continuing
C0103	Marine Air Command and Control Systems Operational Development	3,434	7,055	7,719	6,409	Continuing	Continuing
C1066	Ground Radar Product Improvement	-	-	-	345	Continuing	Continuing
C1067	Aviation Radar Product Improvement	4,179	5,572	6,712	6,883	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides funds for the further development of operational Marine command, control and communications systems. Efforts will be directed toward achieving inter/intraoperability and total integration of tactical command, control and communications systems and related subsystems. Individual system modification and enhancements are initiated as part of this project.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Tactical Systems Inter/Intraoperability Program: The FY 1982 growth of 13 is due to an increase in contractor costs, the FY 1983 decrease of 100 is due to a reduction in management support contracts, and the FY 1984 decrease of 2109 is due to better identification of costs that will be actually billed in FY 1984 and a reduction in planned tactical interface efforts. Intelligence Analysis Center: The FY 1982 increase of 1799 is due to additional Integrated Logistics Support Planning and Operational Test costs of the Integrated Signal Intelligence System, a subsystem of the Marine Air Ground Intelligence System. The FY 1983 decrease of 38 is due to a reduction in management support contracts and the FY 1984 increase of 568 is due to correction of identified software deficiencies in the engineering development model, software upgrades and addition of analyst tools such as computer graphics, improved teletypewriter and mapping and plotting techniques. It also includes planned upgrades to the other subsystems of the Marine Air Ground Intelligence System. Marine Air Command and Control System Operational Development: The FY 1982 decrease of 1269 resulted from the fact that the AN/UYQ-4A Direct Air Support Center was not delivered on schedule and planned software upgrade could not be initiated. The FY 1983 decrease of 58 is due to a reduction in management support contracts, and the FY 1984 decrease of 140 is due to more accurate estimates of projected program costs. Ground Radar Product Improvement: The FY 1982 decrease of 109 is due to a delay in the fielding of the system to be tested. Aviation Radar Product Improvement: The FY 1982 decrease of 26 and the FY 1984 decrease of 91 are due to more accurate estimates of projected program costs.

Program Element: 26626M

Title: Marine Corps Command/Control/Communications Systems (Operational Systems)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,091	12,194	18,447	24,240	Continuing	Continuing
C0045	Tactical Systems Inter/Intraoperability Program	1,173	1,777	3,798	7,800	Continuing	Continuing
C0062	Intelligence Analysis Center Product Improvement Program	1,881	1,400	1,964	1,773	Continuing	Continuing
C0103	Marine Air Command and Control System Operational Development	3,235	4,703	7,113	7,859	Continuing	Continuing
C1066	Ground Radar Product Improvement	2	109	-	-	Continuing	Continuing
C1067	Aviation Radar Product Improvement	1,800	4,205	5,572	6,803	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

		FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	Procurement, Marine Corps						
C0103	Marine Air Command/Control Systems Operational Development:						
	Radar Ground Control Bombing System AN/TPB-1D	8,263	-	-	-	TBD	TBD
	(Quantity)	(3)					
C1067	Aviation Radar Product Improvement Radar Set AN/TPS-59	-	-	126,300	-	TBD	TBD
	(Quantity)			(10)			
	Set 15 for AN/TPS-59		6	5	-	TBD	TBD
	(Quantity)		(6)	(5)			
C0062	Intelligence Analysis Center Product Improvement Program	62,990	14,433	7,521	-	TBD	TBD
	(Quantity)	(4)	(2)	(1)			

F. (U) RELATED ACTIVITIES: This program relates to all tactical command, control and communications systems.

G. (U) WORK PERFORMED BY: In-house: Marine Corps Development and Education Command, Quantico, VA; Marine Corps Tactical Systems Support Activity, Marine Corps Base, Camp Pendleton, CA; Naval Electronics Systems Command, Washington, DC; Naval Ocean Systems Center, San Diego, CA; U.S. Air Force Tactical Intelligence Systems Directorate, Hanscom Field, Boston, MA; Naval Surface Weapons Center, Dahlgren, VA; Combat Surveillance and Target Acquisition Lab, Ft. Monmouth, NJ. Contractors: Litton Industries, Van Nuys, CA; Westinghouse, Baltimore, MD; Systems Development Corp., McLean, VA; Computer Science Corporation (CSC), San Diego, CA; Sierra Research Corp., Buffalo, NY; General Electric Corp., Syracuse, NY; Hughes Aircraft Co., Fullerton, CA. ITT Gilfillan, Van Nuys, CA.

Program Element: 26626M

Title: Marine Corps Command/Control/Communications Systems (Operational Systems)

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0045, Tactical Systems Inter/Intraoperability Program: This project supports participation in Joint Chiefs of Staff sponsored configuration management of the Joint Tactical Air Operations interface; the interoperability for Marine Tactical Command and Control Systems; and the participation in NATO Allied Data System Interoperability Agency activities.

(U) In FY 1982, the following was accomplished:

- o Validation of the Operational Effectiveness Demonstration interface technical changes commenced.
- o Participated in the NATO message standard working group.
- o Commenced work on the Marine Integrated Fire and Air Support System/Position Location Reporting System interface controller for the Marine Integrated Fire and Air Support System Engineering Development Model.

(U) In FY 1983, it is planned to continue:

- o Participation in NATO message standard working groups.
- o Support of the interoperability aspects of the Marine Integrated Fire and Air Support System/Position Location Reporting System Communications Terminal interface.
- o Continue development of the Marine Integrated Fire and Air Support System/Position Location Reporting System interface controller for the Marine Integrated Fire and Air Support System Engineering Development Model.

(U) The FY 1984 program consists of:

- o Supporting interoperability studies and testing.
- o Establishing system engineering groups to assist in interoperability standards development.
- o Continuing to emphasize NATO interoperability.

(U) Project C0062, Intelligence Analysis Center Product Improvement Program: This project supports improvements in the Intelligence Analysis Center to correct deficiencies identified during development. Principal deficiencies are the query response unit, teletypewriter, plotter, and software programs to identify map parameters and message retrieval.

(U) In FY 1982 modification work was conducted to the query response unit, plotter, and software used in mapping and message retrieval to ready the Intelligence Analysis Center for production.

(U) For FY 1983, it is planned to:

- o Continue hardware design and system modifications to the Intelligence Analysis Center.
- o Award production contract.

(U) The FY 1984 program will continue:

- o Modifications to the query response unit, plotter, and message retrieval units.
- o Maintain software configuration management.

Program Element: 26626M

Title: Marine Corps Command/Control/Communications
Systems (Operational Systems)

- o Develop improved dissemination of processed information down to battalion/squadron level.
- o Identify follow-on system and required capabilities.
- o Continue upgrades to other Marine Air Ground Intelligence System subsystems.

(U) Project C0103, Marine Air Command and Control Systems Operational Development: This project provides support for the Marine Air Command Control System to ensure that it achieves interoperability and compatibility both within the Marine Corps and in Joint/Allied operations. This effort also provides reliability and maintainability support for fielded systems.

(U) The FY 1982 program consisted of:

- o Modification development for Tactical Air Command Center upgrade.
- o Marine Air Command Control System software development for NATO interoperability.
- o Development Test/Operational Test of AM/UYQ-4A, Direct Air Support Center and AN/TPB-1D, Radar Ground Control Bombing System.
- o Procurement of Computer Aided Mission Planning System as a first step towards satisfying mission planning requirements of the Fleet Marine Force.
- o Continue Operational Testing of the Radar Ground Control Bombing System for application of Marine Corps modifications.
- o Continue software upgrade in support of fielded systems.
- o Commence software upgrade of the Direct Air Support Center.
- o Data burst transmission information exchange between the Radar Ground Control Bombing System and the Direct Air Support Center.

(U) The FY 1983 program consists of:

- o Defining the Direct Air Support Center interface with the Position Location Reporting System.
- o Continue Marine Air Command and Control System Electronic Countermeasures defense capability, analysis/enhancement.
- o Test Computer Aided Mission Planning System to determine its suitability to satisfy Fleet Marine Force requirements.
- o Continue Operational Test of Radar Ground Control Bombing System for application of Marine modifications.
- o Commence software upgrade of the Direct Air Support Center.
- o Continue software upgrade in support of fielded systems.

(U) For FY 1984, it is planned to:

Program Element: 26626M

Title: Marine Corps Command/Control/Communications
Systems (Operational Systems)

- o Continue Tactical Air Command and Control development for growth to Tactical Air Operations Central - 1985 inter/intraoperability.
- o Maintain engineering change proposals development for other Marine Air Command and Control Systems (i.e., Direct Air Support Center, Radar Ground Control Bombing System).
- o Maintain other system support as required.
- o Continue software upgrade in support of fielded systems.

(U) Project C1067, Aviation Radar Product Improvement: This project ensures that modifications, improvements, and actions in response to field identified discrepancies are developed for existing radars and associated equipments. It also ensures that Electronics Counter-Counter Measures Anti-Anti Radiation Missile capability for existing and developing radar systems are defined and developed.

(U) The FY 1982 program:

- o Continued on the Anti-Anti Radiation Missile capability for all Marine Corps aviation radars.
- o Commenced development of AN/TPS-59/Tactical Air Operations Central - 1985 interface.

(U) For FY 1983, it is planned to:

- o Continue development of TPS-59 and TPS-32 radar decoys.
- o Continue development of AN/TPS-59/Tactical Air Operations Central - 1985 interface.

(U) The FY 1984 planned program will continue to identify required change/mode to production and fielded system with the emphasis on AN/TPS-32, AN/TPS-63, and AN/TPS-59, as well as radar remoting and Anti-Anti Radiation Missile efforts to optimize radar and Tactical Air Operations Central - 1985 survivability.

1. PROJECTS OVER \$10 MILLION IN FY 1984. Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 26627M
DoD Mission Area: 344-Tactical Command and Control

Title: Marine Corps Technical Support of Command and Control Systems
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

<u>Project No.</u>	<u>Title</u>	<u>FY 1982 Actual</u>	<u>FY 1983 Estimate</u>	<u>FY 1984 Estimate</u>	<u>FY 1985 Estimate</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
	TOTAL FOR PROGRAM ELEMENT	1,670*	2,798	2,888	3,099	Continuing	Continuing
CI664	Marine Corps Technical Support of Command and Control Systems	1,670*	2,798	2,888	3,099	Continuing	Continuing

* This project was initiated in FY 1982 by below threshold reprogramming action in Program Element 65854M, Development Center Support. This is a new Program Element established in FY 1983 to more accurately reflect fund usage.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: During July 1970, the Marine Corps Tactical Systems Support Activity as a subordinate of the Marine Corps Development and Education Command was formed to meet the increasing demands of the Marine Corps for developing and supporting automated tactical systems. The Marine Corps objectives relating to compatibility and interoperability of tactical data systems, as well as the attainment of standardization of systems hardware and software, can best be achieved through a centralization of both the testing and support of tactical data systems at one activity. This activity provides software programming support for fielded tactical data systems and hardware maintenance support for tactical data systems required for inter/intraoperability testing during the developmental test and evaluation phase. A flexible network of developmental programming, simulation, and testing has existed for support of Marine Corps Tactical Systems at the Marine Corps Tactical Systems Support Activity; however, current activities also include software product improvement for both existing and yet to be fielded command and control systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY 1982 decrease of 930 was due to initial overestimation of civilian salaries. The FY 1984 decrease of 71 is a result of an inflation adjustment.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

<u>Project Number</u>	<u>Title</u>	<u>FY 1981 Actual</u>	<u>FY 1982 Estimate</u>	<u>FY 1983 Estimate</u>	<u>FY 1984 Estimate</u>	<u>Additional To Completion</u>	<u>Total Estimated Cost</u>
	Total for Program Element	*	2,600*	2,798	2,959	Continuing	Continuing
CI664	Marine Corps Technical Support of Command and Control	*	2,600*	2,798	2,959	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Software programs of currently fielded tactical systems will be certified in accordance with Joint

Program Element: 26627M

Title: Marine Corps Technical Support of Command and Control Systems

Interoperability Tactical Command and Control Systems procedures. Software trouble reports will continue to be generated as a result of this testing and will require further testing and resolution.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA. to include the Marine Corps Tactical Systems Support Activity, Camp Pendleton, CA. Contractors: Systems Development Corporation, San Diego, CA.; Litton Data Systems Division, Van Nuys, CA.; ITT Gilfillan, Van Nuys, CA.; Sperry Univac, Defense Systems Division, St. Paul, MN.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C1664, Marine Corps Technical Support of Command and Control Systems: This project supports the mission of the Development Center within the Marine Corps Development and Education Command by performing developmental testing and evaluation during the required milestones in the acquisition cycle for tactical data systems being developed. In addition, this organization acts as the Marine Corps participating test unit for Joint Interoperability Tactical Command and Control Systems (JINTACCS). Software programs for the following Marine Air Command and Control Systems will be certified annually: Tactical Data Communications Central, Tactical Air Operations Center, and Direct Air Support Center. In addition, efforts will continue with monitoring the software development of Marine Tactical Command and Control Systems: Marine Air Ground Intelligence System, Marine Integrated Fire and Air Support System, Tactical Air Operations Central-1985.

(U) In FY 1982, this program:

- o Provided support for transition testing of Joint Interoperability of Tactical Command and Control System/Tactical Air Defense System.
- o Developed a compile facility for interactive computer programming support.
- o Continued support for fielded tactical systems.
- o Paid Civilian salaries at Marine Corps Tactical Systems Support Activity.

(U) The FY 1983 program consists of:

- o Upgrading the simulation capability to ensure currency with joint interfaces during developmental testing.
- o Continued support for fielded tactical systems.
- o Continuing to certify testing and support of tactical systems.
- o Paying civilian salaries at Marine Corps Tactical Systems Support Activity.

(U) FY 1984, it is planned to:

- o Begin supporting newly fielded system, (Digital Communications Terminal and Position Location Reporting System) by developing software support capability.
- o Develop microprocessor support capability.
- o Continue to certify testing and support of tactical systems.
- o Pay civilian salaries at Marine Corps Tactical Systems Support Activity.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 28009N
DoD Mission Area: 242 - Theater-Wide Nuclear Warfare

Title: Cruise Missile
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	0	0	0	0
K1661	TOMAHAWK Improvement Program	0	0	0	0	0	0

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The TOMAHAWK Improvement Program was to develop follow-on improvements for which concepts were identified in the baseline Sea Launched Cruise Missile Full Scale Engineering Development. These improvements were to be developed as preplanned product improvements. The baseline program is funded under Program Element 64367N, TOMAHAWK.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Congress deleted all funds requested for this program in FY 1983. The start of the TOMAHAWK Improvement has been deferred indefinitely.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 28010M
DoD Mission Area: 345-Tactical Communications

Title: Tri-Service Joint Tactical Communications
Program (TRI-TAC), Marine Corps
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	16,324	15,419	21,595	17,531	Continuing	Continuing
C0049	Unit Level Circuit Switch	1,179	8,390	12,092	11,362	Continuing	Continuing
C0055	Unit Level Message Switch	6,499	5,475	6,805	3,922	Continuing	Continuing
C0056	TRI-TAC Joint Testing Facility	576	1,453	1,972	1,452	Continuing	Continuing
C0065	Marine Corps Participation in TRI-TAC Programs	140	151	726	875	Continuing	Continuing

An this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provides for the development of the TRI-TAC Unit Level Switches for which Marine Corps has been designated the developing Service by Assistant Secretary of Defense for Command, Control, Communications and Intelligence and further provides Marine Corps support to the Joint Testing Office as well as Marine Corps testing of Joint Tactical Communications Program equipments. Equipments developed within this program support the mission area of command and control and specifically support the switching requirements of the various subsystems within the Landing Force Integrated Communications System.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Unit Level Circuit Switch: FY 1982 decrease of 4068 was made to fund critical deficiencies in the Unit Level Message Switch, TRI-TAC, Joint Test Facility and Marine Corps participation in TRI-TAC Programs. The FY 1983 decrease of 66 is due to a reduction in management support contracts. FY 1984 increase of 7152 is to incorporate TRI-TAC approved changes in the Unit Level Circuit Switch that cannot be implemented due to the baseline being frozen until Full Scale Development is completed. Unit Level Message Switch: The FY 1982 increase of 4296 and the FY 1984 increase of 1944 are to incorporate interface changes that will be required to support the Marine Corps Tactical Command and Control Systems. The FY 1983 decrease of 58 is due to a reduction in management support contracts. TRI-TAC Joint Testing Facility: The FY 1982 decrease of 247 is due to minor program realignment in the Marine Corps fair share of cost incurred, the FY 1984 increase of 768 above the previous estimate is due to increased Marine Corps fair share of cost to support the TRI-TAC Joint Test Facility. Marine Corps Participation in TRI-TAC Programs: FY 1984 increase of 434 is due to refinement of fair share costs and development and implementation testing of fiber optic connectivity.

Program Element: 28010M

Title: Tri-Service Joint Tactical Communications Program (TRITAC), Marine Corps

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,193	16,343	15,543	11,297	Continuing	Continuing
C0049	Unit Level Circuit Switch	5,273	13,177	8,456	4,940	Continuing	Continuing
C0055	Unit Level Message Switch	3,270	2,203	5,483	4,861	Continuing	Continuing
C0056	TRI-TAC Joint Testing Facility	559	823	1,453	1,204	Continuing	Continuing
C0065	Marine Corps Participation in TRITAC Programs	91	140	151	292	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Procurement, Marine Corps	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Unit Level Circuit Switch SB3665 (Quantity)	-	-	28,530	45,533	TBD	TBD
Unit Level Message Switch AN/GYC-7 (Quantity)	-	-	-	6,765 (26)	47,223 (152)	53,988 (178)

F. (U) RELATED ACTIVITIES: This effort is related to PE 28010A, Tri-Service Joint Tactical Communications Program, Army; PE 28010F, Tri-Service Joint Tactical Communications Program, Air Force; and PE 28010N, Tri-Service Joint Tactical Communications Program, Navy. National Security Agency is developing Communications Security equipment for the Unit Level Circuit Switch and Unit Level Message Switch programs.

G. (U) WORK PERFORMED BY: In-House: Naval Electronic Systems Command, Washington, DC. Contractors: Calson Corporation, Rockville, MD.; International Telephone and Telegraph, Nuxley, NJ.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0055, Unit Level Message Switch: This program provides tactical automatic message switching equipment capabilities for all U.S. Armed Services. This program has been tasked to the Marine Corps as part of the TRI-TAC program.

(U) In FY 1982, this program:

- o Completed Critical Design Review
- o Commenced hardware/software integration on prototypes.
- o Began single channel radio interface development.
- o Continued Full Scale Development contract.

(U) The FY 1983 program consists of:

- o Beginning hardware/software integration on Service Test Model and Contractor Development Tests.
- o Continue Full Scale Development.

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Program Element: 28010M

Title: Tri-Service Joint Tactical Communications
Program (TRITAC), Marine Corps

(U) For FY 1984, it is planned to:

- o Complete Full Scale Development
- o Complete Contractor Development Tests.
- o Complete development of test plans.
- o Commence Development Test/Initial Operational Test and Evaluation.

(U) Project C0056, TRI-TAC Joint Testing Facility: This program provides Marine Corps fair-share support for testing of TRI-TAC sponsored tactical communications equipments. DepSecDef Memorandum, 2 March 1976, directed the establishment of the Joint Test Facility (JTF) and Organization for the TRI-TAC Testing Program and forwarded the Joint Table of Distribution (JTD) dated 10 Feb 1976 detailing the staffing requirements of the Joint Test Element. Funding of the Joint Test Facility at Fort Huachuca, AZ, is done on a "fair-share" basis with each Service providing a predetermined percentage of the total operating expenses. The Marine Corps provides 15% annually of the 20% tasked to the Department of the Navy.

(U) In FY 1982, this program continued to support the joint testing of TRI-TA' equipment at Fort Huachuca, AZ.

(U) The FY 1983 program consists of:

- o Continuing support for testing of equipment.
- o Participating in Developmental/Operational Testing of equipment.

(U) For FY 1984, it is planned to:

- o Continue to provide Marine Corps fair-share support to the test bed.
- o Continue to participate in TRI-TAC equipment testing.

(U) Project C0065, Marine Corps Participation in TRI-TAC Programs: This program provides for technical writer support in the formulation of joint test plans, Marine Corps Development and Education Command testing of TRI-TAC equipment, and transportation of Marines and Marine Corps peculiar test and evaluation equipment to the joint test bed for testing.

(U) In FY 1982, this program:

- o Continued to finalize test plans for the future.
- o Participated/began testing of the AN/TSQ-111, ANUXC-4, Digital Nonsecure Voice Terminal, Single Subscriber Terminal, Advanced Narrowband Digital Voice Terminal, Unit Level Circuit Switch, AN/TTC-42 and SB-3865.

(U) In FY 1983, it is planned to continue participating in the above equipments and new equipment as it is developed.

(U) For FY 1984, it is planned to continue interoperability testing, to include Marine Corps peculiar communications/electronics equipment.

Program Element: 28010M

Title: Tri-Service Joint Tactical Communications
Program (TRITAC), Marine Corps

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

PROJECT 00049, UNIT LEVEL CIRCUIT SWITCH:

1. (U) Description (Requirement and Project): The Marine Corps was tasked by Assistant Secretary of Defense, Command, Control, Communications and Intelligence, to develop and procure a Unit Level Circuit Switch (ULCS) to satisfy all service requirements. This development and acquisition program was further defined in instructions issued to the Marine Corps by the Director, TRI-TAC. The Unit Level Circuit Switch will extend, where required, the performance capabilities of the new large capacity switches, AM/TTC-39, and its associated Communications Security (COMSEC), to the unit level.

2. (U) Program Accomplishments and Future Efforts:

a. (U) FY 1982 Program: Contractor Development tests began. Hardware test and development complete. Software has completed code and debug and is currently in integration.

b. (U) FY 1983 Program: Full-Scale Engineering Development will be completed. Contractor Development Tests and Developmental Test and Evaluation will be completed. Commence Initial Operational Test and Evaluation.

c. (U) FY 1984 Planned Program: Complete Initial Operational Test and Evaluation (IOT&E) and correct any deficiencies as a result of Developmental Testing. Milestone III (approval for service use) is scheduled. Production contract will be awarded. Commence follow-on R&D to incorporate accumulated Engineering Change Proposals (ECP's) as a result of a frozen baseline for the Circuit Switch and to incorporate new/revised Interface Control Document (ICD) requirement to ensure interoperability of the TRI-TAC switching network.

4. (U) Program to Completion: Initial Operational Capability (IOC) of FY 1986. Continue R&D to further enhance the capabilities of the switches and to incorporate new/revised Interface Control Document requirements to ensure interoperability of the TRI-TAC switching network.

e. (U) Milestones:

<u>MILESTONE</u>	<u>DATE</u>
I	N/A
II	Jun 76
III	Mar 84
IOC	FY 86

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 28010N Title: Tri-Service Joint Tactical Communications Program (TRI-TAC), Navy
DoD Mission Area: 345 - Tactical Communications Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,120	9,139	6,055	6,867	Continuing	Continuing
X0700	Naval Telecommunications System Test Mode	1,366	1,313	1,264	1,911	Continuing	Continuing
X0722	Tactical Digital Facsimile	1,220	97	0	0	0	23,180
X0723	Joint Service Testing	125	0	0	0	0	3,401
X0919	Advanced Narrowband Digital Voice Terminal	6,409	7,729	4,795	4,956	1,040	43,179

The above funding includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only for project X0700 and through completion for all other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This continuing program includes projects which directly support the Department of Defense multi-service/agency Joint Tactical Communications Program (TRI-TAC). Projects include engineering efforts to participate in and support TRI-TAC endeavors including the joint test program for TRI-TAC and Navy equipment/systems to insure interoperability. It also provides for improved secure voice communications to be developed under the TRI-TAC program for both tactical and Defense Communications Systems, and for advanced digital facsimile equipment to provide graphics and record transmissions to tactical forces.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: Naval Telecommunications System Test Mode (X0700): The increase of 245 in FY 1982 is a result of reprogramming funds within the program element for required test and evaluation planning support from the Advanced Narrowband Digital Voice Terminal; the decrease of 16 in FY 1983 is from Navy's application of a general Congressional reduction and the 116 decrease in FY 1984 is a result of inflation adjustments. Tactical Digital Facsimile (X0722): the increase of 1,120 in FY 1982 is a result of reprogramming of funds within the program element for the upgrade/retest prior to joint service approval and award of production contract in second quarter of FY 1983. Joint Service Testing (X0723): the decrease of 85 in FY 1982 is a result of funds returned from the TRI-TAC Joint Test Element. These funds were reprogrammed to the Naval Telecommunications System Test Mode (X0700) to support testing. The FY 1983 decrease of 195 and FY 1984 decrease of 207 are the result of Navy decision to reconsider support to the Joint Test Element at Ft. Huachuca, AZ. The development of the Miniaturized Terminal equipment associated with the Advanced Narrowband Digital Voice Terminal Program has been cancelled. Therefore, there are significant decreases in the Advanced Narrowband Digital Voice Terminal (X0919). FY 1982 funds decreased by 1,368. Of this amount 1,120 was reprogrammed into the Tactical Digital Facsimile, the balance was reprogrammed into the Naval Telecommunications System Test Mode. A decrease of 24 in FY 1983 is a result of Navy's application of a general Congressional reduction. FY 1984 decrease of 2,732 is a result of the cancellation of the development of the Miniaturized Terminal and inflation adjustment. Other Procurement Navy - An increase of 5,340 in FY 1983 is a result of funds required to procure Tactical Digital Facsimiles and production phase cost support items for joint service responsibilities. Tactical Digital Facsimile operational units for Navy will not be procured in FY 1984. Therefore, funding in the amount of 9,231 was deleted from the FY 1984 program.

Program Element: 28010N

Title: Tri-Service Joint Tactical Communications Program (TRI-TAC), Navy

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13,533	9,208	9,374	9,114	Continuing	Continuing
X0700	Naval Telecommunications System Test Mode	1,074	1,121	1,329	1,380	Continuing	Continuing
X0722	Tactical Digital Facsimile	4,478	100	97	0	0	22,060
X0723	Joint Service Testing	174	210	135	207	Continuing	Continuing
X0919	Advanced Narrowband Digital Voice Terminal	7,807	7,777	7,753	7,527	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN						
Tactical Digital Facsimile (Quantity) 1/	-	10,282	961	5,758	18,367	34,727
Advanced Narrowband Digital Voice Terminal (Quantity) 2/	-	-	-	4,081	319,968	324,049
Unit Level Circuit Switches (Quantity) 3/	-	-	-	7,542	12,463	20,005
Total: Joint Tactical Communications 333312	-	10,282	961	17,381	350,798	379,781

Note: 1/: Inventory objective of 247 Digital Facsimile Terminals (128 having meteorological interface units) with delivery commencing in FY 1987 through FY 1989.

Note: 2/: Inventory objective of 9,697 Digital Voice Terminals with delivery commencing in FY 1987. Current unit cost estimate \$16.1 thousand per terminal (excluding COMSEC Module).

Note: 3/: Inventory objective of 112 Unit Level Circuit Switches with delivery commencing in FY 1987.

F. (U) RELATED ACTIVITIES: The projects within this element are complementary to other Navy communications improvement efforts: Program Element 2416W, Fleet Telecommunications (Tactical); Program Element 33109N, Satellite Communications; and Program Element 33126N, Long Haul Communications and to the overall TRI-TAC effort, Program Element 28010.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington, DC; Naval Electronic Systems Security Engineering Center, Washington, DC; Naval Ocean Systems Center, San Diego, CA (less laboratory); Joint Test Organization, Ft. Huachuca, AZ; Naval Electronic Systems Engineering Center, Charleston, SC; and Naval Research Laboratory, Washington, DC. CONTRACTORS: Datalog Division, Litton Systems, Inc., Melville, NY; International Telephone and Telegraph Corporation (Defense Communications Division) Nutley, NJ; Ketrion, Wayne, PA; CNR, Incorporated, Newton, MA; Vought Corporation, Dallas, TX.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0700, NAVAL TELECOMMUNICATIONS SYSTEM TEST MODE: This project provides for Navy participation in TRI-TAC program management, engineering, and Test and Evaluation processes. TRI-TAC test and evaluation program is supported by Naval

Program Element: 28010H

Title: Tri-Service Joint Tactical Communications Program (TRI-TAC), Navy

Telecommunications System Test Node, Navy node portion of Joint Test Facility and provides systems interoperability testing of the Naval Telecommunications System and Phase I TRI-TAC acquisitions. Activity of the Naval Telecommunications System Test Node is coordinated with TRI-TAC Test and Evaluation.

(U) In FY 1982: Navy participated in all phases of TRI-TAC program management, engineering support and Test and Evaluation. Unique Navy system integration testing continued at Naval Telecommunications System Test Node. Navy coordination role increased because of Navy acquisition programs entering procurement phase. Implementation planning imposed increased transition management functions. Navy/TRI-TAC management and engineering support roles produced individual equipment analysis for determination of Navy procurement planning.

(U) The FY 1983 program consists of:

- o Continuation of the FY 1982 program, with increased emphasis on completing test planning efforts for the Advanced Narrowband Digital Voice Terminal.
- o Conduct Government Development and Initial Operational Test programs for the Unit Level Circuit Switch and associated equipment.
- o Prepare reports for equipments tested.

(U) For FY 1984, it is planned to continue:

- o Emphasis on Navy TRI-TAC management and engineering support roles and assessment of individual equipment analysis to support Navy procurement planning.
- o Begin test planning on the Unit Level Message Switch.

(U) Program to completion:

- o Since the project supports the functional participation of the Navy in the TRI-TAC Program Management, engineering, and test and evaluation, this support will continue to be furnished by the TRI-TAC Program Management and Test Management Plans.

(U) Project X0722, Tactical Digital Facsimile: Not Applicable.

(U) Project X0723, Joint Service Testing: Not Applicable.

(U) Project X0919, Advanced Narrowband Digital Voice Terminal: This project provides for the development of the Advanced Narrowband Digital Voice Terminal to meet narrowband secure voice and digital modem requirements. Program consists of the Navy developed basic terminal unit, CV-3591, and the National Security Agency developed plug-in crypto module (KYV-5).

(U) In FY 1982, continued Full-Scale Development Model design, fabrication, assembly, and initiated contract development and test. Plans prepared for Government Development Test and Evaluation and Initial Operational Test and Evaluation.

(U) The FY 1983 program consists of:

- o Complete Full-Scale Development.
- o Development Test and Evaluation and Initial Operational Test and Evaluation using the Full Scale Development Model basic terminal units and the final engineering models from the National Security Agency KYV-5 crypto development. Twenty Advanced

Program Element: 28010X

Title: Tri-Service Joint Tactical Communications Program (TRI-TAC), Navy

Narrow Band Digital Voice Terminals will be delivered under the Full-Scale Engineering Development Contract for testing starting in June 1983.

(U) For FY 1984, it is planned to continue:

- o Test and Evaluation phase to completion.

- o Joint Production Review and Milestone III decision will be made and a Request for Procurement for production of the basic terminal unit will be issued.

(U) Program to completion:

- o Production of the basic terminal unit will begin in FY 1985.

- o Initial operational capability scheduled in FY 1987.

- o Residual funding in FY 1986 will provide for transition of program from engineering into the production phase.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63206N
DoD Mission Area: 371 - Self-Protection

Title: Airborne Electronic Warfare Equipment
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,547	13,090	23,220	20,945	Continuing	Continuing
W0638	Airborne Defensive Electronic Countermeasures	8,132	8,852	12,235	19,619	Continuing	Continuing
W0640	Miniature Expendable Jammers	1,415	4,238	10,985	1,326	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provides tactical Naval and Marine Corps aircraft with advanced technology self defense equipment and expendables which operate against threat weapons systems that utilize the radio frequency portion of the electromagnetic spectrum. Provides Electronic Warfare Support Measures equipment for electronic warfare support aircraft.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: (1) W0638, a net decrease of 48 in FY 1982 as a result of downward economic and budgetary adjustments. In FY 1984, the net increase of 6,626 is due to intensified jamming techniques developments. (2) W0640, a net decrease in FY 1982 of 92 as a result of downward economic and budgeting adjustments. In FY 1983 and FY 1984 the net increases of 2,600 and 9,241 are due to development of second production source for the generic expendable.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,958	9,687	10,490	7,353	Continuing	Continuing
W0638	Airborne Defensive Electronic Countermeasures	6,937	8,180	8,852	5,609	Continuing	Continuing
W0640	Miniature Expendable Jammers	3,021	1,507	1,638	1,744	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy APR-43 (Project W0638-TW) Quantity	10,810 (41)	20,300 (34)	22,560 (97)	21,990 (135)	2,914 (196)	81,707 (503)

F. (U) RELATED ACTIVITIES: Air Force and Army related efforts are formally coordinated through the Joint Tactical Coordinating Group/Warning Receiver Countermeasures Subgroup and informally in various joint development planning meetings, exchange of project reports, and use of Test and Evaluation facilities. Joint/cooperative programs are underway in the areas of

Program Element: 63206N

Title: Airborne Electronic Warfare Equipment

G. (U) WORK PERFORMED BY: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Research Laboratory, Washington, DC; Naval Weapons Center, China Lake, CA; Naval Air Test Center, Patuxent River, MD; Naval Air Development Center, Warminster, PA; Naval Avionics Center, Indianapolis, IN; Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Dahlgren, VA; CONTRACTORS: Sanders Associates, Inc., Nashua, NH; Applied Technology, Sunnyvale, CA; Lundy Electronics, Inc., Pompano Beach, FL; SWL, Inc., McLean, VA; LORAL, Yonkers, NY; Rockwell International, Tulsa, OK; TRACOR, Austin, TX; Texas Instruments, Dallas, TX; Northrop, Rolling Meadows, IL; SEDCO, Long Island, NY.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project W0638, Airborne Defensive Electronic Countermeasures.

1. (U) DESCRIPTION (Requirement and Project): Radar warning and electronic countermeasures equipment using both combined and individual jamming and deception techniques are being developed/modified to protect tactical aircraft from radar controlled weapons and associated systems. Included are joint Navy/United States Air Force development programs for [] warning and jamming and development of high power [] transmitter for EA-6B/EF-111.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed advanced development model for [] radar warning receiver. Completed advanced development model for [] jammer. Demonstrated feasibility of [] solid state amplifier. Continued: Radar warning receiver component and subsystem improvements, electronic warfare equipment integration support and advanced reprogramming concepts, joint United States Air Force [] countermeasures and development of [] jamming techniques.

b. (U) FY 1983 Program: Demonstrate capability of Instantaneous Fourier Transform modification to the Advanced Special Receiver. Continue joint United States Air Force [] countermeasures and development of [] jamming techniques. Commence [] transmitter development risk reduction. Continue electronic warfare equipment integration support and advanced reprogramming concepts.

c. (U) FY 1984 Planned Program: Continue risk reduction of solid state transmitter for EA-6B/EF-111 application. Continue [] techniques with the United States Air Force. Continue electronic warfare equipment integration and software support activities. The increase in the FY 1984 estimate over the FY 1983 estimate is due to intensified monopulse countermeasures and cross polarization jamming techniques developments.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

(U) Project W0640, Miniature Expendable Jammers

1. (U) DESCRIPTION (Requirement and Project): This project provides for the development of countermeasures expendables, with the exception of flares, and for the development of the required dispensers. The expendables are used to degrade []

Program Element: 63206N

Title: Airborne Electronic Warfare Equipment

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Fabricated simulator test generic decoy feasibility models. Completed testing with feasibility model of rocket motor forward launched chaff. Completed design concept of an Advanced Airborne Expendable Decoy and fabricated and tested high risk hardware.

b. (U) FY 1983 Program: Continuation of chaff dispenser/expendable developments including engineering development models generic expendable. Testing of forward launch chaff feasibility model. Coordinated testing of expendables with onboard defensive electronic countermeasures equipment.

c. (U) FY 1984 Planned Program: Continue forward launch feasibility/risk reduction. Continue testing of improved dispenser and generic expendable. The increase in FY 1984 funding over FY 1983 is due to development of second production source for the generic expendable.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestone: Not applicable.

FY 1984 RUT&E DESCRIPTIVE SUMMARY

Program Element: 63208N
DoD Mission Area: 225 - Air Warfare Support

Title: Undergraduate Jet Flight Training System (VTXTS)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,985	7,925	30,261	39,144	410,260	498,047
W1142	Undergraduate Jet Flight Training System (VTXTS) Quantity (Test and Evaluation)	4,985	7,925	30,261	39,144	410,260 (2)	498,047

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Increasing operating and support costs and impending obsolescence of present flight training aircraft require development of a cost effective replacement. The complementary aspects of flight training (flight, simulation and academics) must be integrated to develop an effective, affordable and more efficient system.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net decrease of 1729 in FY 1983 consisting of a 1694 Congressional reduction and a decrease of 75 due to Navy's application of a general Congressional reduction, and an increase of 6185 in FY 1984 due a restructure of the development funding requirements.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,209	4,985	9,654	24,076	TBD	TBD
W1142	Undergraduate Jet Flight Training System (VTXTS) Quantity (Test and Evaluation)	1,209	4,985	9,654	24,076	TBD (4)	TBD

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN	0	0	4,900	110,500	5,429,500	5,544,900
Procurement Quantity				(2)		

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Training Equipment Center, Orlando, FL; Naval Air Propulsion Center, Trenton, NJ; Naval Air Test Center, Patuxent River, MD; Naval Air Engineering Center, Lakehurst, NJ; Chief of Naval Education and Training, Pensacola, FL; Naval Avionics Center, Indianapolis, IN; and Naval Research Laboratory, Washington, DC. CONTRACTORS: McDonnell Douglas Corporation, Long Beach, CA; British Aerospace Limited, Surrey, England

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

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Program Element: 63208N

Title: Undergraduate Jet Flight Training System (VTXTS)

1. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W1142, Undergraduate Jet Flight Training System

1. (U) DESCRIPTION: As documented in Mission Element Need Statement, a need exists to provide an optimized replacement for the present system to meet future pilot training requirements. An inadequate number of training aircraft will be available in the late 1980s because of attrition and service life constraints. This program has explored alternatives for satisfying this need. Options ranging from maintaining existing trainer aircraft to acquisition of a totally new system have been examined and defined. Parallel competitive constraints were awarded for industry exploration of alternatives in 1981. The program has been structured to focus on a system of ground and flight training that will provide trained aviators equal to or better than those currently being produced while minimizing acquisition and operating costs. The alternative selected to fill this need will be summarized for the Defense Systems Acquisition Review Council. The training system based on the McDonnell Douglas Hawk aircraft was awarded a Pre-Full Scale Development contract in September 1982.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed evaluation of Pre-Full Scale Development proposals and conducted source selection. McDonnell Douglas was awarded a Pre-Full Scale Development contract to investigate and validate low to moderate risk technical and programmatic issues, and to develop system and subsystem specifications. Assessed Undergraduate Jet Flight Training System concepts and began preparation of documentation for Milestone review.

b. (U) FY 1983 Program: Continue Pre-Full Scale Development Phase contract effort. In-house analysis of contractor's efforts. Preparation for DSARC I scheduled for second quarter FY 1983. Prepare and release a Full Scale Development Request for Quotation and evaluate industry response.

c. (U) FY 1984 Planned Program: Award Full Scale Development contract for detailed engineering efforts and research and development subsystem component ordering of carrier capable Hawk aircraft and full training system, and subsequent award of an advance acquisition contract for 54 field carrier landing practice capable aircraft, to meet the training command's aircraft shortfall in the late 1980's. The increase in funding from FY 1983 to FY 1984 is reflective of the program's change in development phases and the increase in program requirements.

d. (U) Program to Completion: Conduct full scale engineering development and required test and evaluation of system. Manufacture, assembly and delivery of Field Carrier Landing Practice and Carrier Qualification aircraft. Obtain Approval for Service Use and phase into training operation to ensure a continued output of quality jet aviators.

e. (U) Milestones

<u>MILESTONE</u>	<u>DATE</u>
1. Mission Element Need Statement Approval	June 1979
2. DSARC I *(July 1982)	1983
3. Initial Training Capability *(1987)	1988
4. Full Training Capability *(1988)	1991

*Dates in parentheses are those shown in the FY 1983 Descriptive Summary. DSARC I and II have been combined due to the advanced status of the program and the determination that a Milestone I/II review was appropriate and logical. Changes in Initial Training Capability and Full Training Capability dates are reflective of the restructuring of the program to acquire Field Carrier Landing Practice aircraft to meet training command needs in the late 1980's, to be followed by delivery of the full training system including Carrier Qualification aircraft. Both aircraft are to be used interchangeably in an integrated training program.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63213N
DoD Mission Area: 371 - Self-Protection

Title: Airborne Infrared Countermeasures
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,692	7,259	14,668	6,137	Continuing	Continuing
W0436	Tactical Air Countermeasures	3,326*	1,493*	0	0	0	0
W0468	Heliborne Countermeasures	5,341	5,732	14,668	6,137	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

* Work in Project W0436 was transferred from Program Element 63212N, Tactical Air Infrared Countermeasures, to this program element in May 1982. All work will be in Project W0468 beginning in FY 1984.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element develops missile warning sets, decoys and jammers to protect Navy/Marine Corps fixed-wing, tactical aircraft and helicopters from air-to-air and surface-to-air missiles. Countermeasures protection at this time is limited to the ALQ-123, and to the ALQ-123 which is designed to protect A-7 aircraft from the threat missile systems. Serious threats to the helicopters include the missiles as well as various widely exported US/NATO missiles.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: W0436: (1) A FY 1982 net reduction of 1455 as a result of OPNAV reprogramming to higher priority program; and (2) a FY 1984 net decrease of 2,470 due to work being transferred to project W0468. W0468: (1) A net increase of 18 in FY 1982 as a result of budgetary adjustments; (2) A net increase of 8,550 in FY 1984 to accelerate by one year the Initial Operational Capability date of Infrared/Electro-Optic Countermeasures.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,300	10,104	7,225	8,588	Continuing	Continuing
W0436	Tactical Air Countermeasures	3,577	4,781	1,493	2,470	Continuing	Continuing
W0468	Helicopter Countermeasures	2,723	5,323	5,732	6,118	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
<u>AIRCRAFT PROCUREMENT, NAVY</u>						
AN/ALQ-157 Infrared Jammer CH-46E	0	9,791	10,035	580	0	20,406
Quantity	0	111	69	0	0	180
AN/ALQ-157 Infrared Jammer CH-53A/D	201	5,173	7,509	0	0	12,883
Quantity	0	60	53	0	0	113
AN/AAR-() Missile Warning Set	0	0	0	0	69,710	69,710
Quantity	0	0	0	0	503	503

Program Element: 63213N

Title: Airborne Infrared Countermeasures

F. (U) RELATED ACTIVITIES: Aircraft Infrared Signature Suppression, Program Element 64220N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Air Test Center, Patuxent River, MD; Naval Research Laboratory, Washington, DC; Naval Weapons Support Center, Crane, IN.
CONTRACTORS: Xerox Electro-Optical Systems, Pasadena, CA; Aerojet ElectroSystems Company, Azusa, CA; SWL, Inc., McLean, VA; Honeywell Corporation, Lexington, MA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0436, Tactical Air Countermeasures: This project provides for the design, development, and test of infrared countermeasures systems which will protect United States Navy/United States Marine Corps fixed wing aircraft from missiles.

(U) In FY 1982, prepared specification and evaluated technology for Missile Warning Set. Documented, fabricated and tested Forward Firing Decoy Flare.

(U) The FY 1983 program consists of:

- o Completing and fully documenting engineering development model definition of missile warning set.
- o Documenting directional jammer technology status and data base.

(U) For FY 1984, project not funded, work shifted to Project W0468.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W0468, Heliborne Countermeasures:

1. (U) DESCRIPTION (Requirement and Project): This project provides for the design, development and test of infrared countermeasures systems which will protect United States Marine Corps/Navy helicopters and tactical jet aircraft from missiles.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Solicited industry proposal for full scale engineering development of the AN/AAR-() missile warning set and completed proposal evaluations. For the advanced flare completed fabrication of 8 engineering development model dispensers and 900 flares. Conducted preliminary phase of development testing.

b. (U) FY 1983 Program: Award full scale engineering development contract and monitor contractor development efforts of AN/AAR-(). Continue developmental testing on engineering development model dispenser and flares of the advanced helo.

c. (U) FY 1984 Planned Program: Continue the AN/AAR-() missile warning set through contractor testing and Navy developmental testing and technical evaluation. Continue helicopter flare through operational testing and evaluation with Approval for Service Use in early FY 1985. Commence engineering development of tactical air missile warning set. Continue development of MJU 20 Forward Fired and its associated launcher. Continue joint development of Advanced Infrared Countermeasures system for tactical jet aircraft with the United States Air Force. The increase in the FY 1984 funding over the FY 1983 funding is to accelerate by one year the Initial Operational Capability date of Infrared/Electro-Optic Countermeasures.

Program Element: 63213N

Title: Airborne Infrared Countermeasures

- d. (U) Program to Completion: This is a continuing program.
- e. (U) Milestones: Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63214N

Title: Tactical Command and Control Communications Countermeasures

DoD Mission Area: 372 - Escort, Stand-off and Counter C³

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,214	7,258	12,261	17,568	Continuing	Continuing
W0642	Tactical Command and Control Communications Countermeasures	6,214	7,258	12,261	17,568	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops a tactical command and control communications countermeasures system and a radar countermeasures system. This system will replace the AN/ALQ-92 tactical communications countermeasures system in the EA-6B aircraft.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of '0 in FY 1984 is due from minor adjustments in cost estimates. The increase of 4,506 in FY 1984 is due to additional funds required to carry the ALQ-149 into the full scale development phase.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,499	6,284	7,238	7,755	Continuing	Continuing
W0642	Tactical Command and Control Communications Countermeasures	2,499	6,284	7,258	7,755	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: United States Air Force Program Element 64724F is developing command and control communications countermeasures to support tactical air forces from a dedicated stand-off jammer aircraft. United States Air Force Program Element 63718F is developing an air defense communications jammer in the band which is intended to identify and jam

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN; Naval Research Laboratory, Washington, DC; Naval Air Test Center, Patuxent River, MD; Naval Surface Weapons Center, Dahlgren, VA; Naval Weapons Center, China Lake, CA; Naval Air Development Center, Warminster, PA. CONTRACTORS: None.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

Program Element: 63214N

Title: Tactical Command and Control Communications Countermeasures

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W0642, Tactical Command and Control Communications Countermeasures

1. (U) DESCRIPTION (Requirement and Project): Develop tactical command and control communications equipment to replace the AN/ALQ-52 in EA-6B aircraft and to provide a tactical command and control communications countermeasures capability for tactical aircraft. The AN/ALQ-92 is a limited frequency system which has no analysis capability except operator aural analysis. It generates electromagnetic interference within the aircraft and is basically incompatible with the AN/ALQ-99 system. The replacement system, ALQ-149, is required to be capable of identifying and jamming all types of communications signals in the band, be software programmable, and be compatible with on-board systems of candidate aircraft. Subsequent to the establishment of the original requirement for a system (ADO 33-60X), were identified operating in the band. The United States Marine Corps established a requirement to conduct tactical command and control communications countermeasures in the 20-70MHz band. Frequency coverage to fill the gap between was also required. As a result of these additional requirements, the frequency coverage requirement within the ALQ-149 was extended to include . The AN/ALQ-149 has also been assigned the responsibility to counter radar threats in the band. The AN/ALQ-149 has completed advanced development testing. The advanced development model consists of a acquisition, receiving and processing subsystem and two amplifier and antenna transmitting subsystem.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Final completion of threat scenario. Continued testing in the secure communications simulator Research Laboratory. Commenced competitive contractor selection process for engineering development model. Initiated prototype installation of the AN/ALQ-149 in Electronic Warfare Software Support Laboratory at Point Mugu, CA.

b. (U) FY 1983 Program: Select contractor and award engineering development model contract. Commence AN/ALQ-149 engineering development model development. Initiate prototype installation of AN/ALQ-149 in EA-6B aircraft. Continue prototype installation in Electronic Warfare Software Support Laboratory at Pacific Missile Test Center. Initiate AN/ALQ-149 ground support equipment design.

c. (U) FY 1984 Planned Program: Continue AN/ALQ-149 engineering development model development and commence prototype installation in EA-6B aircraft. Continue prototype installation of AN/ALQ-149 in Electronic Warfare Software Support Laboratory at Pacific Missile Test Center and continue ground support equipment development. The increase in FY 1984 over FY 1983 funding is due to additional funds required to carry the ALQ-149 into the full scale development phase.

d. (U) Program to Completion: Commence contractor test program. Complete ground support equipment development. Complete integration of AN/ALQ-149 at Electronic Warfare Software Support Laboratory. Complete AN/ALQ-149 installation in EA-6B. Commence Navy technical evaluation/operational evaluation testing.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63219N Title: Advanced Aircraft Armament System
DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,185	3,965	2,637	1,959	Continuing	Continuing
W0976	Armament Systems Technology	969	1,641	2,637	1,959	Continuing	Continuing
W0977	Stores Management System	2,094	1,814	0	0	0	TBD
W0978	Multiple Stores Ejector Rack	1,122	510	0	0	0	TBD

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Navy and Air Force aircraft have historically had unique armament systems. Consequently, each time a new weapon system is developed the aircraft has to be modified at great expense to accommodate the weapon. This program is attempting to correct that deficiency. Advanced Aircraft Armament System is the Navy's program to achieve aircraft/stores interoperability between future Navy and Air Force (and where possible, NATO) fixed wing aircraft with current and future NATO and United States stores. This will be accomplished through the development of joint-service Suspension and Release Equipment and Stores Management Systems electrical and mechanical standards for interfaces between aircraft armament systems. Validated standards will be utilized as design specifications for Advanced Development Model hardware for a family of Suspension and Release and Stores Management System equipment which will achieve joint-service and NATO interoperability. The Multiple Stores Ejector Rack was a near-term joint Navy and Air Force effort (Air Force lead) to provide a common multiple (two and four station) bomb rack for stores in the 1000 pound class. The Multiple Stores Ejector Rack was to provide: (1) improved reliability; (2) tenfold increase in maintainability; (3) significant improvement in performance; (4) reduced logistic costs; (5) rack component part interchangeability; and (6) service interoperability of multiple racks.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The funding reduction of 1655 in FY 1982 in W0976 was due to budget constraints and reprogramming actions, funding reduction of 2,109 in FY 1983 (due to Navy reprogrammings) and 4,477 in FY 1984 resulted in major restructuring of the entire program in both tasks and schedule. The reduction of 476 in FY 1983 for project W0977 resulted from Navy's application of a general Congressional reduction. All program tasks in FY 1984 and the out-years will be done under W0976, Armament System Technology.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,543	5,651	6,541	11,406	41,130	82,084
W0976	Suspension and Release Equipment	1,749	2,624	3,761	7,114	24,908	43,316
W0977	Stores Management System	2,831	2,005	2,290	4,292	16,222	31,014
W0978	Multiple Stores Ejector Rack	1,963	1,022	510	0	0	7,714

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

Program Element: 63219H

Title: Advanced Aircraft Armament System

F. (U) RELATED ACTIVITIES: The Suspension and Release equipment and Stores Management System technologies are being coordinated with the Air Force in accordance with a Memorandum of Agreement approved in September 1978. The associated Air Force program is Program Element 63601F Conventional Weapons Technology. The Aircraft Armament Interoperable Interfaces and Advanced Aircraft System are being coordinated with the Air Munition Requirements and Development Committee and the Joint Technical Coordination Group for Munitions Development. The Air Force Multiple Stores Ejector Rack effort is Program Element 64602F. The Multiple Stores Ejector Rack was being developed in accordance with approved Joint Services Operational Requirement and Joint Development Plan. The Advanced Aircraft Armament System Program is currently developing Navy inputs to the NATO Standardization Air Armament Work Party.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA (lead laboratory); OTHERS: Naval Air Development Center, Warminster, PA; Naval Ordnance Station, Indian Head, MD; Naval Avionics Facility, Indianapolis, IN; Naval Weapons Evaluation Facility, Albuquerque, NM; Naval Air Test Center, Patuxent River, MD; Pacific Missile Test Center, Point Mugu, CA; Naval Surface Weapons Center, White Oak, MD; Naval Air Technical Facility, Philadelphia, PA; Naval Air Engineering Center, Lakeland, FL. CONTRACTORS: Vought Corporation, Dallas, TX; Battelle Memorial Institute, Columbus, OH; Western Gear Corporation, Flight Division, Jamestown, ND. OTHERS: Air Force Armament Test Laboratory, Eglin Air Force Base, FL.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0976, Armament Systems Technology: This project is associated with the "armament subsystem to stores" and "armament subsystem to aircraft subsystem" interfaces and includes stores, stores management data transfer, and suspension and release equipment. Interface specification will be developed for pylon interfaces, three weight/size classes of racks, rail and eject missile launchers, multiple ejector racks, stores management data transfer and store attachment and release. In addition to the interface standards, this project will validate and test Advanced Development Model hardware for a family of parent racks, missile launchers, and suspension and release components.

(U) In FY 1982, store interface, communication and data transfer studies continued for NATO Air Armament Standardization Agreements. Component functional requirements and architectural concepts were initiated. Advanced signaling and power requirements update were initiated. Advanced Medium Range Air-to-Air program coordination was established. Service coordination with related advanced development efforts in displays and controls, avionics, and electrical power systems was continued. Completed contractual procedures for the stores management system advanced development model hardware contract, which included finalization of the statements of work and specifications was completed. A contract was awarded for Advanced Armament Equipment. A Stores data base analysis and finalized Joint Service Store suite was completed.

(U) The FY 1983 program consists of:

- o Continuing joint-service development of air armament interface standards.
- o Service engineering analysis of air armament interface standards.
- o Coordination of Advanced Aircraft Armament Interoperability Interfaces with parallel service development efforts in aircraft power, electronics, avionics, display and control.
- o Award Phase I stores management system advanced development model hardware contract.
- o Completing critical design review of stores management system advanced development model contractual effort.
- o Continuing NATO advanced armament interface interoperability studies.
- o Initiate coordination of armament interface standards and specifications with Naval Sea Systems Command for Air/Surface launched weapon system developments.

Program Element: 63219H

Title: Advanced Aircraft Armament System

(U) For FY 1984 it is planned to:

- o Evaluate advanced development model Phase I contract efforts for stores management system
- o Continue stores management engineering support studies and analysis.
- o Continue coordination of suspension and release equipment technology development with stores management system advanced development model.
- o Continue suspension and release equipment system investigations and supporting technology development.
- o Update draft interface standards of stores management system based on critical design review of advanced development model.
- o Continue coordination of armament interface standards and specifications with Naval Sea Systems Command for air/surface launched weapon system development.

(U) Project to Completion: This is a continuing project.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63220N
DoD Mission Area: 238 - Other Naval Warfare

Title: Lift Fan Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	0	0	TBD	TBD
W1689	Tilt Fan Demonstrator Aircraft	0	0	0	0	TBD	TBD
W1690	Propulsive Lift Systems	0	0	0	0	0	0

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element provides for advanced development of fixed wing, Vertical/Short Take-Off and Landing technology for Navy and Marine Corps missions. Project W1689, Tilt Fan demonstrator Aircraft, will initiate development and testing of powered lift demonstrator aircraft. A specific thrust of this R&D effort will be lift fan technologies; alternative technologies will also be evaluated. Project W1690, Propulsive Lift Systems, was to initiate development of a propulsive lift research device to be developed in cooperation with NASA Lewis Research Center.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Congress deleted all funds requested in FY 1983. Due to budgetary constraints in FY 1984, start of project W1689 has been delayed until FY 1986 and project W1690 has been terminated.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63228N
DoD Mission Area: 353 - Naval Warfare

Title: Aircraft Carrier Anti-Submarine Warfare Module
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,566	3,928	6,435	4,678	Continuing	Continuing
S0517	Aircraft Carrier Anti-Submarine Warfare Module Quantity	4,566	3,928	6,435	4,678	Continuing (T&E)	Continuing (1)

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for development of software/hardware improvements necessary to upgrade the anti-submarine warfare link in the aircraft carrier chain of command between air anti-submarine warfare weapon systems, the Navy Tactical Data System, and other elements of the carrier combat system. The principal objective is the provision of a capability aboard aircraft carriers for pre-mission, in-flight, and post-mission information exchange, storage, correlation, processing and display of anti-submarine warfare data as an integral part of the Combat Direction System in support of anti-submarine warfare operations.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 83 Descriptive Summary and that shown in this Descriptive Summary are as follows: The decrease of 35 in FY 1982 is due to revisions in cost estimates. The decrease in FY 1983 is due to Navy's application of a general Congressional reduction (34) and a Navy reprogramming (200). RDT&E change in FY 1984 (+1,843) is due to restructure of the program to be compatible with the new Navy standard AN/UYQ-21(V) Display System. The OPN FY 1982 change (-973) is due to not funding the Fast Time Analyzer modification planned for FY 1982 procurement. The OPN FY 1984 change (+4,900) increases the number of AN/UYK-7 computer double density memory modifications and Fast Time Analyzer reliability and capability modifications to be procured.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,838	4,601	4,162	4,592	Continuing	Continuing
S0517	Aircraft Carrier Anti-Submarine Warfare Module	3,838	4,601	4,162	4,592	Continuing	Continuing

Program Element: 63228N

Title: Aircraft Carrier Anti-Submarine Warfare Module

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Other Procurement, Navy	4,231	7,419	12,488	7,379	Continuing	Continuing
Quantity						
(Reliability Improvements)	(14)					(14)
(ASW Module System for Integrated Combat						
System Test Facility)		(1)				(1)
(AN/UYK-7 Computer Modifications)			(14)			(14)
(Fast Time Analyzer Modifications)			(5)	(4)		(9)

F. (U) RELATED ACTIVITIES: Program Element 64217N, S-3 Weapons Systems Improvement Program and Program Element 64228N, SH-60 Carrier Variant will be supported by the Module. Program Element 64219N, Project X0486, Anti-Submarine Warfare Operations Center will use selected common hardware.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center (lead laboratory), Warminster, PA. CONTRACTORS: Sperry-UNIVAC, St. Paul, MN; Hughes Aircraft, Fullerton, CA; Autonetics, North American Rockwell, Anaheim, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0517 Aircraft Carrier Anti-Submarine Warfare Module: This project provides for the design and development of ASW Module software and hardware required to meet the Tactical Operational Requirement of May 1976, as defined in the ASW Module Navy Decision Coordination Paper of 1 June 1981. A primary objective of this effort is the integration of the ASW function into the carrier Combat Direction System through expansion of ASW Module interfaces and a Combat Direction System/ASW Module display hardware upgrade.

(U) In FY 1982, development of the ASW Module Model 4.1 Mission Software continued and testing of interface and AN/SSQ-78(V) tactical display generator hardware modifications were initiated.

(U) The FY 1983 program consists of:

- o Restructuring of the hardware program to adapt the Navy standard AN/UYK-21(V) Tactical Displays vice modification of the current ASW Module AN/SSQ-78(V) equipment.
- o Restructuring of the software development to interface with the new AN/UYQ-21(V) Tactical Display consoles and common Digital Television Generator unit (developed from prior year display generator effort).
- o Continuing Phase I Model 4.1 Mission Software development (interfaces with current Model 4.0 fleet systems).
- o Developing the AN/UYK-7(V)/AN/UYQ-21(V) Interface Design Specification.
- o Completing requirements analyses to allocate ASW Module functions to the new console function keys.

Program Element: 63228N

Title: Albcraft Carrier Anti-Submarine Warfare Module

(U) For FY 1984 it is planned to:

- o Complete Phase I Model 4.1 Mission Software design.
- o Commence Phase II Model 4.1 Mission Software development and award contracts for major software changes required as a result of restructuring the ASW Module to include the standard AN/UYQ-21(V) Tactical Display System and a new common Digital Television Generator. The increase in funding estimate between FY 1983 and FY 1984 reflects this effort.
- o Perform Technical and Operational Evaluation of Phase I Mission Software.

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

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63254N

Title: Air Anti-Submarine Warfare

DoD Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Program

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,752	12,178	2,421	2,438	Continuing	Continuing
W0493	ARAPAHO	2,856	0	0	0	0	17,547
W1292	Advanced Anti-Submarine Warfare Avionics	2,896	3,663	2,421	2,438	Continuing	Continuing
W1301	Advanced Lightweight Helicopter Sonar	0	0	0	0	22,663	22,663
W1624	Broadband Acoustic Systems	*	3,515	*	*	*	*

* Broadband Acoustic Systems funded under Program Elements 63254N/W1292 and 63259N in FY 1982; transitions to Program Element 64261N/W1624 in FY 1984.

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for project W1292 and through completion for projects W0493 and W1301.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provide improved fixed wing and rotary wing anti-submarine warfare effectiveness through development of enhanced sensor processing, post-processing, data recording and display capabilities; and, in the case of tethered sonar, improved sensor performance against the advanced high speed evasive submarine threat. Shallow water anti-submarine warfare requirements will receive continuing consideration in the development of future ASW sensors and avionics. Particular focus is given to the enhancement of capabilities to exploit broadband target signals.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The decrease in Project W0493 reflects a Navy reprogramming of 144 in FY 1982. A total program decrease of 1816 (516 decrease in Advanced ASW Avionics and 1300 decrease in Broadband) in FY 1983 results from Navy's application of a general Congressional reduction (16) and a Navy decision to reprogram to a higher priority item (1800). In FY 1984, the decrease of 17,503 is due to the following reasons: Decrease of 3,253 in Advanced ASW Avionics due to decoupling multiple development efforts and focusing on the highest priority developments, a decrease of 4,192 in Advanced Lightweight Helicopter Sonar to restructure the new start to FY 1986 and a decrease of 10,058 in Broadband Acoustic System due to the transition to 64261N.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL PROGRAM ELEMENT	2,238	5,896	13,994	19,924	Continuing	Continuing
W0493	ARAPAHO	700	3,000	0	0	0	17,691
W1292	Advanced Anti-Submarine Warfare Avionics	1,538	2,896	4,179	5,674	Continuing	Continuing
W1301	Advanced Lightweight Helicopter Sonar	0	0	0	4,192	18,471	22,663
W1624	Broadband Acoustic System	0*	0*	9,815	10,058	13,324	33,197

* Broadband Acoustic Systems funded under Program Elements 63254N/W1292 and 63259N in FY 1981 and FY 1982.

Program Element: 6325AN

Title: Air Anti-Submarine Warfare

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 62711N, Undersea Target Surveillance Technology provides for initial determination of feasibility of candidate technology approaches. Program Element 63259N/W1010, Advanced Passive Sensors provides complementary advanced development of sensor candidates. Program Element 64261N, Acoustic Search Sensors provides for engineering development of selected sensor systems and signal processing.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Dahlgren, VA; U.S. Atlantic Fleet, Norfolk, VA. CONTRACTORS: IBM, Manassas, VA; Magnavox, Fort Wayne, IN.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0493, ARAPAH0: This project provides for the design and development of a portable, autonomous, aviation facility that can be rapidly installed aboard cargo ships.

(U) In FY 1982, the sea based feasibility demonstration was completed. A report detailing the results of the feasibility demonstration as well as the utility of ARAPAH0 will be submitted to Congress.

(U) Project W1292, Advanced Anti-Submarine Warfare Avionics: This project provides improved air ASW mission effectiveness through development of advanced hardware and software associated with acoustic system processing, post-processing, data recording and display. Key objectives are accommodation of advanced sensors; improved detection, classification, localization and tracking; and increased capacity and flexibility to handle multi-sensor data loads.

(U) In FY 1982, analyses continued on several candidate air ASW enhancements. The efforts included procurement of Acoustic Intercept System prototypes and initial data collection, initiation of options definition for development of acoustic data recall store capabilities, sizing efforts for Advanced Signal Processor processing options to achieve Sonobuoy Thinned Random Array Processing capabilities, and evaluation of active Aural Enhancement processing. Development of Broadband correlation processing and display was continued. The requirements definition for Very High Speed Integrated Circuit/Advanced Signal Conditioner and its interface with existing air ASW acoustic processors was initiated.

(U) The FY 1983 program consists of:

- o Supporting Advanced Signal Processor advanced sensor software development.
- o Completing Advanced Signal Processor broadband algorithm development.
- o []

(U) For FY 1984, it is planned to continue:

- o Recall Store System and Very High Speed Integrated Circuit/Advanced Signal Conditioner requirements definition.
- o The decrease in funding estimates from FY 1983 to FY 1984 reflects program descopeing due to higher priority Navy requirements.
- o To completion: This is a continuing program.

Program Element: 63254N

Title: Air Anti-Submarine Warfare

(U) Project W1624, Broadband Acoustic Systems: This program is fully described in Program Element 64261N, Acoustic Search Sensors into which it transitioned in FY 1984.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63256N Title: Joint Services Advanced Vertical Lift Aircraft (JVX)
DoD Mission Area: 232 - Amphibious, Strike, and Antisurface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,500*	4,900**	53,431	169,294	1,339,475	1,568,600
W1425	Joint Services Advanced Vertical Lift Aircraft (JVX)	1,500*	4,900**	45,626	138,059	951,815	1,141,900
W1808	Modern Technology Engine	-	-	-	-	235,700	235,700
W1809	Navy/USMC Unique Systems	-	-	7,805	31,235	151,960	191,000

*Funded in Program Element 63203N, Advanced Helicopter Development.

**Funded in Program Element 64262N, Marine Medium Assault Transport

The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Joint Services Advanced Vertical Lift Aircraft is a jointly funded development project which will provide the Army, Navy, Air Force and Marine Corps with an aircraft to conduct combat, combat support and combat service support missions requiring vertical takeoff and landing capabilities. The Joint Services Advanced Vertical Lift Aircraft will replace a number of aging, obsolescent aircraft not adequately capable of performing their assigned missions and will also provide for expanded mission capabilities. In the 1990's and beyond, the Joint Services Advanced Vertical Lift Aircraft will be a primary replacement for United States Marine Corps CH-46 and CH-53A/B medium lift, Amphibious Assault Aircraft and United States Navy HH-3A Combat Rescue helicopters. It is also intended for use in Navy direct fleet support logistics roles. The Army and Air Force will utilize Joint Services Advanced Vertical Lift Aircraft in airborne battlefield intelligence and electronic warfare, Medical Evacuation, Combat Rescue and Special Operations mission roles.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this summary reflect a change in basic acquisition strategy from a Marine Corps Medium Helicopter Development to a Joint Services Advanced Vertical Lift Aircraft Program. There were no funds in this Program Element in 1982. The net decrease of 4,622 in FY 1983 was the result of Congressional action. The FY 1984 increase of 29,337 reflects the change in program scope.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	9,522	24,094	TBD	TBD
W1425	Assault Lift Augmentation	0	0	9,552	24,094	TBD	TBD

Program Element: 63256N

Title: Joint Services Advanced Vertical Lift Aircraft (JVX)

K. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy Funds (current requirements)	0	0	0	0	T&D	T&D
Quantities	0	0	0	0	602	602

F. (U) RELATED ACTIVITIES: United States Army - Joint Services Advanced Vertical Lift Aircraft; Special Electronics Mission Aircraft; Modern Technology Engine. United States Air Force - Joint Services Advanced Vertical Lift Aircraft; Modern Technology Engine.

G. (U) WORK PERFORMED BY: CONTRACTORS: Two contractors will be competitively selected to perform preliminary design of the Joint Services Advanced Vertical Lift Aircraft. The contractors will be selected in early CY-1983. The principal Research, Development, Test and Evaluation agency will be the Naval Air Systems Command. Numerous agencies and field activities from the services will participate.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1809, Navy/USMC Unique Systems: (NEW START) Project designs, tests and integrates specific Navy and United States Marine Corps mission systems into the common Joint Services Advanced Vertical Lift Aircraft air vehicle; and conducts service unique Operational Test and Evaluation program.

(U) The FY 1984 program consists of:

- o The conduct of studies related to cost, weight and performance tradeoffs for the various systems alternatives (radars, weapons, electro-optical and other sensor, passive and active defense countermeasures, etc.).
- o System supportability studies and analyses.
- o Systems simulations.
- o Design and initial acquisition of equipment for the mission systems integration and test facility.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project W1425 Joint Services Advanced Vertical Lift Aircraft:

1. (U) DESCRIPTION (Requirement and Project): The Joint Services Advanced Vertical Lift Aircraft is a joint Army, Navy, Air Force program with the Navy as Executive Service. The Joint Services Advanced Vertical Lift Aircraft will be an advanced technology vertical lift aircraft capable of meeting multi-mission service requirements, while achieving a significant increase in performance over current aircraft.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Project initiated (Milestone 0) by Deputy Secretary of Defense memo of December 1981. Joint Services Operational Requirement staffed; Joint Technology assessment conducted; Joint Services Memorandum of Understanding signed; Request for Proposal prepared for release to industry.

Program Element: 63256N

Title: Joint Services Advanced Vertical Lift Aircraft (JVX)

b. (U) FY 1983 Program: Deputy Secretary of Defense approved the Acquisition Strategy (Milestone I) on 8 December 1982 and authorized release of the competitive Request for Proposal to industry for the Preliminary Design Phase. The Request for Proposal was released to industry in January 1983. Proposals will be evaluated to support selection of two competitors who will conduct a series of wind tunnel tests, construct mock-ups, develop math models to be used to simulate the Joint Services Advanced Vertical Lift Aircraft on the National Aeronautics and Space Administration Vertical Motion Simulator, and conduct studies to identify cost and weight tradeoffs.

c. (U) FY 1984 Planned Program: The Joint Services Advanced Vertical Lift Aircraft preliminary design effort started in FY 1983, will continue in FY 1984 with the addition of limited engineering design effort to prepare for entering Full Scale Development in FY 1985. During this phase, industry will develop the Joint Services Advanced Vertical Lift Aircraft design, conduct extensive wind tunnel tests and other simulations, and complete a proposal for the balance of the program. The purpose of this 23 month effort is to validate basic aircraft design and performance parameters and clearly define the cost, risks, and schedule before continuing with the major portion of the program.

d. (U) Program to Completion: Full Scale Engineering Development and testing of eight prototype air vehicles. Emphasis will be placed on verifying actual system performance through joint and integrated test and evaluation. Joint Services Advanced Vertical Lift Aircraft Production Release begins in FY 1989 for the Marine Corps. Production Release for the Army, Navy and Air Force is in FY 1991. Production of 602 aircraft for the Marine Corps and Navy will be completed in FY 1998.

e. (U) Milestones

MILESTONE

1. Preliminary Design Contract Award
2. Full Scale Development Contract Award
3. Operational Test and Evaluation (USMC)
4. First USMC delivery
5. USA/USAF/USN Delivery

DATE

Second Quarter FY 1983
Third Quarter FY 1985
Second Quarter FY 1988
Third Quarter FY 1991
First Quarter FY 1993

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63257N
DoD Mission Area: 23b - Other Naval Warfare

Title: A-6E Short Take-Off and Landing Demonstrator
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
W1658	A-6E Short Take-Off and Landing Demonstrator	0	6,700	31,029	31,435	Continuing	Continuing
W1788	A-6 Upgrade	0	0	14,634	14,642	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through 1985 only for Project W1788 and through completion for Project W1658.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The element provides for advanced development of fixed wing, Vertical Take-off and Landing technology for projected Navy and Marine Corps requirements. Project W1658, A-6E Short Take-off and Landing Demonstrator: Provides for an advanced short take-off and landing lift technology demonstrator aircraft utilizing an A-6 test bed aircraft. This augmented lift technology supports a promising configuration option for future fighter and attack aircraft which will provide short take-off and landing as well as significantly increased maximum carrier landing gross weights. Project W1788N, A-6 Upgrade: Defines specific improvements for the A-6 aircraft to upgrade its current capabilities against the growing threat through the remainder of this century, to increase its operational readiness, to improve survivability and provide stand-off targeting. Definition will be based on results of wind tunnel testing and technology from flight testing of the A-6 Short Take-off and Landing Demonstrator along with evaluation of candidate radars, avionics, airframe and propulsion improvements, and significant reliability and maintainability improvements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net increase of 14,229 in FY 1984 due to inflation adjustments (-405) and the establishment of Project W1788 (+14,634) in this Program Element for definition of A-6 Upgrade requirements.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
W1148	Vertical/Short Take-Off and Landing Technology	4,304	0	6,700	16,800	19,200	53,030
W1658	A-6 STOL Demonstrator	0	0	6,700	16,800	19,200	42,700

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Propulsion Center, Trenton, NJ; Naval Weapons Center, China Lake, CA; David Taylor Naval Research and Development Center, Bethesda, MD; Naval Air Development Center, Johnsville, PA; Contractors: Grumman Aerospace Corporation, Bethpage, NY; General Electric Corporation, Cincinnati, OH.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

Program Element: 63257M

Title: A-6E Short Take-Off and Landing Demonstrator

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984.

(U) Project W1658, A-6E Short Take-Off and Landing Demonstrator

1. (U) DESCRIPTION: The Navy foresees requirements to develop new operational aircraft capabilities for short take-off and landing. The need exists to advance the technology base for these promising sea based aircraft concepts. This project provides for development and flight demonstration which could lead to an enhanced capability for the A-6 aircraft and provide valuable Short Take-Off and Landing Demonstrator technology for incorporation in future aircraft. This project configures an A-6 test bed with two-dimensional deflector exhaust nozzles, utilized in conjunction with General Electric F-404 non-afterburning engines, and with blown flaps in which bleed air is blown over a trailing edge flap for increased lift. Analysis shows that the A-6 can be given improved short take-off and landing characteristics at reasonable take-off gross weights in this configuration, permit landings with increased weight of unexpected fuel and high value weapons, operate reduced wind-over-the-deck conditions and take-off from runways of reduced length for the United States Marine Corps close air support role. This program provides for additional engineering design, wind tunnel testing, modification of an A-6 airframe to incorporate these devices and flight testing to demonstrate technical improvements and operational applicability.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: This project is a new start in FY 1983.

b. (U) FY 1982 Program: Conducts a system analysis and preliminary installation design of F-404 engines, two-dimensional deflected nozzles and high lift system modification to an A-6 aircraft. Initiate procurement action for detailed design fabrication and flight test of a modified A-6 aircraft. Award contract for design, fabrication and flight test. Begin fabrication of components. Conduct analytical analysis, wind tunnel testing, simulation of flight and low speed characteristics. Commence design modifications to an A-6 aircraft to incorporate short take-off and landing capability.

c. (U) FY 1984 PLANNED PROGRAM: Continue fabrication of prototype short take-off and landing modifications to an A-6 aircraft and initiate kit and F-404 non-afterburning engines installation.

d. (U) Program to Completion: Complete aircraft modification and conduct flight testing and performance demonstration of prototype A-6 short take-off and landing aircraft, making minor modifications to the prototype aircraft as required to improve flight and short take-off and landing performance. Analyze flight test results and prepare technical documentation of the results of the demonstration project and assess the applicability of this technology to future sea based attack and fighter aircraft.

e. (U) Milestones:

MILESTONE

1. Initial Contract Award
2. Flight Test
3. Demonstration Complete

DATE

January 1983
1985
1986

(U) Project W1788, A-6 Upgrade

1. (U) DESCRIPTION: The A-6 aircraft is a late 1950's design which has undergone a series of upgrades and improvements through the years to keep it abreast of the threat and capable of performing its all weather attack, interdiction and close air support roles in the current environment. This project provides for the investigation and evaluation of candidate upgrades to the existing A-6 configuration to enable it to perform adequately in the adverse environment posed by the threat anticipated for the 1990's and early 2000's. This evaluation will include consideration of the results of the A-6E Short Take-Off and Landing project as well as other airframe and propulsion changes which could improve aircraft performance, readiness and survivability characteristics. In addition, candidate radar and avionics systems will be evaluated to provide stand-off target classification

Program Element: 63257N

Title: A-6E Short Take-Off and Landing Demonstrator

and weapons delivery capability for greater operational effectiveness and survivability in combat. The results of this evaluation and definition project could lead to full scale development of an upgraded A-6 aircraft for operational employment in the 1990's.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

- a. (U) FY 1982 PROGRAM: This project commences in FY 1984.
- b. (U) FY 1983 PROGRAM: This project commences in FY 1984.
- c. (U) FY 1984 PLANNED PROGRAM: Evaluate the results of the short take-off and landing wind tunnel testing conducted under Project Wla58, A-6E Short Take-off and Landing Demonstrator, and assess the potential of this technology to an improved A-6. Commence definition analysis for A-6 weapon system improvement, including radar, avionics, airframe and propulsion systems.
- d. (U) PROGRAM TO COMPLETION: Continue detailed definition and evaluation of potential A-6 improvements. Analyze the results of the A-6 Short Take-off and Landing Demonstration flight testing for operational application. Conclude definition of A-6 Upgrade configuration, and initiate full scale development in FY 1986.

e. (U) MILESTONE

MILESTONE

- 1. Project Initiation
- 2. A-6 Upgrade Configuration/Program Definition
- 3. Initiate Full Scale Development

DATES

January 1984
January 1985
FY 1986

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element 63259N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Acoustic Search Sensors (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,639	7,601	1,967	994	Continuing	Continuing
W1010	Advanced Passive Sensors	4,639	7,601	1,967	994	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Development of advanced acoustic sensors to improve air anti-submarine warfare acoustic performance in countering the projected submarine threat.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: There is no change in FY 1982. A decrease of 1021 in FY 1983 is due to Navy's application of a general Congressional reduction (21) and a Navy reprogramming (1000). In FY 1984, 1,967 was added to continue advanced development of selected acoustic sensors.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,795	4,639	8,622	TBD	Continuing	Continuing
W1010	Advanced Passive Sensors	3,795	4,639	8,622	TBD	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Program Element 64261N, Acoustic Search Sensors (Engineering), provides engineering development of selected sensors. Program Element 63254N, Air Anti-Submarine Warfare, provides complementary advanced processing capabilities. Program Element 62711N, Undersea Target Surveillance Technology, provides joint development of the Low Cost High Density Field sonobuoy.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA (lead laboratory); Naval Research Laboratory, Washington, DC. CONTRACTORS: Hazeltine, Braintree, MA; Magnavox, Ft. Wayne, IN. Bunker Ramo, West Lake Village, CA; IBM, Manassas, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1010, Advanced Passive Sensors: Develop advanced passive sonobuoy systems to increase detection and localization/attack capability against the quiet submarine threat. The Horizontal Line Array Sonobuoy is under development as a tactical sensor to provide a balanced capability to detect [submarine acoustic signatures. This

Program Element: 63259N

Title: Acoustic Search Sensors (Advanced)

project will initiate, in conjunction with Undersea Target Surveillance (Program Element 62711N), designs for a simple, low cost, broadband energy detection sonobuoy to be employed in submarine threat. In addition, designs for an array sonobuoy providing capability will be developed. A volumetric array capable of operation in the Reliable Acoustic Path for is the baseline design under consideration.

(U) In FY 1982, the definition of far term broadband sensor and processing technique candidates was completed. Critical component development was initiated for the Horizontal Line Array Sonobuoy and initial over-the-side tests for array deployment verification and acoustic data collection were conducted.

(U) The FY 1983 program consists of:

- o Completing the Horizontal Line Array mechanical deployment and module level tests and initiating over-the-side acoustic performance tests.
- o Evaluating at-sea acoustic performance of baseline advanced high gain array utilizing a receiving array model from the Expendable Reliable Acoustic Path Sonobuoy.
- o Initiating design studies for a Low Cost High Density Field sonobuoy.

(U) For FY 1984, it is planned to:

- o Complete Horizontal Line Array over-the-side acoustic performance tests and initiate acoustic performance tests of a low frequency modified array.
- o Continue evaluation of advanced array concepts.
- o Low Cost High Density Field effort transitions to Program Element 64261M, Acoustic Search Sensors (Engineering). Authorization of full-scale development is essential even though all prescribed conditions have not been met.

(U) To completion: This is continuing program.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63260N
DoD Mission Area: 234 - Mine Warfare

Title: Airborne Mine Countermeasures
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,358	21,566	15,125	16,273	Continuing	Continuing
W0528	Advanced Airborne Mine Countermeasures Equipment	12,458	12,305	11,207	10,581	Continuing	Continuing
W0529	Airborne Minehunting System	5,900	9,261	3,918	5,692	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for development of airborne mine countermeasures systems that will enable surface combatants, amphibious force ships and logistic support ships to operate with relative safety in mineable water areas in support of the Navy's sea control and projection missions. The capabilities are required to counter known and projected mine threats. These developments will provide a mechanical mine sweeping capability against mines and a capability to locate and neutralize mines at area coverage rates greater than those afforded by surface mine countermeasures platforms.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY 1982 - a net decrease of 2,277 in distributed budget reductions reduced W0528 (-297) and W0529 (-498) which delayed testing of the AN/AQS-17 Relocation sonar and reduced aircraft installation effort. A Navy decision terminated Project W1239, Buried Mine Minehunting System (-1,482). FY 1983 - no change. FY 1984 - a net decrease of 9,779 due to Navy budget constraints will result in significant reductions in effort: W0528 (-1,226) delays start of advanced acoustic and W0529 (-8,553) extends shallow and deep water Multimode/Mine Hunting.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,338	20,635	21,566	24,904	TBD	TBD
W0528	Advanced Airborne Mine Countermeasures Equipment	9,141	12,755	12,305	12,433	33,711	125,191
W0529	Airborne Minehunting System	1,629	6,398	9,261	12,471	38,795	89,959
W1239	Buried Mine Minehunting System	1,568	1,482	0	0	TBD	TBD

Program Element: 63260N

Title: Airborne Mine Countermeasures

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (BA 3) (334248)	17,776	16,375	19,101	22,360	200,951	289,973

F. (U) RELATED ACTIVITIES: Explosive cutter, cable fairing, and towed body technologies developed under Program Element 6234R, Countermeasures Technology, and sonar technology developed under Program Element 63502N, Surface Mine Countermeasures, Project S0260, Advanced Minshunting Systems, and Project S1404, Neutralization, will be used in the developments under Program Element 63260N, Airborne Mine Countermeasures.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD (lead laboratories) and Naval Surface Weapons Center, White Oak, Silver Spring, MD. CONTRACTORS: Aerojet ElectroSystems, Azusa, CA; Bendix Oceanics Division, Sylmar, CA; EDO Government Products Division, College Point, NY; Tetra-Tech, Inc., San Diego, CA; Lockheed Missiles and Space Company, Sunnyvale, CA; and Los Alamos National Laboratory, Los Alamos, NM.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) W0529, Airborne Minshunting System. This project provides for the development of RN-53D and MH-53E helicopter towed systems to detect and neutralize [] These systems used by themselves, or in conjunction with others under development in this program element and Program Element 63502N, Surface Mine Countermeasures, will enable surface combatants, amphibious force ships and logistic support ships to operate with relative safety in mineable areas in support of the Navy's sea control and power projection missions. The consequences of enemy mining of U.S. and allied territorial waters, as well as [] could be particularly devastating to our military operations and our economy. The Soviets are known to []

[] The Soviet introduction of []
[] the mine countermeasures problem. There is currently []
The systems developed under this project will include sonars for mine detection and classification and systems for mine neutralization by explosive charge, with equipment designed to [] minshunting and minefield capabilities against both []
[] Systems performance goals for AN/AQS-17 Relocation Sonar and Neutralization Device - []
[] Multimode/Mine Hunting - []

(U) In FY 1982, completed fabrication and initiated acoustic measurements and in-water testing of the AN/AQS-17 Relocation Sonar. Initiated development of an upgraded rapid neutralization device. Initiated aircraft installation efforts.

(U) FY 1983 program:

- o AN/AQS-17 Relocation Sonar - complete in-water tests and initiate fabrication of operational test models.
- o Neutralization - complete design and initiate fabrication of neutralization devices.
- o Multimode/Mine Hunting - start system design and initiate subsystem fabrication.

Program Element: 63260N

Title: Airborne Mine Countermeasures

(U) FY 1984 program:

- o AN/AQS-17 Relocation Sonar - complete fabrication, initiate environmental tests and complete aircraft installation.
- o Neutralization - complete fabrication, complete tests, select optimum device and initiate fabrication of operational test models.
- o Multimode/Mine Hunting - complete preliminary design, continue fabrication and determine support requirements.

(U) Program to completion - FY 1985: Deliver AN/AQS-17 Relocation Sonar and conduct contractor demonstration. Conduct effectiveness and safety tests on neutralization device. Conduct minefield tests of Multimode/Mine Hunting system, advertise and award contract for operational test models. FY 1986: Complete fabrication and deliver neutralization device, conduct technical and operational evaluation of AN/AQS-17 Relocation Sonar and Neutralization device and continue Multimode/Mine Hunting fabrication. FY 1987: Obtain approval for production for AN/AQS-17 Relocation Sonar and Neutralization device. Complete detailed design of Multimode/Mine Hunting. FY 1988: Complete fabrication of Multimode/Mine Hunting and initiate environmental test. FY 1989: Deliver Multimode/Mine Hunting, conduct contractor demonstration and initiate technical evaluation. FY 1990: Complete technical and operational evaluations and obtain approval for production of Multimode/Mine Hunting.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project W0528, Advanced Airborne Mine Countermeasures Equipment

1. (b) DESCRIPTION (Requirement and Project): This project represents development of airborne mine countermeasures systems that will enable surface combatants, amphibious force ships, and logistic support ships to operate with relative safety in mineable water areas in support of the Navy's sea control and projection missions. In 1970, the Navy made a decision to make the mine countermeasures force a mix of helicopters and ships. As enemy mines have become more sensitive and complex, the risk of operating mine countermeasures ships

Helicopters were originally envisioned as precursor sweepers for anti-mine countermeasures ship mines to provide relative safety for mine countermeasure ships. This is no longer the situation. The consequences of enemy mining of U.S. and allied territorial waters, as well as could be particularly devastating to our military operations and our economy. The speed of forward deployment and effectiveness of helicopter minesweeping has been proven in Haiphong, Suez and off the coast of Egypt and has led to a requirement to expand helicopter mine countermeasures from the early, simple capability for mechanical sweeping of shallow moored mines and influence sweeping of simple magnetic and acoustic influence mines capabilities which were rapidly developed to support the Vietnam requirement to the projects described below. These projects are designed to provide a deeper and more effective capability to sweep moored mines and a capability to efficiently mines Significant characteristics of systems being developed under this project are:

a. (U) AN/ALQ-166 - Magnetic Sweep - Will be capable of operational speed of 6-30 knots. The output level will more than quadruple the present fleet capability and allow sweeping of increased coverage rate will reduce time required for performing magnetic minesweeping. Major system components include: turbine-generator, control unit, hydrofoil platform, sweep tail and tow/electrical/refueling cable.

b. (U) AN/ASQ-182 - Magnetic Environmental Measurement Equipment - Will measure on-scene magnetic environmental parameters needed to optimize track spacing and effectiveness of electrode-type magnetic sweeps. On-scene measurements are essential to permit optimizing of track spacing thereby minimizing the time required to sweep at maximum efficiency and ensuring system safety.

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Program Element: 63260N

Title: Airborne Mine Countermeasures

c. (U) A/N37U - Controlled Depth/Rapid Deploy Moored Sweep - Will provide a capability to automatically deploy moored sweeping equipment and to adjust sweep depths in 2-foot increments. This will provide a [] per sortie and reduce both the number of air creman and training requirements. Hydrodynamic components are depth controlled to obtain maximum system flexibility and effectiveness. An added benefit is that the design will permit sweeping of both shallow and deep moored mines with []

d. (U) AN/ALQ-160 - Acoustic Sweep - Will provide [] acoustic sweep, with output [] stable towed body and increased life, and reduced handling vulnerability.

e. (U) Advanced Acoustic Sweep - Will provide an operationally flexible sweep for countering acoustic mines [] The device will be a speed-insensitive acoustic device compatible with airborne magnetic sweep gear, with a capability of both [] acoustic output and []

f. (U) Pressure Acoustic Monitoring System - Will provide the capability to measure variations in water pressure to determine when influence sweep systems can be used to actuate pressure combination mines. System will also be capable of monitoring output of acoustic sweep gear to assure its proper operation.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: AN/ALQ-166 Magnetic Sweep - Completed fabrication, initial environmental and performance tests on first system; assembled winches, cradle and test load box. A/N37U Controlled Depth/Rapid Deploy Moored Sweep - Completed fabrication and environmental tests. AN/ASQ-182 Magnetic Environmental Measurement Equipment - Completed major design, completed fabrication of control electronics and initiated testing, initiated qualification tests on expendable probe. AN/ALQ-160 Acoustic Sweep - Completed preliminary design, completed tests of brassboard, selected final configuration and initiated fabrication of test evaluation hardware.

b. (U) FY 1983 Program: AN/ALQ-166 Magnetic Sweep - Complete fabrication of second system (first quarter), complete electromagnetic interference tests, deliver hardware, complete contractor demonstration and initiate technical evaluation. A/N37U Controlled Depth/Rapid Deploy Moored Sweep - Deliver hardware and conduct contractor demonstration (first quarter), complete technical and operational evaluations. AN/ASQ-182 Magnetic Environmental Measurement Equipment - complete fabrication of test evaluation hardware and conduct environmental tests. AN/ALQ-160 Acoustic Sweep - Complete fabrication of hardware (first quarter), conduct environmental tests, deliver hardware, conduct contractor demonstration and Navy evaluation.

c. (U) FY 1984 Planned Program: AN/ALQ-166 Magnetic Sweep - Complete technical and operational evaluations, obtain approval for production. A/N37U Controlled Depth/Rapid Deploy Moored Sweep - Obtain approval for production. AN/ASQ-182 Magnetic Environmental Measurement Equipment - Deliver hardware, complete contractor demonstration, technical and operational evaluations. Pressure Acoustic Monitoring System - Select contractor and award contract.

d. (U) Program to Completion: AN/ASQ-182 Magnetic Environmental Measurement Equipment - Obtain approval for production - FY 1985. Pressure Acoustic Monitoring System - Fabricate and test evaluation hardware - FY 1985, obtain approval for production - FY 1986. Advanced Acoustic Sweep - Award contract FY 1985; complete design trade offs - FY 1987; fabricate evaluation hardware - FY 1989; conduct contract demonstration and technical and operational evaluations - FY 1990 and obtain approval for production - FY 1991.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63261N
DoD Mission Area: 323 - TIARA for Naval Warfare

Title: Tactical Air Reconnaissance
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,019	4,670	10,485	14,067	Continuing	Continuing
W0534	Tactical Reconnaissance System	5,019	4,670	10,485	14,067	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Design and develop a cost effective follow-on tactical air reconnaissance system to provide tactical intelligence for Navy Battle Groups and Marine Corps Amphibious Forces in all weather conditions from a standoff distance beyond surface weapon threat envelopes.

Continue to exchange data on tactical reconnaissance systems with the Air Force.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 1,000 in FY 1983 reflects a specific Congressional reduction. The increase of 7,816 for FY 1984 is required for the Engineering Test Bed phase of the program, which was approved by the CNO Executive Board following program review in FY 1982.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,553	5,019	5,670	2,669	Continuing	Continuing
W0534	Tactical Reconnaissance System	3,553	5,019	5,670	2,669	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Intelligence Systems, Program Element 64511N; F/A-18 Squadrons, Program Element 24136N; Tactical Intelligence Processing Support, Program Element 25670N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Development Center, Warminster, PA; OTHERS: Naval Air Test Center, Patuxent River, MD; Naval Air Engineering Center, Lakehurst, NJ; Naval Weapons Center, China Lake, CA; CONTRACTORS: McDonnell Douglas Aircraft Co., St. Louis, MO; CAI, Barrington, IL; Fairchild Space and Electronics Co., Germantown, MD; Fairchild Weston Systems Co., Syosset, NY; Goodyear Aerospace Co., Litchfield Park, AZ; Howell Electro-Optics Center, Lexington, MA; Zeiss Avionics Systems, Inc., La Jolla, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

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Program Element: 63261N

Title: Tactical Air Reconnaissance

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W0534, Tactical Reconnaissance System

1. (U) DESCRIPTION: [

]

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The Engineering Test Bed approach for the development of the Navy's follow-on reconnaissance system was approved by the Chief of Naval Operations in FY 1982, and the detailed design of the system and procurement of the sensors and avionic equipment were initiated. A contract was let to McDonnell Douglas Aircraft Company for modifying an F/A-18 aircraft for use as the Engineering Test Bed, with the sensors housed in the gun bay, aft of the nose radar.

b. (U) FY 1983 Program: Acquire the optical and infrared sensors and related avionics to be utilized in the Engineering Test Bed. Design and fabricate the pallet on which the equipment will be mounted within the F/A-18 gun bay. Conduct laboratory tests of the equipment to verify performance parameters. Design and fabricate a sensor door to replace the gun bay door, and modify the gun bay to accommodate the sensor package. Initiate ground tests of the Engineering Test Bed system.

c. (U) FY 1984 Planned Program: Install sensors, related avionics and test instrumentation in the modified F/A-18 Engineering Test Bed. Carry out ground tests and preflight tests of the equipment, with the sensors installed in the aircraft gun bay. McDonnell Douglas Aircraft Company will conduct flight tests to demonstrate air worthiness of the overall system. Navy will conduct flight tests to determine the sensor performance parameters in the flight environment, within the performance capabilities of the Engineering Test Bed aircraft. Prepare the detailed specifications for the Full Scale Development aircraft, based on the results of the Engineering Test Bed phase. The increase in the FY 1984 estimate over the FY 1983 estimate is required for the Engineering Test Bed phase of the program.

d. (U) Program to Completion: Complete Full Scale Development of the reconnaissance version of the F/A-18. Conduct development and Operational Test and Evaluation. Initiate production of the RF/A-18. Prepare carriers to receive, interpret and employ real-time tactical intelligence. Produce and deploy the RF/A-18s with F/A-18 squadrons to the Navy and Marine Corps. This is a continuing program.

e. (U) Milestones

MILESTONE

DATE

1. Operational Requirement
2. Development Proposal
3. CNO Executive Board
4. Approval for Full Scale Development
5. Approval for Service Use
6. Initial Operational Capability

January 1977
September 1979
July 1982
FY 1985
FY 1988
FY 1990

FY 1984 RDT & E DESCRIPTIVE SUMMARY

Program Element: 63262N
DoD Mission Area: 238 - Other Naval Warfare

Title: Aircraft Survivability and Vulnerability
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,241	10,751	12,310	15,871	Continuing	Continuing
W0591	Aircraft Survivability, Vulnerability and Safety	2,869	2,927	1,605	1,963	Continuing	Continuing
W0592	Aircraft and Ordnance Safety	2,657	2,685	*	*	*	*
W1088	Joint Technical Coordinating Group on Aircraft Survivability	2,264	3,363	3,548	3,764	Continuing	Continuing
W1277	Aircraft Nuclear Survivability	451	1,104	2,958	4,864	7,124	17,719
W1718	Survivability Enhancement	0	672	4,199	5,280	Continuing	Continuing

* Project W0592 is combined with Project W0591 in FY 1984.

The above funding includes out-year escalation and encompasses all work or development now planned or anticipated through FY 1985 only for projects W0591, W1088 and W1718 through completion for project W1277.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: High aircraft and air crew loss rates in the Southeast Asia and Middle East wars clearly demonstrated the vulnerability of United States aircraft weapons systems to conventional nonnuclear threats. Current weapon systems are vulnerable to nuclear, chemical, biological, radiological, and high, medium, and low energy laser threats. Current events show the willingness of prospective enemy forces to use chemical warfare. Intelligence reveals a laser capability and the nuclear threat are known realities. Current funding for this program element is not adequate to properly consider these unconventional threats. This program does examine electromagnetic pulse effects on aeronautical weapons systems and methods of selecting and designing balanced suites of electromagnetic pulse vulnerability reduction features (Project W1277). The program also evaluates and reduces hazards to personnel and shipboard damage associated with ordnance and aircraft being exposed to shipboard fires (Project W0592). The aircraft combat survivability RDT&E projects under this program element are an integral part of the overall Naval Air Combat Survivability Program which includes specific weapon system survivability programs funded by Weapon System Program Managers. Weapon System Combat Survivability Programs have been established for all major United States Navy/Marine Corps combat aircraft. This program element develops prototype hardware and technologies required to improve the survivability of these aircraft through Operational Safety and Improvement Programs and other modification programs. The prototype hardware is applicable to more than one class of aircraft. This program element contributes to the total funding of the Joint Technical Coordinating Group on Aircraft Survivability program (Air Force PE 63244F and Army PE 63215A also contribute). Through the use of the Joint Survivability effort, high savings and cost avoidances have occurred. Aircraft survivability problems common to more than one service are addressed through Project W1088 funding profile while Navy/Marine Corps specific problems are addressed by the remaining projects.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this descriptive summary are as follows: An increase of 226 in FY 1982 is the result of program adjustments and revision of estimates including inflation. In FY 1983, the net decrease of 113 is comprised of a 585 decrease in W0592 from Navy's application of a general Congressional reduction, a 200 decrease in W1088 for reprogramming and the addition of 672 to establish project W1718. In the FY 1984 estimate there is a net decrease of 4,161. This decrease is the result of reducing the estimate for project W0591 by 4,816, canceling the estimated funding for project W0592, which is a reduction of 3,417, and adding 4,199 for project W1718 to the program element. Projects W0591 and W0592 efforts are continued in FY 1984 and will equally share the FY 1984 funding estimate shown for project W0591 due to the importance placed on reducing the fire/explosion hazard of aircraft carriers accomplished by project W0592. The FY 1984 decrease of 59 in project W1088 and 68 in

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability

W1277 are the result of adjustments during budget development. The increase of the estimate for project W1277 in the Additional to Completion and the Total Estimated Cost columns (9,753) is due to program delays caused by lack of funding in FY 1981 and FY 1982 and budgetary constraints.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		7,399	8,015	10,864	16,471	Continuing	Continuing
W0591	Aircraft Survivability and Vulnerability	1,953	2,569	2,927	6,421	Continuing	Continuing
W0592	Aircraft and Ordnance Safety	2,206*	2,717	3,270	3,417	Continuing	Continuing
W1088	Joint Technical Coordinating Group on Aircraft Survivability	2,022	2,364	3,563	3,607	Continuing	Continuing
W1277	Aircraft Nuclear Survivability	1,218	365	1,104	3,026	2,253	7,966

* Project W0592 was funded in PE 63514N (Shipboard Damage Control) in FY 1981 and prior years.

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Aircraft Nonnuclear Survivability, Program Element 63244F (United States Air Force share of Joint Technical Coordinating Group on Aircraft Survivability program); Joint Survivability Investigation, Program Element 63215A (United States Army share of Joint Technical Coordinating Group on Aircraft Survivability program). In addition, Project W0591 represents a well coordinated effort between the project office and all aircraft and ordnance development program offices, all advanced development aircraft and ordnance offices and the Naval Air Systems Command/Naval Sea Systems Command fire fighting communities.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA (lead lab); Naval Air Development Center, Warminster, PA; Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, Crane, IN; Naval Air Engineering Center, Lakehurst, NJ; Naval Surface Weapons Center, Silver Spring, MD; Naval Research Laboratory, Washington, DC; Naval Postgraduate School, Monterey, CA; Army, Air Force and NASA laboratories; Naval Weapons Evaluation Facility, Albuquerque, NM.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0591, Aircraft Survivability, Vulnerability and Safety: This project develops prototype hardware for incorporation of United States Navy/United States Marine Corps aircraft through Operational Safety Improvement Programs, Engineering Change Proposals and other modification programs in order to enhance the survivability of United States Navy/United States Marine Corps aircraft in a combat environment. Beginning in FY 1984, tasks to increase cook-off times of ordnance in carrier deck fires will be included due to combining projects W0591 and W0592. Previous accomplishments prior to FY 1982 include development of low infrared reflecting paint which has now been incorporated on all Marine Corps CH-46, CH-53, H-1 and OV-10 aircraft. Tactical paint schemes for reducing optical detection were also developed and implemented on the A-4 and F/A-18 aircraft.

(U) In FY 1982:

o Tactical paint schemes were developed for the A-6, EA-6, A-7, AV-8, F-4, F-14, F-3 and S-3 aircraft. These schemes are now being applied to all A-6, EA-6, A-7, F-4 and F-14 aircraft.

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability

(U) The FY 1983 program consists of:

- o Completing flight testing and obtaining approval to apply tactical paint schemes on the P-3, S-3 and SH-60B aircraft.
- o Continuing development of an on-board nitrogen inerting system and a jam resistant actuator.
- o Developing tactical paint schemes for Navy helicopters.
- o Completing development and flight testing of a structural coating to counter high energy lasers.
- o Completing development of a chemical, biological, radiological decontamination coating for aircraft external surfaces.
- o Developing low infrared reflective paints in desert colors.
- o Providing funding to initiate Project W171F in FY 1983.

(U) In FY 1984 it is planned to:

- o Complete development of an onboard nitrogen inerting system for incorporation in the CH-53 during FY 1985 through FY 1989 Operational Safety Improvement Program.
- o Incorporate tactical paint schemes on Navy Helicopters.
- o Incorporate low infrared reflective desert coatings on selected U.S. Marine Corps helicopters.
- o Provide chemical, biological and radiological decontamination coating to the Fleet.
- o Incorporate high energy laser protective coating on fleet aircraft.
- o Complete HARM cook-off improvement. (Effort transferred from project W0592.)

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

(U) Project W0592, Aircraft and Ordnance Safety: Investigations of past flight deck fires aboard the USS FORRESTAL (1967), the USS ENTERPRISE (1969) and more recently the USS NIMITZ (1981) have revealed that the major compounding factor of adequate flight deck damage control was ordnance and aircraft response to the fire environment (cook-off). This project identifies these hazards and applies technologies and techniques to reduce the hazards to required levels.

(U) In FY 1982, project completed:

- o Development of thermal protection for the SPARROW warhead and rocket motor.
- o The SHRIKE rocket motor and the MK-80 series fuze ejection device.

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability

- o Completed preliminary hazard analysis for the advanced light weight torpedo and submitted report to the project office.
- o Metal fire investigations were completed and documented.
- o An effective titanium engine fire extinguishant was identified, documented and released to the propulsion development offices.

(U) Milestones which will be accomplished in FY 1983 are:

- o Complete SPARROW cook-off improvement program.
- o Complete SHRIKE and SIDEWINDER cook-off time extension.
- o Complete venting technique design for conventional rocket loader cases.
- o Complete strip-laminated motor case design.
- o Complete deck fire characterization.
- o Complete metal fire extinguishant identification.

(U) In FY 1984 and out, all effort is transferred to project W0591.

(U) Project W1098, Joint Technical Coordinating Group on Aircraft Survivability: This project coordinates individual service programs to increase the survivability of aeronautical systems in a nonnuclear threat environment, implements efforts to complement the Services' survivability programs, and maintains close liaison with Service levels to ensure that all survivability research and development data and systems criteria are made available to the developers of aircraft. Joint Technical Coordinating Group on Aircraft Survivability programs have saved or avoided \$21,792,000 in calendar years 1981 and 1982 and will yield additional cost avoidances of \$15,700,000 over the budget plan. Joint Technical Coordinating Group on Aircraft Survivability funded technology was used to develop a filament wound survivable external fuel tank. Use of the resulting fuel tank prevented the loss of CH-53D helicopter following a crash landing in 1981. Had the helicopter been destroyed replacement cost would have been \$15,000,000.

(U) FY 1982 efforts included:

- o Developed design guidelines for location of fire sensors and agent distribution nozzles for the F-15 fire suppression system (F/A-18 Engineering Change Proposal pending).
- o Completed major segments of the Survivability Evaluation for the Multi-Application Core Engine program with resultant survivable guidelines.
- o Evaluated the thermal vulnerability of the Fly-by-Wire Flight Control.
- o Developed the U.S. Navy segment of the Joint Advanced Vertical Lift Aircraft survivability specification.

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability

- o Achieved advancement in state-of-the-art lightweight dry bay fire protection.
- (U) Principal milestones for FY 1983 are to:
 - o Produce dense dry bay fire protection concepts.
 - o Develop hydraulic ram tolerant fuel system components.
 - o Produce an engine damage model for Full Authority Digital Electronic Controller application.
 - o Initiate development of hardened composite fuel tanks against multi-fragment threats.
 - o Conduct structural tests against high energy lasers.
 - o Conduct high speed impact characterization of composite materials; incorporate advanced naval gun threats in existing simulation models.
 - o Determine susceptibility of aircraft at low altitudes in a countermeasures environment.
 - o Evaluate the penetration probability of aircraft through anti-air threats in the high speed/low altitude scenario; conduct an electro-optical countermeasure/counter-countermeasures survey to determine effects of medium and low energy lasers on fire control systems.
- (U) In FY 1984 the Joint Technical Coordinating Group on Aircraft Survivability will:
 - o Continue research and development efforts to develop dense dry bay fire protection concepts, survivable high temperature resistant adhesives for composite materials.
 - o Determine the influence of oxygen in composite resins, contribute to the evaluation of survivability for advanced CORE engines.
 - o Evaluate the effects of high energy laser threats to composite/metallic joints and other structural areas.
 - o Develop high energy laser damage tolerant structural concepts.
 - o Develop fuel tank hardening of composite materials against the multiple fragment threat, simulate Naval Surface-to-Air missile threats.
 - o Develop a methodology for simulation of the long range air-to-air threat.
 - o Characterize Soviet non-nuclear Naval threat terminal effects, assess low, medium, and high energy laser vulnerability.
 - o Update survivability assessment models for electronic countermeasures.

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability

- o Accomplish other projects which have been reviewed and approved by each subgroup/committee and the Joint Technical Coordinating Group on Aircraft Survivability principal members from each Service (Army Material Development and Readiness Command Headquarters, Naval Material Commands Air Force Systems Command, Air Force Logistics Command).

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

(U) Project W1277, Aircraft Nuclear Survivability (Electromagnetic Pulse): Project Fleet Aircraft Assessment for Navy Testing and Analysis for Electromagnetic Pulse Limitations will define the vulnerability of selected Naval tactical aircraft to nuclear electromagnetic pulse in response to requirements set forth by Commander in Chief, U. S. Naval Forces, Europe, and Commander in Chief, U. S. Atlantic Fleet. There is currently no other Navy program to assess the vulnerability of Naval tactical aircraft to nuclear electromagnetic pulse.

(U) FY 1982 efforts included:

- o On-site testing of an F-14A aircraft (suspended in February 1982 due to reduction of funds).

(U) FY 1983 efforts will include:

- o Completion of post-test assessments of the A-7E (tested in FY 1981) and the F-14.
- o Pretest analysis and pretest preparations for the F/A-18 test.

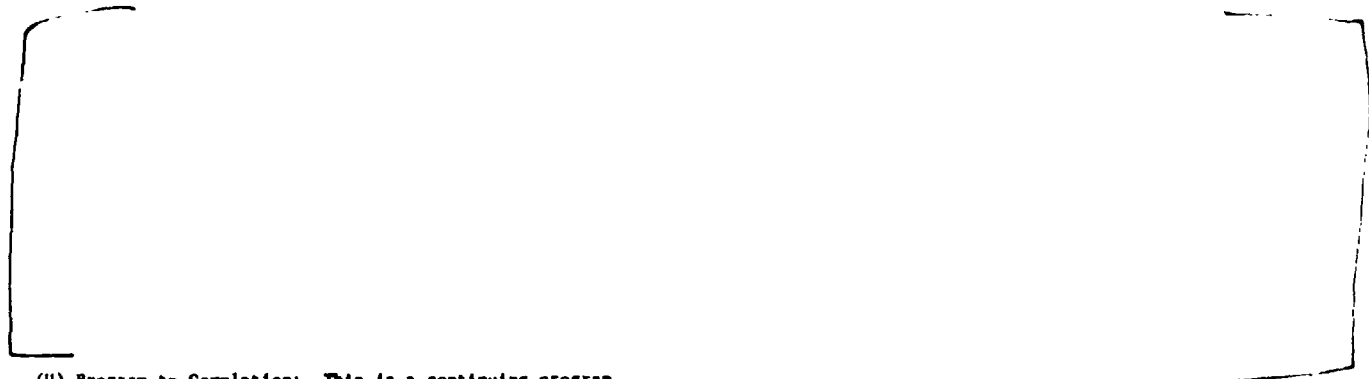
(U) FY 1984 goals include:

- o Completion of F/A-18 program (on-site test, direct drive test, and post test assessment).
- o Analytical assessment of F-14 AWG-9/PHOENIX Weapon Replaceable Assemblies not tested in FY 1982 due to lack of funding.

Although additional aircraft are obvious candidates for follow-on testing, completion of F/A-18 will complete the program as it is currently funded.

Program Element: 63262N

Title: Aircraft Survivability and Vulnerability



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

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63267N

DoD Mission Area: 344 - Tactical Command and Control

Title: Combat Identification System

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,488	6,694	7,019	8,848	36,442	63,991
W1253	Combat Identification System	2,488	6,694	7,019	8,848	36,442	63,991

The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This project is a Tri-Service program, USAF lead, to develop a common advanced identification Friend, Foe or Neutral system. The Navy has the only in-house laboratory capability of the three services and is therefore, a key participant. Promising new identification techniques will be investigated and unique Navy requirements for aircraft, ships, submarines, and shore stations will be determined. This project funds the Navy unique portion of the new cooperative identification system and also provides funds to the Air Force for common item development.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary is an increase of 350 in FY 1984 because of Department of Defense decisions to increase all the services' Combat Identification System program elements.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,500	2,488	6,694	6,669	Continuing	Continuing
W1253	NATO Future Identification System	2,500	2,488	6,694	6,669	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable

F. (U) RELATED ACTIVITIES: An exploratory development program under PE 62712N, Surface/Aerospace Target Surveillance Technology, to explore identification techniques other than transponders has been initiated. Support for identification of non-cooperative targets will be provided by efforts under PE 63515N, Advanced Identification Techniques. Navy shipboard and airborne technical inputs for the engineering development of a new identification system will be provided under PE 64211N, Project W0454, MK XII Identification Friend or Foe.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Ocean Systems Center, San Diego, CA, and Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Contractors will be competitively selected in March 1983.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1253, Combat Identification System: This project provides funds to the Air Force (lead service) for the design and development of the new NATO compatible, common item, Identification Friend or Foe system to replace the present MK XII. It provides for design, development analysis and test of Navy unique items required by ships, submarines, Navy aircraft, and shore stations.

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Program Element: 63267N

Title: Combat Identification System

(U) In FY 1982, development continued on technical approaches, waveform design (in conjunction with NATO, U.S. Army and Air Force). Detailed cost analyses were conducted along with ship and aircraft integration studies and logistic support and hardware demonstrations.

(U) The FY 1983 program consists of:

- o Tri-Service coordination in evaluation of contractors designs
- o Continue cost analysis
- o Test and evaluation and logistic support planning
- o Continuing ship and other Navy-unique integration studies

(U) The FY 1984 program consists of:

- o Continuing Tri-Service evaluation of contractor designs
- o Continuing cost analysis
- o Testing and evaluation of hardware from the contractors

(U) Program to completion consists of:

- o Continue Tri-Service evaluation of contractor demonstration/validation designs
- o Continue cost analysis
- o Test contractors' designs
- o Select design(s) for full-scale development
- o Commence full scale development.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63313N
DoD Mission Area: 223 - Close Air Support and Interdiction

Title: Imaging Infrared Maverick
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,200	1,000	19,620	7,771	6,318	52,332
W0302	Imaging Infrared Maverick	0*	0	17,663	7,771	6,318	31,757***
	Quantity			(DT&E/OPEVAL)			(11)
W0874	Laser Maverick	1,993	1,000	1,952	0	0	12,368
	Quantity	(OT&E)		(OT&E)			(27)
W1415	Hellfire	8,207	0**	0	0	0	8,207

* 10,400 provided to USAF Maverick program (Program Element 646C87)

** Funding transferred to Program Element 64371N after FY 1982.

*** Excludes 23,000 provided to USAF for USN unique requirements (FY 1982 and prior)

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Imaging Infrared Maverick and Laser Maverick provide the Navy and Marine Corps with precision guided short range, line of sight, day-night missiles for close air support, interdiction and strike missions against land and sea targets. These missiles capitalize on the standoff targeting offered by aircraft Forward Looking Infrared and Angle Rate Bombing System acquisition systems thus improving aircraft survivability in the high threat terminal defense environment. The Hellfire missile will significantly enhance the anti-armor capability of Marine Corps attack helicopters and increase survivability with the addition of laser homing. Fire-and-forget weapons.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY 1983: Imaging Infrared Maverick, W0302, was reduced to zero by Congressional action. The FY 1984 request was increased by 15,593 to procure missiles for a second phase operational test program, operational test (OT-IIB). Laser Maverick, W0874, was increased in FY 1982 by 993 to initiate the fuse improvement program. In FY 1983, 1,000 was added to complete the fuse improvement program and fund in-house support. In FY 1984, 1,952 was added to conduct the second phase operational test program, OT-IIB, to test the first production missiles with the improved fuse. Hellfire, W1415, was reduced in FY 1982 by 301 to provide partial source of reprogrammed funds to Project W0874, Laser Maverick.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,473	9,508	4,992	2,075	14,270	TBD
W0302	Imaging Infrared Maverick	0*	0**	4,992	2,075	14,270	24,367***
	Quantity				(OT&E)		(8)
W0874	Laser Maverick	4,473	1,000	0	0	TBD	TBD
	Quantity		(OT&E)		(OT&E)		(27)
W1415	Hellfire	0	8,508	0****	0	0	8,508

Program Element: 63313M

Title: Imaging Infrared Maverick

- * 6,700 provided to USAF Maverick program (Program Element 64608F)
- ** 10,400 provided to USAF Maverick program (Program Element 64608F)
- *** Excludes 23,100 provided to USAF for Navy unique requirements
- **** Funding transferred to Program Element 64371N after FY 1992.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	<u>FY 1982</u> <u>Actual</u>	<u>FY 1983</u> <u>Estimate</u>	<u>FY 1984</u> <u>Estimate</u>	<u>FY 1985</u> <u>Estimate</u>	<u>Additional</u> <u>to</u> <u>Completion</u>	<u>Total</u> <u>Estimated</u> <u>Cost</u>
WPN Laser Maverick	5,000	31,700	46,800	71,300	825,400	980,200
(Quantity)	(0)	(12)	(165)	(185)	(5,019)	(5,381)
WPN Imaging Infrared Maverick	0	0	0	30,800	614,200	645,000
(Quantity)	(0)	(0)	(0)	(100)	(5,420)	(5,520)
WPN Hellfire		0	17,300	21,200	419,600	458,100
(Quantity)		(0)	(219)	(314)	(10,606)	(11,139)

F. (U) RELATED ACTIVITIES: Imaging Infrared Maverick/Laser Maverick (W0302): The Air Force has been designated lead development service with the Navy and Marine Corps assigned as participating services. USAF Program Element 64608F (Close Air Support Weapons System), Hellfire (W1415): The U.S. Army is lead development service for the missile which is the primary weapons system for the Army Advanced Attack Helicopter. Program Element 64310A, Project 074; Heliborne Missile - Hellfire).

G. (U) WORK PERFORMED BY: Imaging Infrared Maverick (W0302): IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Avionics Center, Indianapolis IN. CONTRACTORS: Hughes Aircraft Co., Canoga Park, CA. Laser Maverick (W0874): IN-HOUSE: Naval Weapons Center, China Lake, CA. CONTRACTORS: Hughes Aircraft Company, Canoga Park, CA. Hellfire (W1415): IN-HOUSE: Naval Weapons Center, China Lake, CA. CONTRACTORS: Rockwell International, Columbus, OH.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0874, Laser Maverick: The project provides for conducting a second phase of operational testing, OT-IIB, with first production missiles and the improved fuze. Successful completion of OT-IIB will result in full rate production go ahead.

(U) In FY 1982, OT-IIA was successfully completed which resulted in approval for limited production. A long lead/production start-up contract was awarded in September 1982.

(U) The FY 1983 program consists of:

- o Obtaining Approval for Limited Production.
- o Awarding initial production contract.

(U) For FY 1984:

- o Conduct OT-IIB with initial production missiles.
- o Award FY 1984 production contract.

Program Element: 63313N

Title: Imaging Infrared Maverick

(U) The FY 1984 funding will complete development of the Laser Maverick, AGM-65E, and result in Approval for Full Production.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W0302, Imaging Infrared Maverick

1. (U) DESCRIPTION: W0302, Imaging Infrared Maverick: Will integrate existing missile components to provide the Navy with a Forward-Looking Imaging Infrared, short-range direct-fire missile. It will be used with the A-6E Target Recognition Attack Multi-sensor, F/A-18 and A-7E Forward-Looking Infrared, and AV-8B Angle Rate Bombing System equipped aircraft. The Imaging Infrared Maverick will fill the need for a complementary, moderate cost system that will capitalize on the standoff that these acquisition systems offer. It will utilize modifications to the USAF Imaging Infrared Maverick including the Laser Maverick 300 pound alternate warhead and out-of-line igniter. This weapon will give the Navy/Marine Corps a first pass, day/night, low altitude delivery capability for sea control and interdiction missions. The Imaging Infrared Maverick with the 300 pound warhead will provide wide target spectrum coverage for war-at-sea, interdiction and close air support missions.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Monitored Air Force effort. Developed unique Navy/Marine Corps Test and Evaluation requirements. Defined Navy Imaging Infrared Maverick specification. Awarded full scale engineering development contract to Hughes. Continued development of software modifications to optimize for ship tracking. Conducted captive seeker flights against various classes of ships under both day and night conditions.

b. (U) FY 1983 Program: The reduction to zero results in following restructured program. Continue evaluation of seeker modification for ship tracking. Initiate a three missile DT&E program.

c. (U) FY 1984 Planned Program: Complete three missile DT&E program. Conduct 8 missile operational test program, Of-IIA. Procure additional missiles for operational test, OT-IIIB. Initiate A6-E TRAM integration (will be completed in later years under Program Element 24134N/W1638, A-6E Weapons Integration Project).

d. (U) Program to Completion: Conduct OT-IIIB. Initiate first USN missile production buy. Initiate Pre-Planned Product Improvement efforts for larger detachable wings to improve carrier storage density and improve standoff range.

e. (U) Milestones

MILESTONE

1. Full Scale Engineering Development
2. Developmental Test and Evaluation Test Firings
3. OT-IIIA
4. Approval for Limited Production
5. OT-IIIB
6. Approval for Full Production

DATE

May 1982
March/April 1983
May 1984 - September 1984
January 1985
July 1985 - December 1985
February 1986

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63315N
DoD Mission Area: 235 - Naval Warfare Support

Title: Retract Yellow
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOT.L FOR PROGRAM ELEMENT	3,060	0	8,001	22,549	Continuing	Continuing
R1764	Retract Yellow	3,060	0	8,001	22,549	Continuing	Continuing

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63318N
DoD Mission Area: 231 - Anti-Air Warfare

Title: Army/Navy Surface-to-Air Missile Technology
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,930	14,169	10,174	12,560	Continuing	Continuing
S0186	Army/Navy Surface-to-Air Missile Technology	10,930	14,169	10,174	12,560	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops technology for Army, Navy, and Marine Corps surface-to-air, area defense missile systems. A Joint Service Committee selects projects for advanced prototyping demonstration on the basis of mission priority needs. These projects provide recommendations for new subsystem inclusion in missile system developments, including, where appropriate, use of common subsystems by Army, Navy and Marine Corps. The only current project is the Multimode Guidance Project. Its purpose is to demonstrate the capability of area defense and long-range missile guidance systems to destroy air targets in multi-target, heavy countermeasures environment and to provide greater firepower through missile terminal guidance autonomy.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: an FY 1982 decrease of \$1,070 is due to a Navy decision to reprogram this amount to several other weapon programs with more urgent FY 1982 priority and an FY 1984 decrease of 2,669 is the result of the Navy's restructure of the Multimode Guidance Project which moves the end date from end of FY 1986 to end of FY 1988. This results in reduced funding requirements in FY 1983 and FY 1984. The Multimode Guidance Project schedule restructure results from the Navy's: (a) adjustment of near-term RDT&E priorities; (b) decision to tie the project's near-term effort more closely to the anti-air warfare system development decision process; and (c) decision to maintain a competitive two-contractor approach to multimode guidance design throughout the life of the project.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,216	13,218*	14,169	12,843	Continuing	Continuing
S0186	Army/Navy Surface-to-Air Missile Technology	5,216	13,218*	14,169	12,843	Continuing	Continuing

* The actual amount funded will be \$12,000. \$1,218 was erroneously placed in this project and has been transferred to 64221N, P-3 Modernization Program.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Standard Missile Improvements, Program Element, 64366N.

Program Element: 63318N

Title: Army/Navy Surface-to-Air Missile Technology

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory for Multimode Guidance Project - Naval Weapons Center, China Lake, CA. OTHERS: Naval Surface Weapons Center, Dahlgren, VA; Pacific Missile Test Center, Point Mugu, CA. CONTRACTORS: General Dynamics Corporation, Pomona Division, Pomona, CA. and Hughes Aircraft Company, Missile Systems Group, Canoga Park, CA. OTHERS: John Hopkins University/Applied Physics Laboratory, Laurel, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project S0186, Army/Navy Surface-to-Air Missile Technology: Multimode Guidance Project

1. (U) DESCRIPTION (Requirement and Project): Missile system guidance has been established as a major technological issue in the development of improved tactical anti-air warfare missile capability. The Multimode Guidance Project will develop, test, and evaluate advanced prototyping multimode guidance hardware units to demonstrate a tactical capability to destroy enemy aircraft and missiles attacking U.S. surface forces in multi-target, heavy electronic countermeasures situations. The result will be improved missile guidance technology and the hardware test data needed to answer such critical anti-air warfare issues as minimum performance requirements for long-range anti-air targeting systems and adequacies of technologies (active and passive Radio Frequency, infrared, data and signal processing) to solve air defense problems in heavy Electronic Countermeasures.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The two multimode guidance design contractors, General Dynamics, Pomona Division, and Hughes Aircraft Company, Missile Systems Group, continued component and subsystem tests to validate the soundness of their high-risk design approaches. Tests showed success in combining multiband Radio Frequency capability onto a single antenna global system. High voltage power supplies and high power amplifiers have been proven adequate to the needs of multimode guidance seeker requirements.

b. (U) FY 1983 Program: In the January-September period, both contractors will complete their baseline multimode guidance design. General Dynamics will conduct fly-over tests of an early breadboard of their multimode design. Hughes Aircraft Company will conduct tests to confirm an alternate approach to design of their active Radio Frequency seeker. Both contractors will assess the impact of higher missile speeds upon their basic multimode guidance designs. New contracts will be awarded to General Dynamics and Hughes Aircraft Company for the final phase, Concept Feasibility Demonstration, of the Multimode Guidance Project.

c. (U) FY 1984 Planned Program: Both contractors will begin fabrication of advanced prototyping brassboard multimode guidance units. Special test equipment for testing these units will be built or otherwise acquired by contractors and by the Government test and evaluation team. A Government and Applied Physics laboratory test and evaluation support plan will be written.

d. (U) Program to Completion: The two multimode guidance design contractors will complete fabrication, check-out, and integration of their brassboard multimode guidance units and related test equipment. The Government/Applied Physics laboratory test and evaluation team will complete test planning and preparations. The multimode guidance units will be delivered to the Government evaluation team, who, with design contractor support, will test the brassboard units in anechoic chamber, fly-over tests and captive flight tests. Final reports will be written by contractors. The Government final report will provide unbiased evaluation of both contractors multimode guidance design strengths and weaknesses under various operational conditions, emphasizing effectiveness under heavy countermeasures.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63367N

Title: Submarine Anti-Submarine Warfare Standoff Weapon

DoD Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	35,368	20,217	27,985	63,413	466,832	639,842 1/
S0883	Submarine ASW Standoff Weapon	0	0	27,985	63,413	466,832	584,257 1/
S1669	Common ASW Standoff Weapon (Quantity - Engineering Development Models Operational Evaluation Models)	35,368	20,217	0	0	0 (DT&E/OT&E) (DT&E/OT&E)	51,585 (25) (12)

1/ Includes \$26,027 in project S0883 in FY 1980 and FY 1981

The above funding, includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The lack of an effective attack and kill capability against the projected threat at ranges that match our projected detection capability is a serious deficiency in ASW planning. At present, submarine kill capability has matched submarine ASW targeting capability through employment of two weapons: Torpedo MK 48 at short to intermediate ranges and Submarine Rocket at standoff ranges. Current plans provide for the retirement of Submarine Rocket because it will be obsolete and unsupportable. Projected improvements in Soviet submarine localization and targeting, coupled with their existing long range weapons and higher speed submarines, demand a new submarine-launched ASW Standoff Weapon capability. The Submarine ASW Standoff Weapon Program is intended to correct these deficiencies by developing a long-range quick reaction anti-submarine weapon which is compatible with submarine sensor capabilities.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The difference between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Funding decreases of 4,210 in FY 1982, 21,782 in FY 1983 (Comprised of a 1,999 specific Congressional reduction, an 83 general Congressional reduction and a 19,700 Navy decision), 30,182 in FY 1984 and 185,584 to the completion of the program. The program was reviewed and restructured in March 1982 by termination of the surface version and reversion to a submarine only ASW Standoff weapon program. Project S1669 will terminate at the end of FY 1983 and project S0883 will be reinstated. The total cost of project S1669, at its termination is shown. Due to the restructuring and improved cost effectiveness of the submarine ASW Standoff Weapon RDT&E program, the total estimate cost has been reduced by approximately 185,584. Estimates of the required quantities of engineering development models and operational evaluation models associated with the planned Full Scale Development phase are shown.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	19,027	39,578	41,999	58,167	715,829	881,600 1/
S0883	Submarine ASW Standoff Weapon	19,027	0	0	0	0	26,027
S1669	Common ASW Standoff Weapon (Quantity - Advanced Development Models Engineering Development Models Operational Evaluation Models)	0	39,578 (DT&E/OT&E)	41,999	58,167	715,829 (DT&E/OT&E) (DT&E/OT&E)	855,573 (7) (18) (60)

1/ Includes 7,000 thousand in Project S0883 in FY 1980

Program Element: 63367N

Title: Submarine Anti-Submarine Warfare Standoff Weapon

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: The Advanced Lightweight Torpedo being developed under Program Element 63610N is under consideration as a possible payload for the ASW Standoff Weapon. When the ASW Standoff Weapon is introduced to the fleet in 1990, the only other submarine-launched ASW weapon will be the MK-48 Advanced Capabilities torpedo, currently under development in Program Elements 63691N and 64675N. Long-range targeting in support of the ASW Standoff Weapon is under development in a number of programs including Program Element 63590N (Wide Aperture Array (Advanced)) for submarines and Program Element 64713N (AN/SQR-19 Tactical Towed Array Sonar) for surface ships.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, Newport, RI (lead technical activity - systems integration); Naval Weapons Center, China Lake, CA (lead technical activity - missile); Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Ocean Systems Center, San Diego, CA; Naval Ordnance Station, Indian Head, MD. CONTRACTOR: Boeing Aerospace Company, Seattle, WA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not Applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S0883, Submarine ASW Standoff Weapon:

1. (U) DESCRIPTION (Requirement and Project): The improvements projected in Soviet Submarine post-1990 performance

[coupled with the projected phase-out from the Fleet of the existing Submarine Rocket weapon system] necessitate having an ASW Standoff Weapon available as a replacement. The system will be a primary ASW weapon of the submarine platform. It is anticipated that the ASW Standoff Weapon will be configured to deliver two payloads; a tactical nuclear depth bomb and a conventional lightweight torpedo. A Concept Formulation Study Phase culminated four Demonstration and Validation Phase proposals. Selection of a single contractor for entry into the Development/Validation Phase was considered to be most appropriate from a Navy standpoint and a sustaining engineering contract was awarded to Boeing Aerospace Company in April 1981. Changes in ASW Standoff Weapon Program direction during FY 1982 caused several extensions of the sustaining engineering contract with Boeing Aerospace Company until satisfactory completion of Defense Systems Acquisition Review Council I in December 1983. The Development and Validation Phase will include test demonstrations to verify that the prime and critical subsystems of the chosen ASW Standoff Weapon system concept will (1) satisfy the ASW Standoff Weapon Mission Element Need Statement requirements, (2) be technically sound, and (3) meet the performance requirements of the Government-approved System Specification.

(U) In addition to the development and testing to be conducted during the Demonstration and Validation Phase, the contractor will develop and submit a proposal for the Full Scale Development Phase.

(U) Evaluation of the results of the Demonstration and Validation Phase will provide a basis for transition into the Full Scale Development Phase.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

u. (U) FY 1982 Program: In October 1981, the ASW Standoff Weapon Program was redirected to include surface combatant capability and inclusion of the MK 46 MOD 5 torpedo as a surface variant payload. In March 1982, a CNO Executive Board review restructured the program to delete surface commonality and the MK 46 torpedo requirements. The program has proceeded through a Department of the Navy Systems Acquisition Review Council I on September 8, 1982.

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Title: Submarine Anti-Submarine Warfare Standoff Weapon

b. (U) FY 1983 Program: Conducted successful Defense Systems Acquisition Review Council I on December 8, 1982. Award a Demonstration and Validation Phase contract in March 1983. Follow-on efforts are to perform studies of missile airframe, propulsion, guidance and control retardation system, pyrotechnic devices, capsule and subsystem technologies applicable to the ASW Standoff Weapon. Perform system and subsystem analysis modeling and simulation to verify predicted missile system performance characteristics. Monitor and provide detailed analyses of contractor efforts in Integrated Logistic Support, Reliability and Maintainability Quality Assurance, Safety, and producibility. Maintain currency of baseline weapon specifications and system specification. Monitor contractor's efforts in the design and development of missile subsystem software. Perform technical review of missile subsystem software. Perform technical review, analysis and evaluation of missile and associate support equipment software.

c. (U) FY 1984 Planned Program: Complete floating launch tests to verify complete transition of the missile from capsule float up to flight; conduct and complete deep launch tests to verify surface broach requirements including pyrotechnic devices; conduct system Preliminary Design Review in preparation of invoking class I specification control. Continue incremental funding of the Demonstration and Validation contract with Boeing Aerospace Company and continue incremental funding of systems engineering and technical services contract with Advanced Technology, Inc. The increase in funds between FY 1983 and FY 1984 is due to increased Demonstration and Validation effort.

d. (U) Program to Completion: Conduct Defense Systems Acquisition Review Council II, and award a Full Scale Development contract. Conduct Contractor Test Evaluation flights during this phase leading to a Department of the Navy Systems Acquisition Review Council IIIA. After successful development test/operational test firings by Commander, Operational Test and Evaluation Force, conduct Technical and Operational Evaluation of the ASW Standoff Weapon. Then, initiate pilot production of 15 test units, start procurement of long lead items for production, and award first production buy of 176 units.

e. (U) Milestones:

Milestone	Date
1. Initiate Advanced Development Program	Oct 1979
2. Complete Concept Formulation (Defense Systems Acquisition Review Council Milestone I)	Dec 1982
3. Complete Demonstration and Validation (Defense Systems Acquisition Review Council Milestone II)	Mar 1985
4. Defense Systems Acquisition Review Council Milestone IIIA	Jan 1988
5. Start Technical Evaluation	(Apr 1985)* Nov 1987
6. Pilot Production Decision	Jan 1988
7. Start Operational Evaluation	(Nov 1987)* Apr 1988
8. Approval For Service Use	(Sep 1989)* Nov 1988
9. Department of the Navy Systems Acquisition Review Council IIIB	(Oct 1988)* Dec 1988
10. Production Decision	Mar 1989

* Dates shown in FY 1983 Descriptive Summary. Milestone rescheduling due to program restructuring.

J. (U) TEST AND EVALUATION

1. (U) Development Test and Evaluation

a. (U) The Naval Sea Systems Command will direct Boeing Aerospace Company's planning for and conduct of Demonstration and Validation Phase testing (Development Test I) and Full Scale Development Phase testing (Development Test IIA). The Naval Sea Systems Command will jointly plan and conduct combined Development Test/Operational Test flight tests with Commander, Operational Test and Evaluation Force prior to Department of the Navy Systems Acquisition Review Council IIIA and will also plan and conduct Technical Evaluation (Development Test IIB). Production Acceptance Test and Evaluation will begin after production is initiated.

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Title: Submarine Anti-Submarine Warfare Standoff Weapon

Additional development testing (Development Test III) will be utilized to verify the effectiveness of the Advanced Lightweight Torpedo Payload Preplanned Product Improvement and the correction of deficiencies found in earlier testing. As Technical Direction Agent, the Naval Underwater Systems Center will chair the Test and Evaluation Working Group while the Naval Weapons Center, China Lake, will serve as test and evaluation coordinator for the Demonstration and Validation Phase. The Naval Ocean Systems Center and the Naval Surface Weapons Center will provide test and evaluation planning and facilities support. Critical issues which will be addressed during all phases of Test and Evaluation (both development and operational tests) include: weapon effectiveness, suitability and target localization.

b. (U) Development Test and Evaluation to Date (During Demonstration and Validation Transition): Material specimen testing has provided preliminary data on the leak and corrosion resistance and mechanical properties of the composite submarine capsule material as well as the energy absorption efficiency of the capsule shock isolation material and the fiber strength of the KEVLAR rocket motor case. Several series of full scale hydrostatic tests have been performed on the composite submarine capsule to verify analytical predictions. Scale model hydrodynamic tow tank tests and full scale tests of a steel capsule launched from the Hydraulic Torpedo Tube Launcher at dockside in San Diego and at San Clemente Island have provided initial hydrodynamic data for the selection of the capsule tail configuration and for the collection of data on the launch environment and the verification of initial underwater trajectory predictions. Two series of subscale gas dynamic tests, in air and submerged, have provided initial data on the missile/submarine separation event for: capsule blowout port design, insulation requirements, tipoff rates, timing sequences, and missile/capsule dynamics. Wind tunnel tests have provided initial aerodynamic data for flight vehicle design and control fin sizing (single body testing) as well as for the booster and payload/interstage separation event (two body testing). Inertial Measurement Unit acceptance testing is in progress. Hydroburst tests have been performed on the composite rocket motor case to verify analytic predictions.

c. (U) Future Development Test and Evaluation:

(1) (U) Demonstration and Validation phase (FY 1983 through FY 1985) will be structured to support the Full-Scale Development decision (Milestone II) through risk minimization by component, subsystem and partial system testing. Missile system performance will be evaluated through the utilization of computer and hardware-in-the-loop simulations validated by the aforementioned testing. Testing will be conducted in contractor, Department of Energy or Navy laboratories and on Navy ranges.

(a) (U) A series of rocket motor case tests and an eight-rocket rocket motor static test firing program will support the rocket motor development effort. Additional static and hydrodynamic pressure tests as well as limited qualification testing will support capsule development. Guidance and control hardware and software testing will initially be performed independently using computer-aided simulation/stimulation. This will be followed by integration testing in which hardware is incrementally substituted for software simulations of the hardware interfaces until overall guidance and control system testing, including both hardware and software can be performed. Guidance and control system laboratory tests will verify end-to-end performance of the alignment algorithms and limited verification of navigation performance. Parametric fin flutter testing and actuator development testing will be performed to confirm analytic predictions and configuration selection. Department of Energy laboratories will perform both subscale and full-scale decelerator development and payload water entry tests.

(b) (U) Data for each critical phase of the flight profile will be obtained. Launch of a composite capsule from the Hydraulic Torpedo Tube Launcher at both intermediate and maximum depths and launch of a dummy instrumented capsule from an attack submarine at intermediate and maximum launch speeds will provide additional hydrodynamic data on the launch to broach phase. Additional data on the missile/capsule separation phase will be obtained from laboratory measurement of the frictional forces encountered in missile egress and from full-scale launch of a missile from a tethered, floating capsule. Flight phase data will be obtained from flow-on wind tunnel testing and from a missile model survey which will determine missile system dynamic response, bending modes, and frequencies. The missile/payload separation environment will be measured during interstage pyrotechnic shock tests. Payload separation, deceleration, and water entry phase data will be obtained from subsystem level testing described in (a) above.

Program Element: 63367N

Title: Submarine Anti-submarine Warfare Standoff Weapon

(c) (U) Storage and attack submarine platform compatibility will be verified through a tender handling demonstration and an attack submarine strikedown, handling, loading, and launching demonstration. Compatibility with the submarine fire control system will be verified in the Boeing laboratory by demonstration of the Guidance Electronics Unit interface with FCS MK 117 simulator.

(d) (U) Missile system performance will be evaluated through the use of computer simulations and Operational Mockup flydowns which will utilize actual Guidance Electronic Unit, Inertial Measurement Unit, and fin actuator hardware integrated into a six degree of freedom missile simulation. The simulation (space position, roll, pitch and yaw) will incorporate launch dynamics, underwater transit, broach, boost, aerodynamics, thermal, and shock effects. The Inertial Measurement Unit will be mounted on three axis CARCO table-to-model missile body dynamics. These flydowns will help determine the interactive effects of the subsystems operating together in a dynamic environment and will provide missile performance data to include range, time of flight, and accuracy. The models will be validated by subsystem and performance testing previously described.

(2) (U) Full-Scale Development Phase (FY 1985 through FY 1988), Development Test IIA will be structured to support the Milestone IIIA decision. Initial testing will emphasize the payload separation and deployment events as well as flight and transportation environmental and qualification testing. Subsequent testing will demonstrate system integrity and conformance to the system specification. Eleven contractor flight tests will be conducted from various launch equipment: pad, Hydraulic Torpedo Tube Launcher, and SSN. Five combined Development Test/Operational Test Flights will be jointly planned and conducted with Commander, Operational Test and Evaluation Force to provide early operational data in support of the Department of the Navy Systems Acquisition Review Council IIIA decision for long lead material release and initiation of pilot production.

(3) (U) Technical Evaluation (FY 1988), Development Test IIB, will be structured to support production and deployment decisions (Milestone IIIB) and will include the following objectives: development of sufficient data for certification of Equipment Readiness for Operational Evaluation; verification that the ASW Standoff Weapon meets specification threshold requirements; evaluation of the capability of the entire system (including launch platform) to perform its mission from detection to target kill; development of sufficient data to support Milestone III decisions and Approval for Service Use; verification of the capability of ancillary equipment as well as operating and maintenance documentation support system operations; and verification that training plans and the personnel who will operate and maintain the system during Operational Evaluation are adequate. During Technical Evaluation, eight RDT&E production missiles, prepared using associated maintenance/test equipment and procedures, will be loaded out on the test platform. Firings will be conducted throughout the projected operational range of the weapon.

(4) (U) Post-Milestone III testing, Development Test III, will utilize pilot production hardware to verify the effectiveness of the Advanced Lightweight Torpedo Payload Preplanned Product Improvement (P3I) and correction of any design deficiencies discovered during Technical Evaluation, Operational Evaluation, Follow-on Test and Evaluation, or fleet employment.

(5) (U) Production Acceptance Test and Evaluation will be initiated after production start-up and will include piece part testing, preproduction and periodic testing, factory acceptance testing, and reliability testing. Production Acceptance Test and Evaluation will demonstrate that weapon systems/components meet contract specification and requirements.

2. (U) Operational Test and Evaluation

a. (U) Commander, Operational Test and Evaluation Force will provide for independent assessment of operational system aspects during Operational Test-I, when possible. During Operational Test-IIA, Commander, Operational Test and Evaluation Force will ensure that planning will provide for all operational aspects possible during combined developmental/operational flight tests and independently assess those operational aspects. Commander, Operational Test and Evaluation Force will independently plan and conduct Operational Test-IIB (operational evaluation).

b. (U) Operational Test and Evaluation to date: None.

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c. (U) Future Operational Test and Evaluation:

(1) (U) Operational Test-I objectives are to provide an early estimate of operational effectiveness and operational suitability, initiate tactics development, estimate program progress, and identify operational issues for Operational Test-II in support of the decision to proceed with Full-Scale Development. However, due to the lack of flight tests and incomplete component/subsystem testing, no estimate of operational effectiveness and operational suitability is possible as a result of Operational Test-I testing. Operational Test-I testing is limited to the observation of the component testing conducted by the contractor.

(2) (U) Operational Test-IIA testing will support initiation of pilot production and procurement of long-lead items for production. OT-IIA objectives are to estimate operational effectiveness and operational suitability, continue tactics development, estimate program progress, and identify operational issues for Operational Test-IIB. Operational Test-IIA testing will include monitoring of remaining component/subsystem testing, contractor test firings, the first several technical evaluation firings, and five combined developmental/operational flight tests. Additional testing may be conducted to resolve issues concerning the detection, classification, and localization of targets at standoff ranges.

(3) (U) Successful completion of Operational Test-IIB will support a recommendation for Approval for Service Use and production. Test results will be provided to Department of the Navy Systems Acquisition Review Council IIB. The objectives of Operational Test-IIB are determination of operational effectiveness and operational suitability and valuation/continuation of tactics development. Operational Test-II will include the completion of developmental testing through technical evaluation and at least 12 Operational Evaluation missile firings. Both the operational evaluation flights and combined developmental/operational test firings will be required to determine reliability with a reasonable degree of confidence.

(4) (U) Operational Test-III is Follow-on Operational Test and Evaluation and will evaluate the Advanced Lightweight Torpedo pre-planned product improvement, evaluate correction of deficiencies identified in Operational Test-II complete deferred or incomplete Operational Test and Evaluation, continue tactics development, continue assessment of captive-carry availability and storage availability and provide for transition of testing and evaluation to the fleet.

(5) (U) Operational Test-IV is continued Follow-on Operational Test and Evaluation and will evaluate the differences between the full scale production weapon and pilot production weapons, evaluate the system in previously untested environments, and provide for any ongoing testing as required.

3. (U) System Characteristics:

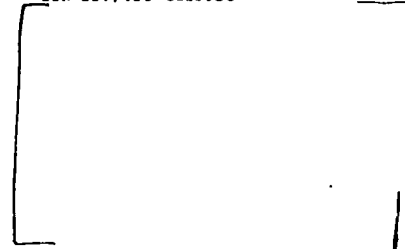
System Characteristics:

Launch Platform Compatibility
Launch Depth
Launch Speed
Minimum Range
Maximum Range
Accuracy

Launch Conditions
Alert to Launch Time
Loading/Handling Weight
Mission Reliability
Maintenance Cycle

Milestone III Threshold:

SSN 637/688 Classes



NOTE (1) with growth potential for increased range.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63369N
DoD Mission Area: 223 - Close Air Support and Interdiction

Title: Air-Launched TOMAHAWK
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	19,000	19,900	19,512	9,762	TBD	TBD
K0650	Air-Launched TOMAHAWK	19,000	19,900	19,512	9,752	TBD	TBD

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Navy funding supports common item development and the Air Force development schedule. This advanced standoff missile is intended to strike high value, heavily defended land and sea targets from outside the lethal envelopes of most enemy defenses. The missile will allow highly accurate attack of key targets from long standoff capability of present and projected ground based defensive systems. The current program provides for two variants, the Air Force AGM-109H, for airfield attack, and the Navy AGM-109L, a dual mission anti-ship/land attack version. Both variants are designed to incorporate the same propulsion and Terrain Contour Matching and Digital Scene Matching Area Correlator. In addition, the Navy AGM-109L is designed to incorporate [] to provide a man-in-the-loop capability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and the changes that are shown in this Descriptive Summary are due to revision of cost estimates (248 decrease in FY 1984). Designating outyears as To Be Determined reflects the decision that total program costs cannot be defined at this time.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	22,548	19,000	19,900	19,760	29,530	110,738*
K0650	Air Launched TOMAHAWK	22,548	19,000	19,900	19,760	29,530	110,738

*Includes funding for the Air Launched TOMAHAWK program for FY 1981 and out only.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Other appropriation funding to be determined.

F. (U) RELATED ACTIVITIES: This development is supported by related developments in TOMAHAWK (PE 64367N) and Air Launched Cruise Missile (PE 64361F). Additionally, the Air-to-Surface Missile Guidance Technology Project under PE 63306N has demonstrated the feasibility of a higher performance, low cost, inertial guidance unit based on laser gyro concepts. The engine is a modification of that developed under PE 63312N for HARPOON. The Air Force funding is in the Medium Range Air-to-Surface Missile Program (PE 64614F).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Air Test Center, Patuxent River, MD; Air Force Armament Division, Eglin Air Force Base, FL; Aeronautic Systems Division, Wright-Patterson Air Force Base, OH. CONTRACTORS: General Dynamics Corporation, Convair Division, San Diego, CA; McDonnell Douglas, Astronautics Corporation, St. Louis MO; Litton Systems, Woodland Hills, CA; Singer-Kearfott Division, Little Falls, NJ; Teledyne/CAE, Toledo, OH.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

Program Element: 63369N

Title: Air-Launched TOMAHAWK

1. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project K0650 AIR-LAUNCHED TOMAHAWK

1. (U) DESCRIPTION: The Joint Air-to-Surface Missile is designed to supplement conventional, short range air launched weapons and anti-radiation missiles by providing operational commanders an alternative to the commitment of a large force to attack a single high value, heavily defended target. Through the ability to attack targets from beyond the range of most defenses, aircraft survivability will be enhanced. The Joint Medium Range Air-to-Surface Missile program was initiated in FY 1979 as a supersonic air-launched low volume ramjet but was later changed to an air-launched variant of TOMAHAWK. The principal required system characteristics are: high survivability, war-in-the-loop for target identification, air point selection and tactical flexibility, effectiveness against land and sea targets, compatibility with the carrier environment and a conventional (non-nuclear) warhead. The scope of effort needed to develop and deploy the Navy air-launched TOMAHAWK includes adding an Inertial and a Walleye Phase II data link. It also requires changing the current TOMAHAWK Inertial guidance system to a length compatible with aircraft carrier weapons elevators and to facilitate external carriage on Navy and Air Force tactical aircraft. Because TOMAHAWK is a modular design, new warhead and guidance modules can be developed for use by either service as the operational requirements dictate. The air-launched TOMAHAWK is designed to employ state-of-the-art micro processor-based guidance and control systems including a gyro navigation unit. Two Air-Launched TOMAHAWK variants are planned for development: AGM-109H and AGM-109L. The Navy AGM-109L dual mission ship/land attack variant is intended for launch from the Navy A-6E aircraft and will be carrier (CV) compatible. The missile will be shorter and weigh less than earlier TOMAHAWK, but will otherwise retain the basic aerodynamic approach used for other TOMAHAWK Missiles. The payload will be the HARPOON Warhead (WDU-18/B). The design of this warhead and its associated fuze/booster has been completed and qualified. The baseline engine for all variants will be the modified Teledyne J-402 HARPOON engine. Modifications will be tested to insure high speed digital data bus, Terrain Contour Matching and Digital Scene Matching Area Correlator. In addition, the Navy variant is designed to employ a modified Inertial and Phase II Walleye Data Link for the ship attack role. The second variant, AGM-109H Airfield Attack Missile is intended for use by the Air Force. It is longer and heavier than the AGM-109L, but the guidance, engine and some airframe structure designs for the AGM-109L are common to this variant. The payload for the AGM-109H will be an airfield attack munition now under development. The development represents the major new efforts for this variant.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Initiated full Scale Engineering Development on all common aspects of both Medium Range Air-to-Surface Missile variants. Aircraft integration and breadboard/prototype testing of Digital Integrating Subsystem computer and Federated Bus design concepts to be used on all Medium Range Air-to-Surface Missile variants. Navy funds in FY 1982 contributed to common item development of the AGM-109H/L missiles and to a full understanding of development and procurement costs plus an assessment of the long term utility of this weapon to the Navy.

b. (U) FY 1983 Program: Navy funding in FY 1983 is sufficient to keep common item development on schedule. System design and integration will continue. Navy unique Imaging Infrared Seeker, Data Link, and A-6E integration/modification will be minimum to keep an option open to continue development when satisfied that the questions of cost, tactical utility and survivability of the air-launched TOMAHAWK variant are satisfactorily answered.

c. (U) FY 1984 Planned Program: Continue to support development requirements common to both the United States Air Force AGM-109H and the United States Navy AGM-109L. The majority of these developments should be completed in FY 1984. In addition, flight test of the United States Air Force AGM-109H will commence mid-FY 1984.

Program Element: 63369N

Title: Air-Launched TOMAHAWK

d. (U) Program to Completion: Navy funds in FY 1985 can be used to start low level effort on AGM-109L unique requirements. System design and integration efforts on [] will continue. A-6E integration efforts will continue and aircraft carrier mission planning requirements definition will be completed, at which time a better understanding of the full development and procurement costs will be gained.

e. (U) Milestones

MILESTONE

1. Initial Full Scale Engineering Development
2. First Medium Range Air-to-Surface Missile free flight
3. Initial Operational Capability (AGM-109L)

DATE

1 October 1981

TBD

TBD

J.(4) TEST AND EVALUATION DATA:

1. (U) Development, Test and Evaluation: The test program is structured to take advantage of component and flight testing completed or planned for items common with other TOMAHAWK variants while emphasizing unique air-launched subsystems and stressing operational factors. The Air Force and the Navy have agreed to integrate test and evaluation of the air-launched variants to the maximum extent practical to eliminate duplication and minimize test hardware requirements. The need for Service-unique Operational Test and Evaluation has been recognized and each service is to be solely responsible for all facets of its peculiar testing.

a. (U) An air-launched TOMAHAWK carrier demonstration program was conducted by General Dynamics-Convair Division, McDonnell Douglas, and the Naval Weapons Center, China Lake, California, from May-November 1980 to provide preliminary confirmation of the suitability and compatibility of the 192 inch, 2200 pound variant of TOMAHAWK when employed by carrier-based aircraft. The information and studies resulting from this program have provided some data for the Full Scale Engineering Development program.

b. (U) The Medium Range Air-to-Surface Missile Full Scale Engineering Development program began in July 1980. Overall objectives for the program include: (1) qualification of the missile for launching from Air Force/Navy aircraft and demonstration of missile compatibility with the launch aircraft; (2) demonstration of CV suitability; (3) evaluation of missile performance; (4) demonstration of a missile capability to fly routes planned by a theater mission planning subsystem, achieving the required terminal accuracy; (5) demonstration of man-in-the-loop capability for target identification, aim point selection and damage assessment; (6) demonstration of operational effectiveness and suitability; and (7) demonstration of launch/flight profiles, safety, and reliability.

c. (U) An extensive laboratory/ground test program will include component, major assembly, and system qualifications test, stress tests, environmental tests, electromagnetic compatibility test, and carrier handling tests to verify compatibility of the Navy variant with aircraft carrier weapons handling and storage capabilities. Particular emphasis in testing of the AGM-109L and AGM-109H variants will be placed on those components (ring laser gyro inertial guidance, airframe/engine, warhead) and systems not common with other TOMAHAWK variants. Captive-carry flight testing will be utilized to develop the aircraft/missile interface, to establish a captive carry reliability data base, and test the performance of weapon guidance and target acquisition functions. Free-flight tests will be conducted to further test these functions, aircraft/missile separation, and the missile's flight control and propulsion systems in order to verify compliance with the system specifications and to obtain an initial estimate of operational effectiveness and suitability.

d. (U) The first free-flight test of the AGM-109H is planned for the second quarter FY 1984. Flight tests of the AGM-109L are to be determined. Some flights will terminate with target impact and others with recovery of the test vehicle using the Recovery Exercise Module parachute recovery system developed for TOMAHAWK.

Program Element: 63369N

Title: Air-Launched TOMAHAWK

2. (U) OPERATIONAL TEST AND EVALUATION: Commander Operational Test and Evaluation Force is the responsible test organization for Navy Operational Evaluation of the AGM-109L Airfield Attack Missile. The Air Force Test and Evaluation Center will be responsible for Air Force operational effectiveness and suitability testing of the Medium Range Air-to-Surface Missile when employed in its environment. Additionally, they will provide data for deployment and for refinement of tactics, techniques, and doctrine.

3. (U) SYSTEM CHARACTERISTICS:

Characteristics

Threshold



FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63382N
DoD Mission Area: 231 - Anti-Air Warfare

Title: Battle Group Anti-Air Warfare Coordination
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	6,458	7,826	13,131	TBD	TBD
S0324	Battle Group Anti-Air Warfare Coordination	0	6,458	7,826	13,121	TBD	TBD

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Soviet Union's ever-increasing ability to coordinate high-density air attacks against Battle groups demands a more effectively coordinated response. That response is presently limited by the accuracy, timeliness, and completeness of the available targeting information, and by the control of its dissemination. The result is potentially inefficient weapons delivery, in which some targets may not be engaged at all while others are multiply-engaged. It also leads to the overcommitment of some units while others remain uncommitted. The introduction of the first AEGIS ship, TICONDEROGA, in 1983, offers the opportunity to improve these situations. With its superior radar surveillance, detection and tracking capabilities, more information will be available. This program capitalizes on the AEGIS data, control, display and decision systems to coordinate the weapons and sensors of other ships and aircraft within a Battle Group and even some non-organic sources. Near and long term upgrades will achieve higher degrees of battle coordination. Battle Group Anti-Air Warfare Coordination objectives will be met in phases. The first phase will provide for the dissemination of AEGIS data to the Battle Group. The second phase will involve force weapon scheduling and remote designation. The final phase will implement advanced weapon control techniques, such as having one ship provide mid-course guidance of another ship's missiles.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 4,900 in the FY 1984 estimate due to extensive schedule changes in the program, as follows: The schedule for land-based and at-sea testing of the Weapons Control Data Link between the AN/SPY-1 radar system and F-14 aircraft has been deferred one year, because earlier funding reductions have not permitted the additional systems engineering required to complete a system suitable for testing. Link management and interface test and evaluation have been deferred pending completion of link requirements work. These schedule changes permit a reduction of 3,400 in data link funding for FY 1984. In the effort dedicated to modifying non-AEGIS Battle Group units (participating units), the work in completing performance specifications and requirements definition for specified ships and aircraft will extend into FY 1984, thus deferring the start of test and evaluation and completion of engineering development for one year. This permits a funding reduction of 1,500 in FY 1984.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,683*	0	6,458	12,726	Continuing	Continuing
S0324	Battle Group Anti-Air Warfare Coordination	5,683*	0	6,458	12,726	Continuing	Continuing

* FY 1981 effort funded in Program Element 64303N, Area Air Defense.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

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Program Element: 63382N

Title: Battle Group Anti-Air Warfare Coordination

F. (U) RELATED ACTIVITIES: Program Element 64303N, AEGIS Area Air Defense; Program Element 64307N, CG-47 Product Improvement; Program Element 64366N, STANDARD Missile Improvements; Program Element 63516N, Radar Surveillance Equipment; Program Element 63589N, DDG-51; Program Element 63519N, Advanced Command Data Systems; Program Element 25604N, Joint Tactical Information Distribution System.

G. (U) WORK PERFORMED BY: CONTRACTORS: Applied Physics Laboratory, Johns Hopkins University, Laurel, MD.; RCA, Moorestown, NJ.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0324, Battle Group Anti-Air Warfare Coordination: This project provides for the development and testing of better data links for the sharing of AEGIS-generated tactical data, and for a Battle Group Anti-Air Warfare Coordination Weapon Control link. Equipment requirements and performance specifications for non-AEGIS Battle Group participating units will be developed, evaluated and tested at sea.

(U) There was no program in FY 1982, as Congress did not approve requested funding.

(U) The FY 1983 program consists of :

- o Link 11 installation in USS NORTON SOUND.
- o Development of requirements and performance specifications for participating units.
- o Development of data link management and interface requirements.

(U) For FY 1984, it is planned to:

- o Complete data link management and interface requirements.
- o Start integration and checkout of Link 11 in USS NORTON SOUND.
- o Assess ship and aircraft development test and evaluation, specifically including modifications to computer programs required for data links improvements.

(U) Program to completion:

- o Conduct at-sea evaluations.
- o Complete development and testing of participating units changes.
- o Continue to evolve the level of coordination required to retain Battle Group capability.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63501N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Reactor Propulsion Plants
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,062	5,783	-	-	-	88,101
S0409	SG6 Nuclear Attack Submarine Propulsion Plant	6,062	5,783	-	-	-	88,101

The Total Estimated Cost includes only those costs attributed to Project S0409, S6G Nuclear Attack Submarine Propulsion Plant.

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program element supported the development and testing of a nuclear propulsion plant for use in the SSN 688 Class submarines. This plant has Utilizing the S6G plant, these attack submarines have achieved a sustained submerged speed of [] This program element also emphasized the reduction of self and radiated noise to the maximum extent consistent with the higher power rating. Development work was required for the application of the longer life D2W reactor core and associated reactor systems and components to these submarines.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: The funding and associated work scope for the program element have been transferred to Program Element 25675N, Operational Reactor Development.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63502N
DoD Mission Area: 234 - Mine Warfare

Title: Surface Mine Countermeasures
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	39,967	31,465	28,036	29,121	Continuing	Continuing
S0260	Minehunt	11,815	15,681	13,993	14,427	Continuing	Continuing
	(Quantity)			(DT&E)	(OT&E)		(3)
S0262	Influence Mine Countermeasures	4,840	*	*	*	*	*
S1018	CHANNEL FINDER	914	195	0	0	0	10,973
	(Quantity)	(OT&E)					(1)
S1233	Mine Countermeasures Improvements	12,188	9,588	9,243	8,121	Continuing	Continuing
	(Quantity)	(DT&E)	(DT&E/OT&E)				(8)
S1404	Neutralization	10,210	6,001	3,710	2,690	Continuing	Continuing
	(Quantity)	(OT&E)					(1)
S1597	Surface Ship Magnetic Silencing	0	0	1,090	3,883	Continuing	Continuing

Note: *FY 1983 and out work under PE 64576N, Projects S1670 and S1677.

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only and through FY 1983 for project S1018.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for development of surface mine countermeasures systems which will enable surface ships and submarines to operate with relative safety in mineable water areas in support of the Navy's sea control, projection of force and strategic deterrence missions. A capability for minehunting/neutralization to are essential elements of a surface mine countermeasures capability. Deep water minehunting will require a variable depth minehunting sonar with a capability for detecting moored mines at ranges of 1,000 yards and a Mine Neutralization Vehicle capable of cutting mine mooring cables or placing neutralization charges within a few feet of bottom mines. The] The Mine Countermeasures Improvement project is needed to reconfigure the AN/SQQ-14 Minehunting Sonar to the more capable AN/SQQ-30 Minehunting Sonar, to develop a Precise Integrated Navigation System, to develop ALFA TWO, AN/SLQ-35, a surface ship towed version of the helicopter towed DOUBLE ALFA AN/ALQ-141 Countermeasures Set and to develop a Single Ship Deep Moored (mechanical) Sweep. The Surface Ship Magnetic Silencing project will develop shipboard degaussing/countermeasures system components to upgrade the capabilities of Navy ships to avoid mines actuated by magnetic influences.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a net decrease of 580 in FY 1982, a net decrease of 107 in FY 1983 and a net increase of 2,647 in 1984. The differences by project are as follows: Project S0260, Advanced Minehunting Sonar System (a) A decrease of 195 in FY 1982 is due to revision of cost estimates. (b) A decrease of 33 in FY 1983 is due to Navy's application of a general Congressional reduction. (c) A decrease of 955 in FY 1984 is due to a reduction in support costs. Project S0262, Influence Mine Countermeasures - A decrease of 3,375 in FY 1982 is due to reprogramming action. Project reductions in FY 1983 and FY 1984 are due to shifting the project to engineering development under

Program Element: 63502N

Title: Surface Mine Countermeasures

program element 64576N, Influence Mine Countermeasures. Project S1018, CHANNEL FINDER - An increase of 152 in FY 1982 is due to FOT&E planning requirements. A decrease of 2 in FY 1983 is due to Navy's application of a general Congressional reduction. Project S1233, Mine Countermeasures Improvements - An increase of 2,838 in FY 1982 is due to increased software requirements for the AN/SSN-2 development. A decrease of 52 in FY 1983 is due to Navy's application of a general Congressional reduction. An increase of 1,311 in FY 1984 is due to AN/SSN-2 cost growth in upgrading the computer capability. Project S1404, Mine Neutralization System - A decrease of 20 in FY 1983 is due to Navy's application of a general Congressional reduction. An increase of 2,313 in FY 1984 is due to implementing nonmagnetic redesigns of the handling systems, and selected redesign of systems as a result of technical and operational evaluation. Preplanned product improvement efforts will also be initiated.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	22,288	40,547	31,572	25,389	Continuing	Continuing
S0260	Advanced Minehunting Sonar System	9,818(1)	12,010	15,714	14,548	Continuing	Continuing
S0262	Influence Mine Countermeasures	2,141	8,215	(?)	(2)	(2)	(2)
S1018	Channel Finder	2,041	762	197	0	0	10,823
S1233	Mine Countermeasures Improvements	8,288	9,350	9,640	7,932	Continuing	Continuing
S1404	Mine Neutralization System	0	10,210	6,021	1,397	Continuing	Continuing
S1527	Surface Ship Magnetic Silencing	0	0	0	1,112	Continuing	Continuing

Notes: (1) Includes Mine Neutralization System development expenditures as part of Project S0260 during FY 1981.

(2) Starting in FY 1983, Influence Mine Countermeasures effort will be included under PE 64576N. Influence Mine Countermeasures, Project S1677, Explosion Resistant Multi-Influence Sweep System and Project S1670, Hydrofoil Pressure/Acoustic/Magnetic Sweep System.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Sonar technologies developed under Program Element 62711N, Undersea Target Surveillance Technology, will be used in the development of the Advanced Minehunting Sonar System and Mine Neutralization Systems. The technology to support Influence Mine Countermeasures has been investigated in Program Element 62734N, Countermeasures Technology. Program Element 63260N, Airborne Mine Countermeasures, has developed the AN/ALQ-141 Countermeasures Set and is developing the Controlled Depth/Rapid Deploy Moored Sweep which will be adapted for surface ship use as the Single Ship Deep Sweep.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL and Naval Ocean Systems Center, San Diego, CA - lead laboratories; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ship Engineering Center, Philadelphia, PA; Naval Surface Weapons Center, White Oak, MD and Dahlgren, VA; Naval Explosive Ordnance Disposal Facility, Indian Head, MD. CONTRACTORS: R.M. Vredenburg & Co., McLean, VA; NATO Project Office (PG-14), Koblenz, Germany; Applied Research Laboratories, University of Texas, Austin, TX; Westinghouse Electric Corporation, Baltimore, MD; General Electric Co., Syracuse, NY; EG&G Washington Analytical Services Center, Inc., Rockville, MD; Honeywell Marine Systems, Seattle, WA; Science and Management Resources Inc., Arlington, VA; Sperry Marine, Charlottesville, VA; Boeing Marine, Seattle, WA; Magnavox, Torrance, CA; Raytheon Co., Portsmouth, RI; Sperry Corp., Great Neck, NY.

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Program Element: 63502W

Title: Surface Mine Countermeasures

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S1233, Mine Countermeasures Improvements: The effort under this project will improve the capability of the mine countermeasures systems scheduled for installation on new mine countermeasures ships: (1) adapt the airborne DOUBLE ALFA AN/ALQ-141 Countermeasures Set to surface ship use (ALFA TWO AN/SLQ-35 Countermeasures Set), (2) increase the maximum depth capability and improve reliability and maintainability of the AN/SQQ-14 Variable Depth Minehunting Sonar by reconfiguring it to the AN/SQQ-30 Minehunting Sonar, (3) integrate commercially available navigation components into the AN/SSN-2 Precise Integrated Navigation System for installation on mine countermeasures ships and (4) adapt the airborne Controlled Depth/Rapid Deploy Moored Sweep being developed in Program Element 63260N, Airborne Mine Countermeasures, for shipboard use as the Single Ship Deep Sweep. Since some of the present 423 Class MSOs will be in commission until the late 1980s, improvements to the equipment on these ships will be included in this project as required.

(U) In FY 1982, AN/SQQ-30 - Completed technical and operational evaluation, received provisional approval for service use. Planned for the contract award of the first production unit to be installed on the lead MCM-1 ship. AN/SSN-2 Precise Integrated Navigation System - Advanced development model installed and evaluated on USS PLUCK (MSO 460). Awarded contract for full scale engineering development. Installed engineering development model aboard USS PLUCK for technical evaluation. AN/SLQ-35 ALFA TWO engineering development contract award.

(U) The FY 1983 program consists of:

- o ALFA TWO Countermeasures Set - Complete design specification.
- o AN/SQQ-30 Sonar approval for service use in January 1983, continue production procurement, implement product improvements for integration with MCM-1 class ships.
- o AN/SSN-2 Precise Integrated Navigation System - Complete fabrication of second engineering development model and commence environmental tests. Complete technical and operational evaluation. Approval for production is planned for July 1983. Begin refurbishment of the AN/SSN-2 engineering development models, one for support of the MCM-1 combat system integration and testing and one for support of the AN/SSN-2 software.
- o Single Ship Deep Sweep - Commence design analysis and complete system specification.

(U) For FY 1984, it is planned to continue:

- o AN/SQQ-30 - Procure hardware for MCM-1 class ship, achieve initial operational capability in [] conduct production improvement program.
- o AN/SSN-2 - Precise Integrated Navigation System - deliver refurbished and modified engineering development models, one for support of combat system integration and training, and one for support of AN/SSN-2 software. Late in FY 1984, deliver engineering development model for installation on the lead MCM-1 ship. Procure production hardware for follow-on ships. Develop and introduce preplanned product improvement.
- o Single Ship Deep Sweep - Complete design analysis and commence concept verification, assembly and test. Technical and operational evaluation will be completed in FY 1986. Approval for production in FY 1987. Production will begin in FY 1988 with initial operational capability in []
- o ALFA TWO Countermeasures Set - complete engineering drawings and initiate procurement of long lead time hardware. Obtain approval for production in FY 1988. Begin production in FY 1989 with operational capability in []

(U) This is a continuing program.

Program Element: 63502N

Title: Surface Mine Countermeasures

(U) Project S1404, Neutralization: Develop a remotely controlled Mine Neutralization System which controls a tethered submersible capable of neutralizing mines to a depth of 2,000 feet by either placing a neutralization charge near the mine or cutting its mooring cable.

(U) In FY 1982, engineering development continued with completion of technical and operational evaluation. Approval for production is anticipated in January 1983. Awarded contract for refurbishment of engineering development model which, after refurbishment, will be installed on board the lead MCM-1 ship.

(U) The FY 1983 program consists of:

- o Designing refurbishment and modification of engineering development model to production baseline for installation on the lead MCM-1 ship.
- o Initiating production contract for MCM 2-5 ships.

(U) For FY 1984 it is planned to continue:

- o Procuring production hardware for follow-on ships.
- o Initiating mission package 3 development. Mission package 3 is a [] which will insure sympathetic detonation of the target mine.

(U) This is a continuing program.

(U) Project S1597, Surface Ship Magnetic Silencing: A new start, this project will develop shipboard degaussing countermeasures to defend against mines actuated by magnetic influences.

(U) In FY 1982, program requirements were defined under program element 62543N, Ships, Subs, and Boats Technology. The project will transition to program element 63502N in FY 1984.

(U) The FY 1983 program consists of:

- o Continuing exploratory development under Program Element 62543N.

(U) For FY 1984, it is planned to continue:

- o Awarding of contract for prototype equipment.
- o At-sea and land-base test and evaluation of candidate equipment.
- o Approval for production and []

(U) This is a continuing program.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S0260, Minehunt

1. (U) DESCRIPTION (Requirement and Project): This project will develop a surface ship mine detection and classification capability which will enable surface mine countermeasure ships such as the MCM-1 (FY 1982 program) and the MSH-1 (FY 1984 program)

Program Element: 63502N

Title: Surface Mine Countermeasures

to detect the modern moored and bottom mines at case depths and ranges which will enable the mine countermeasures forces to counter the mines with minimum threat to themselves. Together with Project S1404, Neutralization, the Advanced Minehunting Sonar System will provide the capability to detect, classify and neutralize unburied mines of all types. This system is needed to [in the U.S. surface mine countermeasures forces [an aggressive Soviet mine campaign. Currently, available surface ship minehunting equipment

[In addition, the [The Advanced Minehunting Sonar System will be [of its predecessor, the AN/SQQ-30. The Advanced Minehunting Sonar system is an outgrowth of the shipborne minehunting sonar project and is being designed to be used by MCM-1 class mine countermeasures ships. It will be more reliable and more easily maintained. It will have an increased depth capability, computer-aided detection/classification and improved display features not available in the AN/SQQ-30 Sonar. The Advanced Minehunting Sonar System will be used to [When a mine has been detected by the Advanced Minehunting Sonar System, the ship will hover, hold the detected mine in the sonar beam, launch the mine neutralization vehicle, and direct it toward the mine using output from the Advanced Minehunting Sonar System display and a dedicated tracking system until the sonar and underwater television located in the Mine Neutralization Vehicle acquire the mine for final localization and neutralization. For mines moored in the volume, the Single Ship Deep Sweep System may also be used for neutralization.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: A six-month conceptual design phase was started in November 1981. Four contractors were selected from a field of six to make studies, provide a prime item development specification and produce a proposal for the full scale engineering development phase. The four contractors selected were: General Electric Company, Raytheon Company, Westinghouse Electric Corporation, and Sperry Company. A data collection program was started April 1982 to determine the optimum system design characteristics and to develop computer-aided detection/classification algorithms for use by the contractor in the design. Preliminary data was obtained from the first phase and supplied to the four contractors. The full scale engineering development phase contract was awarded to the Raytheon Company on 20 September 1982.

b. (U) FY 1983 Program: Contractor will continue development of Advanced Minehunting Sonar System. Conduct preliminary and critical design reviews and commence fabrication of hardware. Government will continue tests and data collection to assist with development.

c. (U) FY 1984 Planned Program: Complete development and fabrication of Advanced Minehunting Sonar System. Conduct system integration factory test. Conduct environmental tests. Complete installation and system checkout in test platform. Conduct at-sea tests. Government will complete near term test and data collection and continue far term work to obtain data for preplanned product improvement effort.

d. (U) Program to Completion: Conduct technical and operational evaluation. Obtain approval for production. Award contract to refurbish and modify one engineering development model for installation in MCM class ship. Award contract for initial production system. Continue production until installations and backfits in 14 MCM and 17 MSH ships have been completed.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63504N

Title: Submarine Sonar Developments (Advanced)

Dod Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	42,623	16,676	12,661	24,662	Continuing	Continuing
S0222	Wide Aperture Array (Advanced)	23,683	0*	0*	0*	Continuing*	Continuing*
S0223	Submarine Sonar Improvements (Advanced)	18,940	16,676	7,125	18,993	Continuing	Continuing
S1305	Advanced Conformal Submarine Acoustic Sensor	(2,361)**	(2,727)**	5,536	5,133	Continuing	Continuing
S1306	Advanced Multiple Function Submarine Sonar	0	0	0	536	Continuing	Continuing

* The Wide Aperture Array sub-task transfers to Program Element 63590N in FY 1983. The Low Ship Impact Ranging sub-task transfers to project S1686 (Attack Submarine Combat Control System Improvements (Advanced)) of Program Element 63562N in FY 1983.

** Funded in Program Element 63503N (Acoustic Communications (ADV)) in FY 1982 and FY 1983 which becomes part of project S1305 in FY 1984 and the out-years.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides the advanced development and testing of improvements to present and future integrated sonar systems in order to maintain clear acoustic superiority over the high performance submarine and surface ship threat circa 1985-2020.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1982, Project S0222 was decreased by 700 due to a revision in cost estimates including escalation and Project S0223 was decreased by 2,200 due to reprogramming to a higher priority program. FY 1983 Project S0223 decreased by 1,649 due to reprogramming to higher priority program and 46 due to Navy's application of a general Congressional reduction. In FY 1984 S0223 was reduced 12,909 due to a transfer to a higher priority program, and S1305 was increased 5,536 for continuation of sonar transmitting development previously funded under Program Element 63503N, Project S0918.

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Program Element: 63504N

Title: Submarine Sonar Developments (Advanced)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	35,031	45,523	18,371	20,034	Continuing	Continuing
S0222	Wide Aperture Array (Advanced)	15,383	24,383	0 1/2/	0 1/2/	(Continuing)	(Continuing)1/2/
	(Wide Aperture Array)	(14,493)	(23,513)	(0)1/	(0)1/	(37,847)1/	(160,414)1/
	(Quantity-Wide Aperture Array Adv Development Model)3/	(0)	(0)	(0)	(0)	(0)	(1)3/
	(Low Ship Impact Ranging)	(890)	(870)	(0)2/	(0)2/	(Continuing)2/	(Continuing)2/
S0223	Submarine Sonar System Advanced Development	18,665	21,140	18,371	20,034	Continuing	Continuing
	(Sub-Tasks; Quantities)	(4/)	(4/)	(4/)	(4/)	(4/)	(4/)
S0970	Attack Submarine Federated Combat System Development	982	0	0	0	0	16,261

1/ The Wide Aperture Array sub-task transfers to Program Element 63550N in FY 1983. The advanced development total cost estimate shown applies to the completion of advanced development in the new Program Element.

2/ The Low Ship Impact Ranging sub-task transfers to project S1686 (Attack Submarine Combat Control System Improvements (Advanced)) of Program Element 63562N in FY 1983.

3/ Development/Operational Test and Evaluation. Procured prior to FY 1981.

4/ Refer to the Descriptive Summary for Project S0223 for Sub-Tasks and Test Item quantities.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Wide Aperture Array (Engineering), Program Element 64520N; Submarine Sonar Development (Engineering), Program Element 64503N; Submarine Tactical Warfare Systems (Advanced), Program Element 63562N; Submarine Tactical Warfare Systems (Engineering), Program Element 64562N, Undersea Warfare Weaponry Technology, Program Element 62633N; and Submarine Advanced Combat System, Program Element 64524N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Underwater Systems Center, Newport, RI; Naval Weapons Support Center, Crane, IN; and Naval Surface Weapons Center, White Oak, Silver Spring, MD. CONTRACTORS: EG&G Washington Analytical Services Center, Rockville, MD; Radian, Inc., Austin, TX; Sperry Rand, Great Neck, NY; General Dynamics, Electric Boat Division, Groton, CT; ENSCO, Springfield, VA; Raytheon, Submarine Signal Division, Portsmouth, RI; General Electric Co., Syracuse, NY; International Business Machines, Manassas, VA; Beranek and Newman, Cambridge, MA; Analysis and Technology, No. Stonington, CT; Brunswick Corp., Costa Mesa, CA; H. I. Thomas Corporation, Gardena, CA. Additional contractors are involved in minor developments or providing specific items in support of advanced development projects.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0223, Submarine Sonar Improvements (Advanced): This project is the vehicle by which basic and exploratory development Submarine ASW Sensor and Combat system technology are provided systems application and transitioned to full-scale development with minimal and identifiable risk. Included in the project are: Submarine Active Detection Sonar, Towed Array Improvement Program, Transient Acoustic Processor, and Fiber Optic Sonar Link.

(U) In FY 1982, development continued as follows:

- o Submarine Active Detection Sonar - Delivered Integrated Advanced Development Model.

Program Element: 63504N

Title: Submarine Sonar Developments (Advanced)

- o Towed Array Improvement Program - Completed ☒ sea-test. Completed ☒
algorithm development. Fabricated and completed initial sea-test ☒
- o Transient Acoustic Processor - Initiated advanced development model. Completed reduction of FY 1981 sea-test data.
Initiated transition to AN/BQK-22A and Submarine Advanced Combat System.
- o Fiber Optic Sonar Link - Completed ☒ test of ☒ hull penetration insert.
Developed low-microbend, flame-retardant fiber optic cable. Developed fiber optic Standard Electronic Module
package.

(U) The FY 1983 program consists of:

- o Submarine Active Detection Sonar - Installation of Advanced Development Model on test ship.
- o Towed Array Improvement Program - Participation in ☒ sea-test ☒
- o Transient Acoustic Processor - Completing algorithm and hardware developments for Advanced Development Model.
Initiation of testing.
- o Fiber Optic Sonar Link - Completing ☒ test of ☒ hull penetrator insert.
Development of pressure tolerant electronics. Completion of performance test at Lake Seneca ☒

(U) For FY 1984 it is planned to:

- o Submarine Active Detection Sonar - Complete sea-test.
- o Transient Acoustic Processor - Complete system test and initiate transition of ☒ system.
- o Fiber Optic Sonar Link - Continue to develop pressure tolerant electronics. Develop improved cabling. ☒

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

(U) Project S1305, Advanced Conformal Submarine Acoustic Sensor: (NEW START) This project is an FY 1984 new start. It provides for the Advanced Development of a suite of sonar sensors for a future new class of nuclear attack submarines. The objective is to maintain the U.S. Acoustic advantage over threat submarines of the late 1990's and beyond. Beginning in FY 1984, the sonar transmitting array development previously funded under Program Element 63503N, Project S0918, will be continued under this project. (Other portions of the sensor suite will begin advanced development in FY 1985 and beyond.)

(U) In FY 1982, under Project S0918, parallel development of ☒ high-power, small size projectors for the transmitting array was begun.

(U) The FY 1983 program under Project S0918 consists of:

- o Completing fabrication and in-plant testing of prototype projectors (two vendors).

Program Element : 63504N

Title: Submarine Sonar Developments (Advanced)

- o Testing, at Navy facilities, prototype projectors for power outputs, operation under pressure and temperature variations, shock resistance, etc.

- o Selecting a projector type for use in a partial transmitting array.

- o Preparation of a specification for partial-array procurement.

(U) For FY 1984, the planned efforts are:

- o Procurement, fabrication and in-plant testing of a partial transmitting array.

- o Preparation of partial array test plans.

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

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63506N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Surface Ship Torpedo Defense
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	2,428	10,259	29,509	Continuing	Continuing
S0225	Surface Ship Torpedo Defense	0	2,428	9,282	26,567	Continuing	Continuing
S1700	NIXIE Improvements	0	0	977	2,942	3,927	7,846

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for Project S0225 and through completion for Project S1700.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The capability of Soviet submarines and surface ships to employ anti-ship torpedoes presents a formidable threat to U.S. Navy surface ships. The two projects in this program element are required to counter this threat. Project S0225 provides additional torpedo defense equipment, capable of various type torpedoes, in order to further improve ship survivability. The new threat:

25 NIXIE to improve the [] system [] Project S1700 is an upgrade to the existing AN/SLQ-

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profiles shown in the 1983 Descriptive Summary and this Descriptive Summary are as follows: The decrease of 10 in FY 1983 results from Navy's application of a general Congressional reduction. The total FY 1984 increase of 4,978 results from restructuring the program element by initiating Project S1700 (977) and adding (4,001) to the work scope of Project S0225 and also accelerating its schedule. Under the Total Estimated Cost Project S1700 has been priced at 7,846.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands)

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	2,447	5,281	Continuing	Continuing
S0225	Surface Ship Torpedo Defense	0	0	2,447	5,281	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (BA 2) (332213)	3,594	5,000	10,985	11,922	6,272	43,426
Quantity	(14)	(26)	(52)	(67)	(20)	(193)

Program Element: 63506N

Title: Surface Ship Torpedo Defense

F. (U) RELATED ACTIVITIES: The Surface Ship Sonar Modernization Program, Program Element 25623N, makes provisions for incorporation of the [] software/hardware being developed by the Surface Ship Torpedo Defense Program. The AN/SQR-19 Tactical Towed Array Sonar Program, Program Element 64713N, could be used to increase [] capabilities of the Surface Ship Torpedo Defense System. The ASW Combat System Integration Program, Program Element 25620N, can integrate the sensor and countermeasure systems. The Surface Ship Silencing Program, Program Element 63553N, Project S0229, is concerned with reducing ship-susceptibility to detection and hence reducing the likelihood of torpedo attack.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Laboratory, Panama City, FL; Naval Underwater Systems Center, New London, CT. CONTRACTORS: To be determined

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0225, Surface Ship Torpedo Defense: Elements of prior programs which have completed advanced development testing and validation testing will be used in the initiation of this project. The effort in the past has been []

The project objective is to provide surface ships with an effective torpedo defense capability against all types of torpedo threats. This will be accomplished by the development of individual items []

Some of these have more than one component which will be introduced to the Fleet sequentially as they become approved for production use in order to provide as much torpedo defense capability to surface ships as quickly as possible.

(U) In FY 1982, the project was not funded.

(U) In FY 1983, this program is a new start and it is anticipated that funds will not be available in the first quarter. Therefore, all work is planned for January through September. Complete system level analysis for Surface Ship Torpedo Defense. Prepare specifications for procurement [] all necessary experimental work has been performed and the [] system is ready for full scale development. Award full scale development contract for [] late 1983. Prepare statement of work and award system integration contract. Prepare specification and procurement documents for development of a Towed Torpedo Detector. Develop plans and requirements for development of a [] capability.

(U) In FY 1984, the project will conduct the following tasks: Continue full scale development [] All necessary experimental work will have been performed and [] ready for full scale development. Award full scale development contract for [] integration effort. Award advanced development contract for [] Continue system development contract [] Award an advanced

(U) Project S1700, NIXIE Improvements: (NEW START) The AN/SLQ-25 NIXIE improvement project will afford the system better effectiveness against the current and projected acoustic torpedo threat. The project will provide the following improvements to the existing AN/SLQ-25 NIXIE: []

Program Element: 63506N

Title: Surface Ship Torpedo Defense

(U) In FY 1984 the project will be initiated and will complete design definition and award the development contract.

(U) In the outyears, the project will complete fabrication (FY 1986) and will undergo test and evaluation and gain Approval for Production (FY 1987).

I. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63509N
DoD Mission Area: 238 - Other Naval Warfare

Title: Shipboard Information Transfer
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,900	4,411	5,320	7,997	Continuing	Continuing
S0248	Shipboard Data Multiplex System	7,900	4,411	5,320	7,997	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the development of techniques and systems to improve ship design and construction in terms of reducing schedule and cost, plus increasing flexibility and survivability. Shipboard Data Multiplex System is being developed as a general-purpose multiplex system for ships and submarines that could allow at least a ten-to-one reduction of point-to-point cabling. An advanced multiplex system to support high speed (10 Megabits per second or greater) computer-to-computer data transfer will be developed in the outyears. This system will be complementary to the general-purpose system. Also, to be developed in the outyears is a Digital Voice Multiplex System to provide an integrated interior voice communications capability aboard ship. Benefits include reduced cost, increased information transfer capacity, improved ship system survivability, increased reliability and reduced ship and submarine construction time.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 500 in FY 1983 and 1,117 in FY 1984 resulted from a Congressional reduction and budgetary constraints, respectively.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	16,994	7,900	4,911	6,437	Continuing	Continuing
S0248	Shipboard Data Multiplex System	16,994	7,900	4,911	6,437	Continuing	Continuing
	Quantity			(DT&E/OT&E)			(2)

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Shipboard Data Multiplex System has been coordinated with related efforts through the basic Tri-Service Joint Tactical Communications Program, Program Element 28010N. It is planned that Shipboard Data Multiplex System will be compatible with recently-developed NATO Interface Standards (STANAGS 4153 and 4156). Exploratory Development work under Program Element 62721N, Command and Control Technology, is addressing the technology base related to advanced multiplexing systems.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (Lead Laboratory). CONTRACTORS: Rockwell International Autonetics Group, Anaheim, CA; SEMCOR, Inc., Moorestown, NJ/San Diego, CA.

Program Element: 63509N

Title: Shipboard Information Transfer

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0248, Shipboard Data Multiplex System: This project provides for the development, design, fabrication, test and evaluation of data multiplex systems which will improve the capability and performance and reduce the construction time and cost of ships and submarines.

(U) In FY 1982 fabrication and assembly of the Shipboard Data Multiplex System Engineering Development Models was completed and factory testing of these systems continued.

(U) The FY 1983 program consists of:

- o Completion of Shipboard Data Multiplex System Engineering Development Models factory reliability testing.
- o Completion of shipboard installation and check-out of a Shipboard Data Multiplex System Engineering Development Models.
- o Initiation of Technical Evaluation.
- o Continuation of Test and Evaluation planning and applications analyses.

(U) For FY 1984, it is planned to:

- o Complete Shipboard Data Multiplex System Engineering Development Model Technical Evaluation.
- o Conduct the Operational Evaluation of the Shipboard Data Multiplex System.
- o Submit Request for Approval for Production
- o Provide system support and integration for planned shipboard installations.
- o The increase in the FY 1984 estimate over the FY 1983 estimate is due to the increase cost of testing, the correction of discrepancies and the preliminary design work on follow-on of the digital quality data transfer system.

(U) Program to completion will consist of:

- o Continue System improvements and shipboard integration.
- o Development of advanced data/voice transfer systems to meet future requirements.

I. (U) PROJECTS OVER \$10M IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63512N
DoD Mission Area: 239 - Naval Unassigned

Title: Cacapults
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	2,645	3,243	44,634	50,522
W1721	CV Wind Surveillance System	0	0	888	0	0	888
W1723	CV Launch and Recovery System	0	0	1,757	3,243	44,634	49,634

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element provides for the development of systems and subsystems required for the safe and effective launch, visual landing and recovery of sea-based aircraft. It includes all aspects of equipment for aircraft - ship motion effects. This element addresses advanced development of equipment required for aircraft ship interface which is essential for the safe operation of aircraft at sea and is, in most respects, Navy-unique.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: Not applicable. Funding for this element begins in FY 1984.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: Not applicable. Funding for this element begins in FY 1984.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Work in Project W1721 is transitioned from Aircraft Technology, Program Element 62241N, and is coordinated with efforts in Motorized Movement Systems, Program Element 63207N, Environmental Applications. The work in Project W1723 is transitioned from Aircraft Technology, Program Element 62241N, subproject 41-462, Sea-Based Aircraft Support Systems.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Engineering Center, Lakehurst, NJ; OTHERS: Naval Air Development Center, Warminster, PA; Naval Avionics Center, Indianapolis, IN; Naval Air Test Center, Patuxent River, MD; CONTRACTORS: Not determined.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1721, CV Wind Surveillance System: (NEW START) This project is to develop a wind measurement/display system specifically attuned to the needs of aircraft operations on ships. It will provide both high reliability, accuracy and displays providing not only mean values of wind direction and speed, but dynamic features and trend information. This system is intended to replace the existing wind measurement systems originally designated in the early 1940's. The present systems are inaccurate and unreliable and have become a serious maintenance, logistics and safety problem.

- This project completes sensor and measurement work originally begun under Aircraft Technology (PE 62241N) and continued under Environmental Applications (PE 63207N). This project is a new start under this program element.

- The planned FY 1984 program calls for the production and verification of an Advanced Development Model of the proposed wind measurement system using performance specifications and preliminary design from prior research and development efforts. Preliminary approval for service use is expected to be obtained by December 1984.

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Program Element: 63512N

Title: Catapults

(U) Project W1723, CV Launch and Recovery System: (NEW START) This project is to develop an Advanced Optical Landing System which will upgrade or replace the present standard Fresnel Lens Optical System. The Advanced Optical Landing System will provide greatly improved trend and glide slope tracking capability with enhanced night landing safety through extended acquisition range and improved trend and lineup cues. A key improvement is the addition of an all-optical or Forward Looking Infrared tracker to eliminate the need for ships radar data for the visual landing aid. This is a new start in FY 1984.

- The existing Fresnel Lens Optical Landing System provides degraded data during night and poor visibility operations. Exploratory development work under Program Element 62241N, Aircraft Technology, has established the feasibility of providing enhanced cues through the use of an active tracker coupled to the visual landing aid.

- The FY 1983 program is being conducted under Program Element 62241N, Aircraft Technology, to establish the feasibility of providing aircraft tracking data using Forward Looking Infrared technology. This project is the transition into advanced development of these efforts.

- The planned FY 1984 program will consist of performance definition for the proposed Advanced Optical Landing System and will initiate subsystems contracts for the Forward Looking Infrared tracker.

(U) Program to Completion: Extend and integrate the Augmented Visual Carrier Aircraft Recovery system concept into a total, optimal and advanced Optical Landing System with increased long-range visual cue acquisition and state-of-the-art electronic and stabilization systems for enhanced reliability and maintainability.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: None.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63513N
DoD Mission Area: 238 - Other Naval Warfare

Title: Shipboard System Component Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,142	15,442	12,723	17,432	Continuing	Continuing
S0382	Shipboard Auxiliary Systems Development	7,663	14,345	10,675	15,102	Continuing	Continuing
S1417	Shipboard Corrosion Control	479	1,097	2,048	2,350	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops machinery subsystems and components for new ship construction and in some instances for backfit into the present fleet. Shipboard system component developments are aimed at providing the Fleet with standardized/modularized systems possessing improved effectiveness, reliability, maintainability, and significant life cycle cost, size and weight savings. The program includes shipboard auxiliary systems and shipboard corrosion control developments. Auxiliary machinery developments include high-efficiency potable-water production systems; single-screw rotary, oil-free air compressors; advanced-concept pumps; propulsion shaft seals, synthetic-based hydraulic fluids, advanced piping system components, hull and deck machinery systems, electrical auxiliaries, improved electric distribution components, small but critical Hull/Mechanical/Electrical components, machinery control and monitoring systems, and shipboard salvage techniques and equipments. Shipboard corrosion control developments are concerned with production processes to improve life cycle costs of ships' components through improved corrosion and wear characteristics.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Project S0382 no change in FY 1982 and -10 in FY 1983 from Navy's application of a general Congressional reduction. In FY 1984 +5,098 to increase the scope of this project to include shipboard salvage equipment development and to increase development efforts on electric equipment and small auxiliary components. Project S1417 no change in FY 1982 and no change in FY 1983. A decrease of 44 is due to revised cost estimator including inflation. In FY 1984 the planned new start on Project S1589 and Project S1590 were deferred.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,124	8,142	15,452	13,710	Continuing	Continuing
S0382	Shipboard Auxiliary Systems Development	5,124	7,663	14,355	5,577	Continuing	Continuing
S1417	Shipboard Corrosion Control	0	479	1,097	2,092	Continuing	Continuing
S1589	Improved Electric Distribution Components	0	0	0	4,183	Continuing	Continuing
S1590	Critical Hull, Mechanical and Electric Components	0	0	0	1,858	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable

F. (U) RELATED ACTIVITIES: Program Element 62543N, Ships, Submarines and Boats Technology (feasibility studies) and Program Element 62761N, Materials Technology, are the exploratory development efforts which will provide part of the basis for this program. Other portions will come from the civilian industrial community.

Program Element: 63513N

Title: Shipboard System Component Development

G. (U) WORK PERFORMED BY: IN-HOUSE: David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ship Systems Engineering Station, Philadelphia, PA; Naval Weapons Support Center, Crane, IN. CONTRACTORS: Varo Inc., Power Systems Division, Garland, TX; Gould, Inc., Chesapeake Instruments Division, Glen Burnie, MD; Changler and Evans Inc., Hartford, CT; Crane Packing Co., Morton Grove, IL; Sealol Corp., Providence, RI; Karnyak Corp., Hamilton, OH; Norden Systems Inc., Norwalk, CT; MECO Corp., New Orleans, LA; Massachusetts Institute of Technology, Cambridge, MA; and others to be selected.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project 81417, Shipboard Corrosion Control: This project develops production processes to improve life cycle costs of ships' components through improved corrosion and wear characteristics. Many areas on ships, such as topside, machinery spaces, bilges, decks and wet spaces, are plagued with corrosion problems. These problems require an inordinate amount of labor from ship's force and other maintenance personnel. These problems are especially acute in new low-manned ships such as the DD-961 and PFG-7 Class ships. The Project will utilize results from completed exploratory development, promising new commercial development and "off-the-shelf" items not previously used by the Navy, for immediate adaptation for Fleet use for maintenance of old ships and construction of new ones. These developments include flame spray, plasma spray, paints, ceramics, plastics, composites and engineering/design changes of components.

(U) In FY 1982 the project was initiated. Draft specifications were completed for arc-wire-sprayed aluminum primer for conventional non-skid coatings. Initiated preparation of a corrosion control handbook for shipyard design/production engineers. Completed feasibility demonstration of infrared, nondestructive testing of thermal spray coatings.

(U) The FY 1983 program consists of:

- o Continue development of corrosion control handbook
- o Initiate development of pre-production prototype model of infrared, nondestructive testing system for thermal spray coating.
- o Initiate service tests of thermal spray coatings of shipboard machinery components and propellers.
- o Initiate development of thermal-sprayed ceramic-cored coatings.

(U) For FY 1984, it is planned to:

- o Complete initial issue of corrosion control handbook for shipyard design and production engineers
- o Continue service testing of machinery components with thermal spray coatings
- o Complete development of thermal-sprayed, ceramic-cored coatings for use by intermediate maintenance activities.
- o Complete development of infrared, nondestructive testing system for thermal spray coatings.
- o Start development of improved conventional non-skid coating systems.

(U) Program to completion will consist of a continuation to incorporate corrosion control equipments, materials and techniques from exploratory development programs and new commercial developments into this advanced development program to reduce corrosion and wear of ships' components and to reduce life cycle costs.

Program Element: 63513K

Title: Shipboard System Component Development

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S0382, Shipboard Auxiliary Systems Development

1. (U) DESCRIPTION (Requirement and Project): This project develops shipboard auxiliary components and systems including compressed air and fresh water production systems, advanced pumps, hydraulic systems, propulsion and electric auxiliaries, hull and deck machinery, advanced piping systems, sensors and controls for ship and machinery systems, electric distribution components and shipboard salvage equipment. Emphasis is on developing auxiliary machinery which will not only improve performance reliability and maintainability, but will also result in size, weight and/or life cycle cost savings. Representative of the type of auxiliary equipment items under development in this project are a reverse osmosis desalinator which is significantly less in volume and weight than a conventional plant and can produce twice as much fresh water; a highly reliable low-pressure, water-flooded, screw-type, air compressor which is less than one-half of the volume and weight of the conventional piston type compressor now used aboard ships and requires less than one-half the number of parts for logistic support. This project includes development of electric auxiliaries for correcting design and logistic support costs in future shipboard machinery systems, and for correcting problems associated with waste heat supplied steam systems in DD-963 Class ships. Project develops improved equipments which are small but critical parts of shipboard systems but which are not effectively supportable as separate budget-line items. Components characteristics of this are valves, regulators, sensors, safety devices, switches, controllers, filters, small motors and coolant systems. Project develops advanced electrical components for improvements in ship service power systems. The scope of equipment developments include power generation, conditioning, distribution and protection, components. Principal thrusts are greater component survivability and maintainability, improved continuity of power to vital loads, and better inherent power-quality compatibility between generation/distribution systems and user equipments. Navy salvage techniques and equipment are relatively unchanged from those developed during World War II. The inadequacies of such obsolescence under conditions of increasing salvage problems posed by the increased size and sophistication of combatants and support ships requires development of new shipboard salvage systems and equipment. Salvage equipment developments include towing, buoyancy generation, salvage firefighting, salvage work systems and dewatering.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued shipboard evaluation of 12,000 gallons per day industrial-model reverse osmosis desalination unit in USS FLETCHER DD-992 and released procurement solicitation for design and construction of a military specification prototype unit for operational evaluation. Installed preprototype 9,600 gallons per day vapor compression distiller in USS THORN DD-988. Completed shipboard evaluation, and awarded contract for military specification prototype unit. Completed fabrication and initiated laboratory evaluation of 3,000 psi single-stage compressor. Continued laboratory testing of titanium-construction, variable-breadth-impeller fire pump. Completed propulsion shaft seal laboratory evaluations and revised specifications. Initiated laboratory tests of composite material pump. Completed shipboard evaluation of prototype water-cooled, solid state 60/400 Hz frequency changers. Continued shipboard technical evaluation of Standard Electronic Module shipboard elevator control system. Continued development of electric auxiliaries for DD-963 Class ships.

b. (U) FY 1983 Program: Complete ship evaluation of the industrial model reverse osmosis unit installed in DD-992 and complete design of 12,000 gallons per day military specification unit for operational evaluation. Complete design and initiate fabrication of low pressure, single screw military specification prototype air compressor, and complete specification for multi-stage 3,000 psi water-lubricated air compressor for operational evaluation. Complete evaluation of laboratory-model variable breadth impeller fire pump. Complete laboratory evaluation of balanced rotor single screw fuel oil service pump of cup-and-cylinder configuration and issue procurement solicitation for prototype unit. Issue contract for design and initiate fabrication of lightweight fuel oil purifier for high performance ship applications. Complete land-based test/evaluation of Navy-standard design vertical package conveyor. Continue development of general purpose machinery controller. Continue development of electric auxiliaries for DD-963 Class ships.

Program Element: 63513N

Title: Shipboard System Component Development

c. (U) FY 1984 Planned Program: Complete fabrication and initiate laboratory evaluation of 12,000 gallons per day military specification reverse osmosis desalinators. Complete laboratory evaluation of low pressure single screw air compressor and design of prototype 3,000 psi rotary air compressor. Complete laboratory evaluation of variable breadth fire pump and design for military specification unit. Complete design and fabrication prototype single screw fuel oil service pump. Complete fabrication of 25 gallons per minute, lightweight, fuel oil purifier. Continue operational evaluation of air-cooled models of Navy Standard Family 400 Hz Frequency Changers and initiate development of portable tester. Initiate development of improved shipboard salvage equipment for towing, buoyancy generation, salvage work systems, and dewatering.

d. (U) Program to Completion: This is a continuing program. Planned development completion dates for auxiliary system developments underway or planned are: FY 1985: - Single-screw, low-pressure air compressor; standard-model vertical package conveyor; air-cooled Navy Standard Family 400 Hz Frequency Changers. FY 1986 - Centrifugal fuel purifier for high-performance ship applications; composite-material-constructed overboard brine pump; synthetic-fiber rope; reverse osmosis desalinators. FY 1987 - Rotary, single-screw, fuel oil service pump; rotary, oil-free, high pressure air compressor; FY 1988 - Advanced oxygen-nitrogen gas generation system, integrated tank level indicator system; advanced circuit breakers and solid state bus transfer systems.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63514N
DoD Mission Area: 23A - Other Naval Warfare

Title: Shipboard Damage Control
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	20,249	23,628	4,401	16,299	Continuing	Continuing
S0384	Ship Survivability	16,348	18,272	8,032	6,368	Continuing	Continuing
S1121	Personnel Protection	2,351	2,251	1,055	1,893	Continuing	Continuing
R1545	LINK MACE	350	194	0	0	Continuing	Continuing
S1555	Ship Damage Control	1,200	2,911	3,273	3,884	Continuing	Continuing
S1607	EMPRESS II	0	0	1,241	4,154	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops the improved equipment, systems and design specifications and standards required for the protection of ships and their embarked personnel from the effects of hostile actions involving conventional, nuclear, chemical or biological weapons. Recent combat experience, peacetime disasters, and tests have highlighted the Navy's need to improve all areas of survivability. Survivability consists of the prevention, control, containment, and restoration of battle damage.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows:

(U) Project S0384, Ship Survivability FY 1982 funds were increased by 40 as the net result of Navy reprogrammings. FY 1983 funds were reduced by 24 due to Navy's application of a general Congressional reduction. The reduction of 7,287 in FY 1984 resulted from budget development decisions.

(U) Project S1121 Personnel Protection No change in FY 1982 and -7 in FY 1983 due to Navy's application of a general Congressional reduction. A decrease of -45 in FY 1984 is due to budget constraints.

(U) Project R1545, LINK MACE An increase of 350 was reprogrammed from S0384 in FY 1982.

(U) Project S1565, Ship Damage Control This program was established in FY 1982 for 1,200. A decrease of -71 in FY 1984 is for inflation.

(U) Project S1607, EMPRESS II -30 in FY 1984 due to budgetary constraints.

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Program Element: 63514N

Title: Shipboard Damage Control

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	23,941	18,659	23,659	21,834	Continuing	Continuing
S0364	Submarine Damage Prevention *	1,090	*	*	*	*	*
S0384	Ship Damage Prevention	18,208	16,308	18,296	15,319	Continuing	Continuing
S1121	Personnel Protection	1,544	2,351	2,258	1,900	Continuing	Continuing
R1545	LINK MACE	893	0	194	0	Continuing	Continuing
S1565	Ship Damage Control	0	0	2,911	3,344	Continuing	Continuing
S1607	EMPRESS II	0	0	0	1,271	Continuing	Continuing
W0592	Aircraft and Ordnance Safety	2,206	**	**	**	**	**

* S0364 transferred to PE 63561N Submarine (Advanced) in FY 1982.

** W0592 transferred to PE 63262N Aircraft Survivability and Vulnerability in FY 1982.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not Applicable.

F. (U) RELATED ACTIVITIES: Ships, Submarines and Boats Technology, PE 62543N; Ship Development (Advanced), PE 63564N; Ship Subsystems Development, PE 64567N; Ship Survivability, PE 64516N; Submarine Damage Prevention, PE 63561N Project S0364; Chemical, Biological and Radiological Defense Technology, PE 62764N; BW/CW Countermeasures, PE 64506N; Synthetic Firefighting, PE 64703N, Project S0791.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Surface Weapons Center, Dahlgren, VA; Naval Air Systems Command, Washington, DC; Naval Air Development Center, Warminster, PA; Naval Sea Systems Command, Washington, DC; Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI; Naval Clothing and Textile Research Facility, Natick, MA; CONTRACTORS: Scott Aviation, Lancaster, NY; Mine Safety Appliance, Pittsburgh, PA; George G. Sharp, Inc., Hyattsville, MD; Gibbs and Cox, Inc., New York, NY; Monsanto Research, Dayton, OH; Southwest Research Institute, San Antonio, TX; FMC/Northern Ordnance Division, Minneapolis, MN; Rockwell International, Pittsburgh PA; Applied Physics Laboratory/Johns Hopkins University, Laurel, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0384, Ship Survivability: This project develops technology and hardware that enhances (1) ship survivability and (2) combat systems, hull, mechanical and electrical systems and ship structure survivability to all weapons effects.

(U) In FY 1982 program consisted of full scale testing of threat protective systems for aircraft carrier magazines and continued comparisons of ship measurements. Nuclear vulnerability surveys were initiated on several ship classes. Defined combat system survivability requirements for use in Top level Requirements and equipment design specifications. Continued development of damage models for array antennas, and improved fragmentation and blast vulnerability data and fixes for electronic components, antennas and ordnance.

(U) The FY 1983 program consists of:

- o Initiating baseline requirements definition for a ship system interaction and damage assessment model.
- o Continuing full scale testing of large threat protection systems for aircraft carriers.

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Program Element: 63514N

Title: Shipboard Damage Control

- o Evaluation of specific design concepts for []
- o Completion of nuclear vulnerability survey and commencement of experimental evaluations of hardening designs.
- o Completion of advanced development design and fabrication of prototype hardened components for SPS-48 Radar, SPS-10/67 Radar, Navy Tactical Data System/LINK II, Close In Weapons Systems.
- o Testing and evaluation of prototype enhancement packages for MK-74 Missile Fire Control System (SPG-51D Radar), MK-86 Gun Fire Control System (SPQ-9 Radar) ASROC Launcher MK-32 Surface Ship Torpedo Tube.
- o Completing development and testing of Electromagnetic Pulse Transient Protection Devices.
- o Continuing development of survivability enhanced Hull, Mechanical and Electronic systems.
- o Continuing development of shipboard survivability design guidance.
- o Initiating investigations into chemical/bacteriological/radiological threat detection and protective devices and materials.

(U) For FY 1984, it is planned to:

- o Complete experimental work on large scale threat protection systems for aircraft carriers.
- o Complete evaluation of []
- o Continue development and application demonstration of nuclear hardening technology to existing mission essential systems.
- o Continue combat system technical base effort and equipment survivability enhancement tasks.
- o Complete development of ship survivability design guidance.
- o Complete development of ship systems interaction and damage assessment model (electrical power systems).
- o Continue development of chemical/bacteriological/radiation detection and protective devices and materials.

(U) Program to Completion will consist of:

- o Continuing development of nuclear hardening technology.
- o Development and full scale testing of design concepts for []
- o Continued development and testing of combat system antennas lightweight armor to provide improved antenna damage tolerance.)

Program Element: 63514N

Title: Shipboard Damage Control

- o Development of hardened back-up antennas for mission critical sensor functions.
- o Demonstration of a mission critical system casualty management system.
- o Continue development of chemical/bacteriological/radiation detection and protective devices and materials.

(U) Project S1121, Personnel Protection: This project provides for design and development of new and improved shipboard personnel protective clothing and equipment to protect ship's crew from effects of hostile actions and peacetime accidents. This CNO sponsored project was initiated to resolve a long neglected area of ship survivability.

(U) In FY 1982 program consisted of completed acquisition and fleet distribution of Fire Retardant Engineering coveralls. The MK-4 MOD 0 phone/talker helmet granted Approval for Production, acquisition initiated. Continued development of Fire Retardant Shipboard Uniform, General Purpose Battle Helmet, Auto Inflatable Life Vest, Body Armor, Ballistic Face Shields and Cold Water Survival Suit.

(U) The FY 1983 program consists of:

- o Fleet evaluation of prototype General Purpose Battle Helmets, Auto Inflatable Life Vests and Body Armor.
- o Continuing development of the Ballistic Face Shield and Cold Water Survival Suits.

(U) For FY 1984, it is planned to:

- o Obtain Approval for Production for the General Purpose Battle Helmet, Auto Inflatable Life Vests and Body Armor Suit.
- o Continue development of the Ballistic Face Shield and Cold Water Survival Suit.

(U) Program to Completion consists of:

- o Development and Approval for Production of major fleet personnel protective clothing and equipment requirements.

(U) Project R1545, LINK MACE - The details of this project are of a higher classification.

(U) Project S1565, Ship Damage Control: This project is developing damage control equipment, systems and advanced concepts and techniques to provide significantly improved capabilities to deal with battle damage and other casualties. These capabilities will enable more rapid and efficient ability to detect, suppress and control damage and to restore combat capabilities.

(U) In FY 1982 program consisted of completing a draft Military Specification for a Shipboard Fire Detection System. Testing was completed on a 12 gallon per minute injection pump as a replacement for the fixed FP-180 foam proportioner and on an in-line eductor as a replacement for the portable FP-180. Laboratory testing of a military specification balanced pressure proportioner was completed and a unit installed in USS NEW JERSEY. Work continued on the reduction of flammability and toxic gas evolution from burning shipboard cables. An improved Oxygen Breathing Apparatus Voice Amplifier was built and laboratory and field tests completed. Operational and environmental tests were completed on the life raft desalinator for making potable water.

Program Element: 63514N

Title: Shipboard Damage Control

(U) The FY 1983 Program consists of:

- o Completion of military specification on shipboard fire detection system.
- o Completion of system evaluation of improved shipboard fire-resistant coaxial cables.
- o Completion of testing of redesigned FP-180 and balanced pressure proportioners.
- o Conducting shipboard tests of infrared imaging device for seeing through smoke.
- o Continued damage control communications improvements including wire-free communications and improved sound powered telephone headset.
- o Initiate work on a damage control console, investigating state of the art and human factors.
- o Developing breadboard acoustic beacon emergency egress system.

(U) For FY 1984, it is planned to continue:

- o Development of a shipboard fire detection system.
- o Improvements in fire extinguishing agents, both liquid and dry chemicals, and systems.
- o Investigations into methods of controlling and removing smoke in shipboard fires.
- o Investigation and feasibility studies of real-time systems reconfiguration capabilities.

(U) Program to completion will consist of:

- o Continued development of Damage Control Console.
- o Continued development of acoustic beacon emergency egress system.
- o Continued development of improved extinguishing agents.
- o Continued development of improved systems for the mitigation of damage due to fire, smoke, and flooding affected structures.

(U) Project S1607, EMPRESS II - (Electromagnetic Pulse Radiation Environment Simulator for Ships) is a project which provides the capability to test Electromagnetic Pulse hardening fixes aboard ships by subjecting them to realistic simulations of the Electromagnetic Pulse environment. In FY 1982, initiated planning for FY 1984 start-up of program; continued this planning in FY 1983. This project starts in FY 1984 and will consist of:

- o Initiating major design and development contracts for the EMPRESS II pulser system and the barge/support systems.
- o Completing the detailed design of the pulser system and the data acquisition system.

Program Element: 63514N

Title: Snipboard Damage Control

(U) Program to Completion will consist of:

- o Completing the detailed design of the barge and supportive systems.

- o Initiating major contracts for the fabrication of the pulser system and the data acquisition system.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63515N
DoD Mission Area: 344 - Tactical Command and Control

Title: Advanced Identification Techniques
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCE (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,810	1,472	2,222	3,214	Continuing	Continuing
W0460	Advanced Non-Cooperative Identification Technology	3,810	1,472	2,222	3,214	Continuing	Continuing

A. this is a continuing program, the funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Long range all-weather Non-Cooperative Target Recognition will significantly enhance wartime Command and Control and permit Commanders to utilize the full capability of today's long range intercept radar and missiles, and the efficient and optimum allocation of resources. This project is exploiting

Cooperative Target Recognition solution. A cooperative technique, [] each of which provides a portion of the overall Non-Long Range Infrared Identification techniques are also investigated.] is also being developed. New

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 775 in FY 1983 was a result of Navy's application of a general Congressional reduction. The increase of 1,450 in FY 1984 is to fund the radar target identification system and the passive Non-Cooperative Target Recognition System.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	992	3,810	2,247	772	Continuing	Continuing
W0460	Advanced Non-Cooperative Identification Technology	992	3,810	2,247	772	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: The Air Force has developed an offshoot [] Techniques for the F-15 [] The Navy Target Recognition [] has been successfully interfaced and demonstrated on the HAWK, F-4J, F-14, improved HAWK missile systems, and the shipboard Terrier missile system. The Navy AN/SPG-55 and MK-115 shipboard systems also possess the technical characteristics that make them candidates []

Techniques development has also been adapted by the Air Force for the F-15 [] and by the Army [] This technology is also under development and evaluation for implementation in the Navy F-18 aircraft. Program Element 64267N, Project W0467, developed the F-14 Target Identification Software necessary to implement various [] Techniques algorithms.

Program Element: 63515N

Title: Advanced Identification Techniques

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent River, MD; Naval Air Development Center, Warminster, PA; Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Pt. Mugu, CA; Naval Research Laboratory, Washington, DC; and Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: Hughes Aircraft Co., Culver City, CA (MFS); Westinghouse Corp., Baltimore, MD; and Scope Electronics, Inc., Reston, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0460 - Advanced Non-Cooperative Identification Technology: This project provides for investigations, research and development and test of new and continuing advanced Non-Cooperative Target Recognition Techniques.

(U) The FY 1982 program:

- o Continued testing of the Shipboard Combat Identification Module.
- o Initiated program to develop the Radar Target Identification Device which will be used with radars which do not have digital programmable signal processors.
- o Continue Passive Non-Cooperative Target Recognition Development for F-14 aircraft.

(U) The FY 1983 program consists of:

- o Complete testing of the Shipboard Combat Identification Module.
- o Continue development and test of Radar Target Identification Device.
- o Continue [] development for F-14 aircraft.
- o Initiate development []

(U) The FY 1984 planned program consists of:

- o Development and test of a final configuration of the Shipboard Identification Module System.
- o Complete development and test []
- o Continue development and test of the Radar Target Identification System.

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

I. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63516N

DoD Mission Area: 237 - Naval Warfare Surveillance and Reconnaissance

Title: Radar Surveillance Equipment

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	495	8,131	TBD	TBD
S0181	Radar Reliability/Performance Improvement	0	0	0	2,348	TBD	TBD
S1627	Shipboard Electromagnetic Interference Fix and Sensors	0	0	495	490	0	985
S1703	Modular Integrated Radar System	0	0	0	5,293	TBD	TBD

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program emphasizes the identification and advanced development of improvements to existing Fleet radars and Combat Systems sensors to improve their mission effectiveness and minimize the performance degrading effects of electromagnetic interference.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: Not applicable. Program not funded in FY 1983.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: Not applicable. Program not funded in FY 1983.

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

F. (U) RELATED ACTIVITIES: Under PE 65803N, Project X0706, Electromagnetic Spectrum Management, related background work has, and is currently being accomplished to define sensor classes and specific equipment types which are to be dynamically stimulated; to identify special signal generation requirements not within existing capabilities; and to construct prototype hardware. Project S1627 will build on this groundwork starting in FY 1984.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, Virginia, and White Oak, Maryland.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S1627, Shipboard Electromagnetic Interface Fix and Sensor Kits: (NEW START) The purpose of the Shipboard Electromagnetic Interference Fix and Sensor Kit project is to develop equipment for performance evaluation and repair of shipboard sensor systems such as search, fire control, and navigation radars and electronic warfare equipment. This is an emergent requirement identified through the Naval Sea Systems Command Shipboard Electromagnetic Compatibility Program.

(U) In FY 1982, work was performed under PE 65803N, Project X0706, Electromagnetic Spectrum Management. Performed field tests of a prototype device and modified the device as indicated by test results. Constructed sonar, optical, and special radio frequency signal prototype circuitry and incorporated them into prototype device. Identified representative operational scenarios simulated by sensor exerciser and initiated design for the device and associated shipboard equipment interface.

(U) The FY 1983 program was not funded.

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Program Element: 63516N

Title: Radar Surveillance Equipment

(U) For FY 1984, it is planned to:

- o Complete final design and perform engineering development of this design.
- o Complete field tests and evaluation of prototype device.

(U) Program to completion:

- o Provide management support for production devices and coordination support for shipboard testing, and installation integration.
- o Continue in Fleet investigation, considering changing populations, combat systems and threats.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63519N
DoD Mission Area: 345 - Tactical Communications

Title: Advanced Command Data Systems
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,359	4,387	2,544	6,079	Continuing	Continuing
S0245	Tactical Data Systems	2,359	4,387	2,544	6,079	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element develops standard shipboard Command Data Systems hardware, software, and system interaction techniques to respond to the increasing complexity of operational situations being experienced by tactical commanders.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are: In FY 1982, no change. In FY 1983 a decrease of 25 is due to Navy's application of a general Congressional reduction. The FY 1984 reduction of 2,482 is the result of overall Navy Research and Development budget adjustments to accommodate the technology effort for Block I Combat Direction System transfer into the PE 64518N, Combat Information Center Conversion, effort for the Aircraft Carrier Block I upgrade.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	362	2,359	4,412	5,026	Continuing	Continuing
S0245	Tactical Data Systems	0	2,359	4,412	5,026	Continuing	Continuing
X0710	Low Cost Link II	362	0	0	0	0	4,380

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Program Element 63228N, CV ASW Module; Program Element 63582N, Combat System Integration; Program Element 64518N, Combat Information Center Conversion.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Laboratory is the Naval Ocean Systems Center, San Diego, CA. OTHERS: Fleet Combat Direction Systems Support Activity, Dam Neck, VA; Fleet Combat Direction Systems Support Activity, San Diego, CA; Naval Postgraduate School, Monterey, CA. CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; American Systems Corporation, San Diego, CA; SEMCOR, Arlington, VA; Automation Industries, Vitro Laboratories, Silver Spring, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0245, Tactical Data Systems: The Tactical Data Systems project provides systematic development of combat direction systems for combatant ships to improve command support, increase sensor/weapon employment effectiveness, enhance multi-unit coordination, develop new software and hardware concepts, reduce Combat Information Center manning requirements, and maintain technological advances. This project will be applicable to multiple ship classes and provides the major design effort for Combat Direction System/Navy Tactical Data System upgrades for all major platforms.

Program Element: 63519N

Title: Advanced Command Data Systems

(U) In FY 1982, the following work was accomplished:

- o Completed multi-source track management design and modeling.
- o Completed advanced command decision and display aid designs.
- o Commenced design for incorporation of Joint Tactical Information Distribution System, Tactical Data Link J, Standardization Agreement 1241, etc., into Advanced Combat Direction Systems.
- o Initiated engineering development model specifications for Advanced Combat Direction System development to be completed under Program Element 64518N, Combat Information Center Conversion.

(U) The FY 1983 program consists of:

- o Producing standards for computer program production, symbology, identification structure and support documentation, to be applied within Advanced Combat Direction Systems.
- o Defining performance and design requirements to ensure that adequate gridlock/force track alignment and warfare area commander capabilities are implemented in Block 0 and Block 1 Advanced Combat Direction Systems and adequately support operations with AEGIS capable ships.
- o Preparing specifications for augmenting Restructured Navy Tactical Data Systems computer program generation tools to be applied within Advanced Combat Direction Systems.
- o Continuing design for incorporating Standardization Agreement 1241 (I.D.), Model 5.0, Joint Tactical Information Distribution System Stage 2, Tactical Data Link J and Link II improvements in Advanced Combat Direction Systems.
- o Completing system-level specifications to the Block 1 Engineering Development Model contract to be accomplished under Program Element 64518N, Combat Information Center Conversion.

(U) For FY 1984, it is planned to:

- o Update system level specifications for Block 1 Advanced Combat Direction Systems.
- o Prepare specifications for engineering development model hardware and software design enhancements.
- o Continue design analyses and modeling of new Advanced Combat Direction System capabilities and techniques.
- o Complete design for augmenting Restructured Navy Tactical Data Systems computer program generation tools.
- o Complete design for incorporating Standardization Agreement 1241, Model 5.0, Joint Tactical Information Distribution System Stage 2, Tactical Data Link J and Link II improvements in Advanced Combat Direction Systems.
- o Program to completion: Complete specifications for the total family of Advanced Combat Direction Systems that will eventually replace the current Navy Tactical Data System.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984. Not Applicable.

FY 1984 RIT&E DESCRIPTIVE SUMMARY

Program Element: 63522N Title: Advanced Submarine Support Equipment Program
DoD Mission Area: 324 - Tactical Intelligence and Related Budget Activity: 4 - Tactical Programs
Activities Capabilities Development

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		4,881	2,322	5,753	4,951	Continuing	Continuing
X0770	Advanced Submarine Support Equipment Program	4,881	2,322	3,794	2,890	Continuing	Continuing
S1739	Submarine Arctic Warfare Development	0	0	1,959	2,061	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: X0770, Advanced Submarine Support Equipment Program: The program is designed to enhance the capability of submarines to conduct productive tactical surveillance and other submarine support missions. It uses the latest advances in technology to ensure timely response. The advanced development is directed at determining technical feasibility, military usefulness and financial acceptability of alternative advanced systems and techniques to enhance the attack class submarine surveillance capability to meet tactical support requirements. This program develops advanced development model equipments to provide development testing of theoretical concepts for application within various systems. S1739, Submarine Arctic Warfare Development: The program is designed to advance the capability of submarines to conduct warfare in the Arctic including ASW, mining, tactical surveillance, and other submarine support missions. It explores the latest technology to improve the capabilities of present class SSN submarines to operate under and in the unsigned ice zones and pack ice of the northern hemisphere. Additionally, environmental and barometric data is collected in all efforts to improve knowledge of this particularly difficult environment. Advanced development is aimed at identifying technically feasible, militarily useful and financially acceptable advanced systems and techniques to enhance the ability of the attack class submarine to conduct surveillance and offensive warfare in the Arctic regions in order to meet tactical and strategic objectives.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a FY 1982 reduction of 94 due to refinement of cost data, an FY 1983 reduction of 775 due to funding of higher priority Navy projects. FY 1984 increases by 1959 due to the start of project S1739 while project X0770 decreases by 271 due to budgetary constraints.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		2,232	4,975	3,097	4,065	Continuing	Continuing
X0770	Advanced Submarine Support Equipment Program	2,232	4,975	3,097	4,065	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: X0770, Advanced Submarine Support Equipment Program: The work in this program dovetails with the development of those systems under Program Element 64515N, Project X0775, Submarine Support Equipment Program (Engineering). Also, there is very close coordination with technical sensors in Program Element 31325N, Project X0122, PRAIRIE WAGON. Close monitoring of other defense and federal agencies is conducted by the Naval Material Command, Chief of Naval Operations, Assistant

Program Element: 63522N

Title: Advanced Submarine Support Equipment Program

Secretary of the Navy (Research, Engineering and Systems), and Under Secretary of Defense for Research and Engineering to take advantage of all available technology and to prevent unnecessary duplication of effort.

G. (U) WORK PERFORMED BY: X0770, Advanced Submarine Support Equipment Programs: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Research Laboratory, Washington, DC; David W. Taylor Naval Ship Research and Development Center, Bethesda and Annapolis, MD; Naval Underwater Systems Center, New London, CT and Newport, RI. CONTRACTORS: ARGO Systems, Palo Alto, CA; General Research Corporation, SWL Division, McLean VA; GTE Sylvania, Mountain View, CA; Litton Systems, Inc., ANECON Division, College Park, MD; Sanders Associates, Nashua, NH; Teledyne, Inc., Micronetics Division, San Diego, CA; and five others. S1739, Submarine Arctic Warfare Development: IN-HOUSE: Arctic Submarine Laboratory, Naval Ocean Systems Center, San Diego, CA; Naval Postgraduate School, Monterey, CA; Naval Research Laboratory, Washington, DC; Naval Surface Weapons Center, White Oak, MD. CONTRACTORS: Polar Research Laboratory, Santa Barbara, CA; Applied Physics Laboratory, University of Washington, Seattle, WA; and United States Coast Guard, Department of Transportation, Washington, DC.

4. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0770, Advanced Submarine Support Equipment Program: [

] This program develops new diverse sensor/support systems to keep abreast of such new threat systems. It uses the latest advances in technology to ensure timely response to newly identified or suspected foreign threat signals. The program is directed at establishing the feasibility of a number of techniques and associated devices/equipment to enhance the tactical surveillance capabilities of U.S. submarines. For example, [improvements for the Type 18 periscope have been developed and tested. An Interferometer Direction Finding System was developed and completed operational evaluation in 1982. This advanced development will be directed at determining technical feasibility, military usefulness, and financial acceptability of alternative advanced sensor systems and techniques.

(U) In FY 1982 development continued on the following projects:

- o Improved submarine [] materials
- o Electronic Support Measures [] and automation
- o Periscope anti-fouling techniques
- o []
- o Improved antennas []

(U) The FY 1983 program consists of:

- o Continuing the above tasks
- o Starting design/development work of the Submarine Advanced Combat System Electronic Support Measures system

(U) For FY 1984 it is planned to:

- o Continue FY 1982 and FY 1983 tasks that have not moved into engineering development.

Program Element: 63522N

Title: Advanced Submarine Support Equipment Program

- o Start advanced development work on [] new reconnaissance scope, replacement for 617 class radar direction finding antenna, fiber optics, and [] antenna and receiver.

(U) This program element develops advanced development model equipment to support development tests of theoretical concepts for application within various systems.

(U) Program to Completion: This is a continuing program that includes the tasks listed above for FY 1982/1983/1984.

(U) Project S1739, Submarine Arctic Warfare Development: The requirement for a capability to conduct warfare in the Arctic []

time environment under the ice. This program focuses on the development of improved arctic equipment for SSN's such as improved under ice sonar and weapons. [] to operate in a war

(U) For FY 1984:

- o Test an advanced developmental model []
- o Experiment [] to reduce deterability.
- o Refurbish ice pool in preparation for submarine component structural tests.
- o Continue work on submarine []
- o Support experimentation []
- o Test submarine []

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: None.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63525N
DoD Mission Area: 235 - Naval Warfare Support

Title: Pilot Fish
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	61,388	93,823	97,328	120,528	Continuing	Continuing
T0428	Pilot Fish	61,388	93,823	97,328	120,528	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63528N

Title: Non-Acoustic Anti-Submarine Warfare

DoD Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,464	11,533	13,375	23,174	Continuing	Continuing
S0967	Non-Acoustic Anti-Submarine Warfare	9,464	11,533	13,375	23,174	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Continuing advances in Soviet submarine technology (

] The purpose of this program is to review the progress in Non-Acoustic Anti-Submarine Warfare in the areas of basic research, exploratory development, and the work accomplished by the Navy's strategic submarine security program, and to select those Non-Acoustic Anti-Submarine Warfare concepts that offer the greatest potential for exploitation. Those concepts will then be assembled and technically and operationally assessed in this advanced development program, for implementation on air, surface, and submarine anti-submarine warfare platforms.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary reflect for FY 1982/

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,984	11,164	11,533	15,053	Continuing	Continuing
S0967	Non-Acoustic Anti-Submarine Warfare	12,984	11,164	11,533	15,053	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: This program will draw heavily on the non-acoustic work already accomplished and continuing (

] The Defense Advanced Research Projects Agency is also conducting basic research in non-acoustic phenomena. Coordination of these efforts is being accomplished through the Coordination Committee for Development of Non-Acoustic Anti-Submarine Warfare Techniques which consists of the top level management of all related Non-Acoustic Anti-Submarine Warfare activities. The committee reviews all efforts in the field of non-acoustics and ensures that redundant efforts are avoided.

Program Element: 63528N

Title: Non-Acoustic Anti-Submarine Warfare

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is Naval Underwater Systems Center, Newport, RI. OTHERS: Naval Ocean Systems Center, San Diego, CA; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; Texas Instruments Corp., Dallas, TX; D. H. Wagner Associates, Paoli, PA; TRW Space Systems, Redondo Beach, CA; others to be determined.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: None.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project S0967, Non-Acoustic ASW

1. (U) DESCRIPTION (Requirement and Project: Developments in the U.S. non-acoustic technology have, to date, been centered around

The occurrence of non-acoustic phenomena may be classified into three general categories based on the underlying physics which describe the generation of the observable phenomena. Motion phenomena include observable signatures of the submarine that are created by the disturbance of the ocean medium through which it is moving. Emissions include all effluents that are deposited in the ocean medium of the submarine, and any electromagnetic fields that are created by either the operation of machinery or the flow of water around the submarine body. The passive category includes observable phenomena that are independent of the motion or actions of the submarine. The understanding of these phenomena and their detection lies in the forefront of science and technology and has been limited to work that falls in the areas of fundamental research and exploratory development. Because of the budding and dynamic nature of non-acoustics it is essential that the progress to date be fully assessed. Furthermore, those techniques with sufficient maturity must be evaluated in the context of an advanced development program in order to gauge their military utility.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program:

Assessment of a new candidate technology was initiated. The details of this program are of a higher classification.

b. (U) FY 1983 Program: Assessment of new candidate technology continues. Details of this effort are of a higher classification. System studies continue

Assessment of other non-acoustic detection techniques will continue. Integration of proven concepts into planned ship, submarine, and airborne data processing and display systems will be defined and evaluated.

c. (U) FY 1984 Planned Program: Assessment of new candidate technology continues. The increase between FY 1983 and FY 1984 is due to commencement of major at-sea testing. Details of this effort are beyond the classification of this document.

Assessment of other non-acoustic detection techniques will continue, and integration plans will be definitized and tested.

Program Element: 63528N

Title: Non-Acoustic Anti-Submarine Warfare

- d. (U) Program to Completion: This is a continuing program.
- e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63529N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Advanced Anti-Submarine Warfare Target
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	832	3,907	3,865	16,499	93,014	120,376
S0968	Advanced Anti-Submarine Warfare Target Quantity	832	3,907	3,865	16,499	93,014 (DT&E/OT&E)	120,376 (n)

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The development program will provide an Advanced Anti-Submarine Warfare Target and associated support equipment which will realistically simulate the submarine threat postulated for the 1990's. The Advanced Target will be an underwater vehicle capable of duplicating the acoustic and dynamic characteristics of current and future threat submarines. Such a mobile target does not currently exist, but is required to provide the maximum degree of target realism. The primary mission of the target is for training of fleet personnel, with a secondary mission of test and evaluation of advanced weapons currently in development. Targets MK-30 Mod 1 and MK 27 Mod 0 are presently in the Navy's inventory but they will not provide the degree of threat realism required nor are their design characteristics compatible with new advanced sensor and weapon systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: decrease of 12 in FY 1983 results from Navy application of a general Congressional reduction; the FY 1984 reduction of 6,819 was due to a Navy decision to develop the required capabilities incrementally; and the increase of 33,221 for Total Estimated Cost is due to program restructuring.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands)

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	759	832	3,919	10,684	69,461	87,155
S0968	Advanced Anti-Submarine Warfare Target	759	832	3,919	10,684	69,461	87,155

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: None.

F. (U) RELATED ACTIVITIES: Program Element 63610N/64610N, Advanced Lightweight Torpedo, which is developing a lightweight torpedo and Program Element 63691N, MK-48 Advanced Capability Torpedo, which is developing further improvements to the MK-48 heavyweight torpedo.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; Naval Underwater Systems Center, Newport, RI (lead laboratory). CONTRACTOR: To be determined.

Program Element: 63529N

Title: Advanced Anti-Submarine Warfare Target

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0968, Advanced Anti-Submarine Warfare Target: The present submarine threat is simulated by the Mobile Targets MK-27 Mod 0 and MK-30 Mod 1 for Anti-Submarine Warfare fleet training and sensor and weapons evaluation. However, the future submarine threat is characterized as being faster, deeper and quieter. Available targets will not provide an adequate representation of these enhanced characteristics. To counter this expanded scenario of sophistication, new Anti-Submarine Warfare weapons such as the Advanced Lightweight Torpedo and the MK-48 Advanced Capability Torpedo are now in development. As a result, development of an advanced Anti-Submarine Warfare Target is necessary to provide a proper degree of threat representation for fleet Anti-Submarine Warfare training. It is planned to incrementally develop a mobile target which will be acoustically and functionally capable of realistically exercising and evaluating new acoustic sensors and weapons as well as fleet Anti-Submarine Warfare forces. These new target capabilities are in the areas of (

└ Other characteristics desirable in the new target include: (

| New technologies (will be investigated and incorporated, as applicable, during the target development process. The six targets available by the end of engineering development are required to support operational evaluation and technical evaluation prior to reaching a production decision.

(U) In FY 1982, the project continued development of the prime item specification and testing was completed for helicopter launch and recovery.

(U) In FY 1983 the project will:

- o Complete the Test and Evaluation Master Plan
- o Commence preparation of subsystem specifications and a request for procurement of the first incremental development contract.

(U) In FY 1984, the project will initiate design and development of the first incremental upgrade to provide compatibility with the MK-48 Advanced Capability Torpedo.

(U) During the outyears, the project will:

- o Complete development of the first incremental upgrade for MK-48 Advanced Capability Torpedo.
- o Initiate development of the second incremental upgrade for the Advanced Lightweight Torpedo (FY 1986) and commence development of improvements to increase sonar system realism (FY 1986); these developments should complete during FY 1990.
- o Initiate third and final incremental upgrade to provide expanded acoustic frequency range for the sonar system (FY 1990); development should complete in FY 1991.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63531N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: HY-130 Steel
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	955	3,000	1,952	0	0	43,218
S0385	HY-130 Steel	955	3,000	1,952	0	0	43,218

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1984 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Certify HY-130 Steel (130,000 pounds per square inch yield strength) for future attack submarine construction. Supports Submarine Improvement Technology mission.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary (increases of 3,000 in FY 1983 and 1,952 in FY 1984) result from the extension of the program through those years from the anticipated completion date of FY 1982 due to restructure of program as described below.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,533	955	0	0	0	38,266
S0385	HY-130 Steel	1,533	955	0	0	0	38,266

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: None

F. (U) RELATED ACTIVITIES: Exploratory Development Program Ships, Submarines and Boats Technology, PE 62543N, SF-43-422-250, Structures for Combatant Submarines.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea System Command, Washington, D.C.; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; David W. Taylor Naval Ship Research and Development Center Detachment, Annapolis, MD; Mare Island Naval Shipyard, Vallejo, CA. CONTRACTOR: General Dynamics Corporation, Electric Boat Division, Groton, CT.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0385, HY-130 Steel: This project provides for a less costly alternative than the Nuclear Hull Test Vehicle, PE 64559N, to certify HY-130 Steel for use in construction of deeper-diving combatant submarines. The DOLPHIN Hull Test Vehicle approach will be representative of a conceptual SSN hull and be fabricated in a realistic shipyard environment involving real schedule constraints, and ways and dockside conditions, application of more stringent welding procedures, production inspection and repairs and shipyard production personnel.

(U) in FY 1982, the laboratory, shipyard and industry-formed HY-130 steel development/certification program was successfully completed.

Program Element: 63531N

Title: HY-130 Steel

(U) The FY 1983 program consists of those efforts necessary to get the DOLPHIN Hull Test Vehicle certification approach started by performance of and completing a contract design in eight months, requalification of industrial supplies of HY-130 Steel product forms and providing for design planning support.

(U) The FY 1984 program consists of continuing design supports that plan development, detail design, some materials, procurement and the start of fabrication of Navy lead time items.

(U) Program to completion will be determined at a later date.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63532N
DoD Mission Area: 238 - Other Naval Warfare

Title: Ship Systems Engineering Standards
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,257	4,993	4,565	4,788	Continuing	Continuing
S1379	Ship Systems Engineering Standards	9,257	4,993	4,565	4,788	Continuing	Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Ship Systems Engineering Standards Program will develop engineering standards to allow the decoupling of platform and payload by completing definition of the interface constraints early in the design process. This will reduce the risks in concurrent development, shorten construction time and greatly reduce the time required for modernization/conversion.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: Reprogramming by Navy resulted in a reduction of 721 in FY 1982. In order to accelerate the development of the Ship System Engineering Standards, maintain compatible schedule, and support the DDG-51 acquisition, Congress appropriated an additional 3,251 in FY 1983. Minor budgetary adjustments of -7 in FY 1983 result in a new total of 4,993 (a total increase of 3,244). FY 1984 was increased during FY 1984 budgetary development by 2,893 in order to accelerate the program.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,933	9,980	1,749	1,672	Continuing	Continuing
S1379	Ship Systems Engineering Standards	5,933	9,980	1,749	1,672	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: The Ship Systems Engineering Standards Program includes both generic type work and applications-oriented work. The generic work was to be funded under PE 63532N. Congress appropriated an additional \$7,900,000 in FY 1982, needed to support the Variable Payload Ship design of the DDGX in this program element.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; Naval Electronics Systems Command, Washington, DC; Naval Air Systems Command, Washington, DC; Naval Facilities Engineering Command, Washington, DC; Naval Shipyards; Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Dahlgren, VA; David Taylor Naval Ship Research and Development Center, Bethesda, MD. CONTRACTORS: Sperry, Reston, VA; Martin-Marietta, Baltimore, MD; FMC, Minneapolis, MN; Ingalls, Pascagoula, MS; Todd, San Pedro, CA; Hughes Aircraft Co., Ground Systems Group, Fullerton, CA; Bath Iron Works Corp., Bath, ME; RCA Corp, Moorestown, NJ; Lockheed Electronics Co., Plainfield, NJ; and John C. McMullen Associates, Inc.; Arlington, VA.

Program Element: 63532N

Title: Ship Systems Engineering Standards

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S1379, Ship Systems Engineering Standards: The design, construction, and modernization of surface combatants has become increasingly complex in the last twenty years. The development of the Ship Systems Engineering Standards process will enable the hull and payload to be simultaneously and independently designed and constructed. The product of the Ship Systems Engineering Standards Program will be a set of comprehensive design standards and guidelines for the application of these standards to new ship and combat system design and construction. The Ship Systems Engineering Standards Program will provide improvements in these areas: combat system state-of-the-art technology available earlier for Fleet initial operating capability, single ship design to satisfy a variety of requirements--standard hull provides economy of scale, separation of platform and payload simplify shipyard process and shortens construction time by 3 months, and modernization/conversion by approximately 20%.

(U) The FY 1982 program, completed the Mid-Size Combatant notional design for developing Variable Payload Destroyer Standards. Developed a draft of the Preliminary Zone Standards for Variable Payload Destroyers. Developed initial Test Implementation Plan. Developed alternative weapon module and zone designs for applications to the DDG-51. Completed a sample Gun Fire Control System Standard. Started DDG-51 Variable Payload.

(U) FY 1983 program consists of:

- o Concept Design of the DDG-51 Variable Payload.
- o Interface Development Center testing requirements.
- o Small-Size Combatant notional design for developing Variable Payload Frigate Standards.
- o Draft of Module Standards
- o Zone and Module Mock-up
- o Draft of Topside Standards
- o Large-Size Combatant notional design for developing Variable Payload Cruiser Standards.

(U) FY 1984 program will:

- o Continue development of the DDG-51 Variable Payload
- o Define Standards for Variable Payload Destroyers.
- o Initiate test program.
- o Develop zone mock-up

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&F DESCRIPTIVE SUMMARY

Program Element: 63537N

Title: Retract Silver

DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING). (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	63,446	94,365	144,991	105,710	Continuing	Continuing
R1483	Retract Silver	63,446	94,365	144,991	105,710	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

b. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63539N
DoD Mission Area: 235 - Naval Warfare Support

Title: Retract Amber
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,545	13,017	4,057	0	0	44,087
R1367	Retract Amber	18,545	13,017	4,057	0	0	44,087

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1984 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63549N
DoD Mission Area: 235 - Naval Warfare Support

Title: Link Cedar
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	9,756	19,522	Continuing	Continuing
R1774	Link Cedar	0	0	9,756	19,522	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63553N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Surface Anti-Submarine Warfare
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1982 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,489	0	2,956	17,947	Continuing	Continuing
S0220	Advanced Surface Sonar	1,864	0	0	0	0	20,865
S0229	Surface Ship Silencing	3,625	0	2,956	17,947	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for Project S0229 and through completion for Project S0220.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops anti-submarine warfare improvements for surface ships with an ASM mission. Ongoing efforts focus on the development of cost effective means for reducing the sonar self noise to enable optimum utilization of present and future sonar systems and development of means to reduce radiated noise to enhance ship survivability, particularly at higher operating speeds.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profiles shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: the 394 decrease in FY 1982 results from reprogramming actions and an inflation adjustment; the 4,408 decrease in FY 1983 results from Congressional reduction; and the 1,759 decrease in FY 1984 results from the restructuring of Project S0229 for FY 1984 as a result of the FY 1983 Congressional reduction.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands)

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,030	5,883	4,408	4,715	Continuing	Continuing
S0220	Advanced Surface Sonar	2,279	1,864	0	0	0	20,865
S0229	Surface Ship Silencing	3,751	4,019	4,408	4,715	Continuing	Continuing

Program Element: 63553N

Title: Surface Anti-Submarine Warfare

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: (Dollars in Thousands)

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (Surface Ship Silencing, Hull, Mechanical and Electrical)	1,653	6,689	1,504	10,225	Continuing	Continuing
Quantities					Continuing	Continuing
FF 1052	(13)	(16)	(12)	-		
FF 1052	(26)	(34)	-	-		
FF 1052	-	(96)	(32)	(56)		
FF 1052	-	(14)	-	(16)		
FF 1052	-	(26)	-	-		
DD 963	-	(18)	-	(126)		
DD 963	-	(80)	-	(152)		
DD 963	-	(6)	-	(20)		
PFG-7	-	(24)	-	-		
PFG-7	-	-	-	(64)		
Over the Side Test Hardware	-	(6)	-	(4)		
Instrumentation	-	-	-	(1)		
CV Air	-	-	-	(1)		
OPN (AN/SQS-26/53/53A)	-	-	-	21,300	18,200	39,500
AN/SQS-26 Adaptive Noise Canceller	-	-	-	(51)	(43)	(94)

F. (U) RELATED ACTIVITIES: Program Element 62543N, Ships, Submarines and Boats Technology - Development of acoustic silencing technology; Program Element 25634N, Submarine Silencing - Development of noise reduction technology for submarines; Program Element 64713N, Tactical Towed Array Sonar - Development of towed array sensors for surface ship tactical use; and Program Element 25623N, Surface Ship Sonar Modernization - Development of preplanned product improvements for active/passive sonar systems.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Carderock, MD; Naval Underwater Systems Center, Newport, RI, and New London, CT; Philadelphia Naval Shipyard, Philadelphia, PA. CONTRACTORS: Applied Research Laboratory, Pennsylvania State University, State College, PA; EPOCH Engineering, Gaithersburg, MD; and General Electric Company, Syracuse, NY.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0229, Surface Ship Silencing: This project was initiated to develop cost effective means for reducing the sonar self-noise and radiated noise on surface ships to improve their anti-submarine warfare performance and their survivability, respectively, particularly at higher operating speeds. Reductions in sonar self-noise, propulsion and machinery radiated noise will enable optimum utilization of present and future acoustic sensor systems while also reducing the counter-detectability of the ships involved. Adaptation of technology developed in the Submarine Silencing Program (PE 25634N) and commonality across ship classes are stressed.

(U) In FY 1982, development efforts were completed for at-sea evaluation of [] FF 1052 Class ships; development efforts were continued on the AN/SQS-26 CX adaptive noise canceller and the FF 1052 Class [] and diagnostics were conducted on the DD-963 class.

Program Element: 63553N

Title: Surface Anti-Submarine Warfare

(U) The FY 1983 program is being restructured to allow continuation of at-sea evaluations of developed products during FY 1983 and to ensure that efforts prematurely terminated because deletion of FY 1983 funding can be picked up in an orderly manner in FY 1984.

(LD) For FY 1984, it is planned to:

- o Complete the evaluation of FF 1052 Class products [
- o Initiate DD 963 Class quieting developments, and
- o Initiate an FFG-7 quieting program, starting with diagnostics evaluation.

(U) For the outyears, this project will be a continuing effort.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63560N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Wide Aperture Array (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	23,560	15,820	14,101	TBD	TBD
S0222	Wide Aperture Array (Advanced) (Quantity - Advanced Development Model) 3/	(23,683)1/	23,5602/	15,820	14,101	TBD	TBD (1)

1/ FY 1982 funding for Project S0222 is contained in Program Element 63504N, Submarine Sonar Development (Advanced). The funding shown reflects the Wide Aperture Array sub-task amount in project S0222.

2/ Funding profile for FY 1983 Descriptive Summary was under Program Element 63590N.

3/ Procured prior to FY 1982 under Program Element 63504N.

The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops a Wide Aperture Array sonar system for use on attack submarines. The Wide Aperture Array will provide more accurate rapid passive ranging and tracking to support accurate delivery of the MK 48 torpedo and tactical cruise missiles against a maneuvering target. Present fire control systems utilizing passive data to generate an accurate range solution against an assumed non-maneuvering target. The Wide Aperture Array will also provide range information. The Wide Aperture Array will be capable of integration into the Submarine Advanced Combat System.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY 1982 increased by 170 due to a revision in cost estimates. FY 1983 decreased by 54 due to Navy application of a general Congressional reduction. FY 1984 increased by 1,113 due to revision in cost estimates, inflation and schedule slippage from previous year. Additional cost to completion and total estimated cost are listed as TBD due to program restructuring and schedule change to meet ship construction scheduled in a later fiscal year.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	23,614	14,707	37,847	160,414 1/
S0222	Wide Aperture Array (Advanced) (Quantity - Wide Aperture Array Advanced Development Model)2/	(14,493)1/	(23,513)1/	23,614	14,707	37,847	160,414 2/ (1)2/

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Program Element: 63560N

Title: Wide Aperture Array (Advanced)

1/ FY 1982 and prior-year funding for Wide Aperture Array is contained in Program Element 63504N, Submarine Sonar Development (Advanced). FY 1981 and 1982 estimates shown reflect the Wide Aperture Array sub-task amounts in Project S0222 in Program Element 63504N.

2/ Development/Operational Test and Evaluation; procured prior to FY 1981 under Program Element 63504N.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Program Element 63504N (Submarine Sonar Developments (Advanced)), Project S0223, Submarine Sonar System Advanced Development, provided the initial efforts prior to FY 1975. Program Element 63504N (Submarine Sonar Developments (Advanced)), Project S0222, Rapid Passive Localization Sonar, continued development through FY 1982. Program Element 64520N (Wide Aperture Array (Engineering)), Project S0198, will provide engineering development. Submarine Advanced Combat System, Program Element 64524N, Project S1347, is the combat system which will integrate Wide Aperture Array into future submarine combat system architectures.

G. (U) WORK PERFORMED BY: IN HOUSE: Lead labor is the Naval Underwater Systems Center, New London, CT. OTHERS: Naval Ocean Systems Center, San Diego, CA; Naval Weapons Support Center, Crane, IN; and Naval Surface Weapons Center, White Oak, Silver Spring, MD. CONTRACTORS: Raytheon, Submarine Signal Division, Portsmouth, RI, is the prime electronics contractor. Brunswick Corporation, Costa Mesa, CA is the prime array contractor. OTHERS: HITCO, Gardena, CA; General Dynamics Electric Boat Division, Groton, CT; Newport News Shipbuilding Co., Newport News, VA; EG&G Washington Analytical Services Center, Rockville, MD. There are six additional contractors.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: None.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S0222, Wide Aperture Array (Advanced)

1. (U) DESCRIPTION (Requirement and Project): Operational Requirement OR-AS55 contains the Rapid Passive Localization requirements for the Wide Aperture Array. Present fire control systems generate a solution against an assumed non-maneuvering target. The Wide Aperture Array will provide more accurate rapid ranging and tracking to support accurate delivery of the MK 48 torpedo and tactical missiles against a maneuvering target. The Wide Aperture Array The Wide Aperture Array project has been restructured from a development integrated into the Submarine Advanced Combat System to a stand alone advanced development model to evaluate the external array technology and associated ranging performance. The Wide Aperture Array is for potential installation on SSN 688 or future class submarines and will be capable of integration into the AN/BQQ-5 sonar or future platform sonars. One array (7 feet x 13 feet) and systems electronics will be tested at Seneca Lake. Advanced development model electronics and six (7 feet x 13 feet) arrays are being procured for Development/Operational Test I.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Electronics system design was completed, fabrication started and unit testing initiated. One array assembly was delivered, installed at Seneca Lake and array testing with the Lake Test Electronics was initiated. Design yard contract was awarded and installation design started. Dummy array installation on a 637 Class submarine was started for long duration array survivability tests.

b. (U) FY 1983 Program: Continue to monitor dummy array on 637 Class Submarine for long duration array survivability tests during October through December. During January through September conduct factory acceptance test of advanced development model sea test electronics. Complete advanced development model installation design. Complete development of target motion analysis

Program Element: 63560N

Title: Wide Aperture Array (Advanced)

module designs. Perform shock test on production compliant tube baffle segments and hydrophone assemblies. Complete lake test. Develop detection software for evaluation of Wide Aperture Array detection capability during sea test. Deliver six array assemblies to shipyard.

c. (U) FY 1984 Planned Program: Continue to monitor dummy array survivability test on 637 Class Submarine. Complete factory acceptance test and deliver Advanced Development Model electronics to shipyard. Install on [] submarine for Development/Operational Test I.

d. (U) Program to Completion: The Wide Aperture Array development model will complete Development/Operational Test I [] with Department of the Navy Systems Acquisition Review Council Milestone II review [] Full scale development will occur under Program Element 64520N (Wide Aperture Array (Engineering)), Project SC198, Wide Aperture Array, a planned [] new start. Four Engineering Development Models will be procured. Defense Systems Acquisition Review Council Milestone III review is scheduled for []

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63561N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Submarines (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	54,388	47,850	88,922	69,544	Continuing	Continuing
S0205	Submarine Atmosphere Control System	8,001	7,513	0*	0*	0*	0*
S0206	Submarine Ejection System	2,634	1,972	0	0	0	21,216
S0307	Advanced Submarine Control	2,895	2,511	2,934	3,433	Continuing	Continuing
S0344	Submarine Auxiliaries	2,643	2,459	1,329	6,962	Continuing	Continuing
S0348	Deep Components	4,605	1,981	4,983	1,962	Continuing	Continuing
S0364	Submarine Damage Prevention	1,373	1,188	1,459	2,349	Continuing	Continuing
S0923	Improved Performance Machinery	2,991	25,860	47,555	24,707	Continuing	Continuing
S0971	Submarine Shock	3,271	2,879	7,624	13,072	Continuing	Continuing
S1122	Titanium-100**	2,700	0	0	0	0	5,136
S1266	Submarine Propellers	3,474	1,487	16,828	17,059	Continuing	Continuing

* Program merged with Submarine Auxiliaries in FY 1984.

** Program cancelled in FY 1983.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: S0205 - Submarine Atmosphere Control System is developing systems control of atmosphere conditions. S0206 - Submarine Ejection System is developing a polymer system for speed increases and quieting. S0207 - Advanced Submarine Control will increase safety, effectiveness and speed by development of advanced control systems. S0344 - Submarine Auxiliaries will develop improved auxiliary machinery. S0348 - Deep Components is the effort to extend operational depths of future submarines. S0364 - Submarine Damage Prevention addresses fire prevention, detection, containment, and extinguishment. Current emphasis is being placed on extinguishment and fire hardening. The latter is being accomplished by identifying the more vulnerable fuel loads such as submarine hull insulation and developing or locating a more suitable replacement material. S0923 - Improved Performance Machinery is to increase power density in future submarines by minimizing the size of the propulsion plant. S0971 - Submarine Shock: The ability of a submarine to operate in conditions of present and projected threats is paramount to mission success.

S1122 - Titanium-100 will transition laboratory titanium technology to industry to provide Navy titanium hull requirements as a technology option. S1266 - Submarine Propellers: The objective of this project is to develop both the capability to reliably predict submarines propulsor performance and to analyze deviations from predicted performance so that future propulsors will perform as designed. A major emphasis of this project is the development and use of a large scale vehicle for propulsor design refinement and validation and thereby significantly diminish the need for Fleet services and to reduce transition time from R&D to Fleet utilization.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: (1) The FY 1982 total estimate has increased by 825 as a result of reprogramming 825 to Project S0971 for a HY-80 steel casting problem in the submarine shock program.

and of 300 for Submarine Damage Prevention, Project S0364, for accelerating the development of fire retardant hull insulation. The FY 1982 decreases of 903 in Deep Components, Project S0348, and of 375 in

Program Element: 63561N

Title: Submarines (Advanced)

Submarine Auxiliaries, Project S0344, was to support the above increases. (2) The FY 1983 total estimate has increased by 3,437 due to an increase of 3,967 in Improved Performance Machinery, Project S0923, which reflects an increase in effort, offset by the Navy's decision to terminate (reduction of 483) the Titanium-100, Project S1122, and minor inflation adjustments to other projects. (3) The FY 1984 total estimate has increased by 34,580. This is composed of a 2,181 increase in Submarine Shock, Project S0971, due to project acceleration (no net increase in total estimated cost for S0971); an increase of 4,901 in Submarine Auxiliaries, Project S0344, is due to the transfer of task previously under Submarine Atmosphere Control, Project S0205 (a reduction of 4,792); an increase of 13,025 in Submarine Propellers, Project S1266, due to the decision to build a Large Scale Vehicle test platform, a decrease of 451 in Titanium-100, Project S1122, reflecting the Chief of Naval Operations FY 1983 decision to terminate; increases of 16,859 in Improved Performance Machinery, Project S0923; 490 for Advanced Submarine Control, Project S0207, and 2,513 for Deep Components, Project S0348; and a decrease of 146 for Submarine Damage Prevention, Project S0364; resulting of restructuring to support the design of a new SSN, reprioritizing and minor inflation adjustments.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	34,079	53,563	44,413	54,342	Continuing	Continuing
S0205	Submarine Atmosphere Control System	3,848	7,023	7,522	4,792	9,600	53,747
S0206	Submarine Ejection System	2,272	2,634	1,972	0	0	21,216
S0207	Advanced Submarine Control	2,134	2,696	2,511	2,444	14,245	38,899
S0344	Submarine Auxiliaries	973	3,018	2,461	2,428	Continuing	Continuing
S0348	Deep Components	981	5,508	1,981	2,470	46,717	70,641
S0364	Submarine Damage Prevention	*	1,073	1,188	1,615	Continuing	Continuing
S0923	Improved Performance Machinery	19,302	22,991	21,893	30,696	Continuing	Continuing
S0971	Submarine Shock	1,472	2,446	2,882	5,643	110,183	129,100
S1122	Titanium-100	1,968	2,700	483	451	9,786	15,856
S1266	Submarine Propellers	1,129	3,474	1,520	3,803	Continuing	Continuing

Sub-Tasks and Quantities of test items associated with the above project listing are too numerous to tabulate.

* Funded under Program Element 63514N, Shipboard Damage Control, in FY 1981 and prior years.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Project S0205 (Submarine Atmosphere Control System) receives technology/

Auxiliaries. Project S0206 (Submarine Ejection System) is related to Submarine Silencing, Program Element 25634N; Acoustic Silencing, Program Element 62543N, Project SF43-452; and Submarine Draft Reduction, Program Element 64561N, Project S0411. Project S0207 (Advanced Submarine Control) received initial study support for its requirements from Program Element 63564N, Project S0408, Ship Development (Advanced). Project S0344 (Submarine Auxiliaries) receives technology development in the areas of compressors, distillers and fiberoptic monitors from Program Element 62543N, SF43-433, Auxiliaries. Project S0348 (Deep Components) utilizes a HY-130 hull baseline, complements Program Element 63531N, Project S0385, HY-130 Steel, provides technology inputs in the areas of piping, heat exchangers and fouling protection to Project S0923, Improved Performance Machinery, and reviews and utilizes technology from Project S0971, Submarine Shock. Project S0364 (Submarine Damage Prevention) receives technology support from Program Element 62543N, Ships, Submarines and Boats Technology, and is coordinated with Shipboard Damage Control under Program Element 63514N. Project S0923 (Improved Performance Machinery) provides equipment and system design information to Program Element 62543N, Ships, Submarines and Boats Technology; Program Element 63564N, Project S0408, Ship Development (Advanced); and Program Element 63588N, SSN Subsystem Technology program, Project S0001; reviews and utilizes material developed by Project S0348, Deep Components;

Title: Submarines (Advanced)

Program Element: 63561N

monitors developments for possible program inputs from Project S0344, Submarine Auxiliaries, and includes the latest shock information and data developed under Project S0971, Submarine Shock. Project S0971 (Submarine Shock) uses the technology developed by Program Element 62543N, Ships, Submarines and Boats Technology, Task SF43-451, Survivability and Task SF43-422, Structural Design and Test. Shock is an important requirement in following programs which involve developing submarine systems with improved performance at minimum cost: Program Element 63569N, Attack Submarine Development; Program Element 63588N, SSBN Subsystem Technology; and Projects S0148 (Deep Components) and S0923 (Improved Performance Machinery) of this Program Element. Project S1122 - Titanium-100 is based on technology provided by Program Element 62761N.

Project S1266 (Submarine Propellers) is coordinated with Program Element 25643N, Project S0218, Submarine Silencing; Program Element 64561N, Project S0411, Submarine Drag Reduction; Program Element 62543N, SF43-432, Main Propulsion Technology; and Program Element 63728N, Project Z1050, Manufacturing Technology.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory for Projects S0205 (Submarine Atmosphere Control System) and S0364 (Submarine Damage Prevention) - Naval Research Laboratory, Washington, DC; for Project S0206 (Submarine Ejection System) - Naval Ocean Systems Center, San Diego, CA; for Project S0207 (Advanced Submarine Control) - Naval Coastal Systems Center, Panama City, FL; for Project S0344 (Submarine Auxiliaries) - Naval Ship Research and Development Center, Annapolis, MD; for Projects S0348 (Deep Components), S0923 (Improved Performance Machinery), S0971 (Submarine Shock), and S1266 (Submarine Propellers) - David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. OTHERS IN HOUSE: Naval Underwater Systems Center, Newport, RI; Naval Ship Systems Engineering Station, Philadelphia, PA; Puget Sound Naval Shipyard, Bremerton, WA; Naval Ocean Research and Development Activity, Bay Saint Louis, MS; Naval Surface Weapons Center, Dahlgren, VA. 3 additional activities involved. CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; Westinghouse Electric Corporation, Sunnyvale, CA; Bolt, Beranek and Newman, Boston, MA; Westinghouse Electric Corporation, Pittsburgh, PA; Weidlinger Associates, New York, NY; United Technologies, Hartford, CT; General Electric, Lynn, MA; Fitchburg, MA; Binghamton, NY; and Schenectady, NY; Curtiss-Wright Corporation, Woodbridge, NJ; Vitro Laboratories, Silver Spring, MD. 25 additional contractors involved.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0205, Submarine Atmosphere Control System: The present Atmosphere Control System on nuclear submarines was put together by adapting individual existing commercial equipments and processes available in the 1950's. The net result has led to numerous deficiencies. A controlled atmosphere is essential to the mission of nuclear submarines. Maintaining an adequate atmosphere during long submergence involves processing of air to achieve temperature and humidity control, oxygen replenishment, removal of carbon dioxide, carbon monoxide and hydrogen, and atmosphere constituent sensing and monitoring. The Advanced Submarine Atmosphere Control System is designed to eliminate all known deficiencies, will be more reliable and maintainable and will meet the latest design performance requirements established by Operational Requirement SL-67R1. Savings in space, weight and power requirements will result from this development.

(1) In FY 1982, completed fabrication and initiated laboratory evaluation of [

] Completed fabrication of full scale military specification prototype solid polymer electrolyte oxygen generator. Completed fabrication and initiated first article testing of central atmosphere analyzer Mark-II. Continued development and initiated ship testing of intumescent and non-intumescent (non-swelling) paints for underway use. Work on a 0.2 percent carbon dioxide removal plant has been deferred. Completed operational evaluation of thermoelectric solid state air conditioning system.

(U) The FY 1983 program consists of:

o [

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Title: Submarines (Advanced)

- o Complete formal technical evaluation of central atmosphere control system Mark-II and prepare installation package for selected hull.
- o Complete laboratory evaluation/testing of full scale military specification prototype of a solid polymer oxygen generator.
- o Initiate fabrication of second solid polymer oxygen generator and select candidate hull for operational evaluation.
- o Continue development of ship tests of interior intumescent and non-intumescent paint.

(U) For FY 1984, program transferred to S0344.

(U) Program to completion will consist of being transferred in FY 1984 to S0344.

(U) Project S0206, Submarine Ejection System:

(U) In FY 1982, [

(U) The FY 1983 program consists of:

- o [
- o [
- o [

(U) Project to end in FY 1983.

(U) Project S0207, Advanced Submarine Control: This program is directed toward improving the operational safety and combat effectiveness of submarines through the improvement of control system performance. These improvements will be made by better definition of performance criteria, better modeling of components and systems performance, better integration of the design process and, finally, improved prototype hardware. Such hardware will be designed, developed, and tested for eventual use in submarine programs.

(U) In FY 1982, work continued on the sternplane system on SSN 718 and advanced procurements were made. Operation of the submarine control system test vehicle was started. Development of the basic design tool was completed and work on development of the advance control system design tool continued. Work was started on improving the equations of motion.

(U) The FY 1983 program consists of:

- o [
- o [
- o [

Program Element: 63561N

Title: Submarines (Advanced)

(U) For FY 1984, it is planned to continue:

o [

(U) Program to completion will consist of:

o]

(U) Project S0344, Submarine Auxiliaries: The objective of this program is to develop standardized auxiliary machinery components and systems possessing improved effectiveness, reliability and maintainability. Goals include use of modular subsystem designs to achieve reduction in forced outages, maintenance man-hours at sea and improved monitoring capability.

(U) In FY 1982, completed fabrication of full scale prototype lead-acid battery cells and initiated performance and accelerated life testing. Completed design of full scale size nickel-cadmium battery system. Terminated further development of competitive nickel-iron system due to technical problems. Solicited proposals for development, test and evaluation of a reverse osmosis desalinator, and for design of the high pressure stage of a 4,500-pound per square inch compressor. Continued bearing service life tests and development of fiber optic machinery monitoring discriminants and initiated fiber optic bearing monitor at shipyard and tender sites. Completed design, fabrication and initiated testing of breadboard prototype of arcing fault detector in TRIDENT S8C nuclear prototype.

(U) The FY 1983 program consists of:

- o Complete accelerated life testing of full scale prototype lead-acid batteries and continue long life tests.
- o Fabricate full scale prototype nickel-cadmium battery system, and initiate cell performance and life tests.
- o Complete testing and evaluation of prototype arcing fault detector system and prepare for ship installation.
- o Defer development of reverse osmosis desalinator, 4,500-pound per square inch water-lubricated rotary high-pressure air compressor.
- o Continue fiber optic bearing performance monitor evaluation.

(U) For FY 1984, it is planned to continue to:

o [

Program Element: 63561N

Title: Submarines (Advanced)

(U) Program to completion will consist of: Complete operational evaluation of solid polymer electrolyte oxygen generator in FY 1986, and emergency smoke and carbon monoxide removal systems in FY 1988. Complete operational evaluation of reverse osmosis desalinators and lead-acid battery in FY 1986; fiber optic bearing performance monitor and depth detector in FY 1987; rotary high pressure air compressor in FY 1988; and nickel-cadmium battery in FY 1989; arcing fault detector in FY 1985; and intumescent and non-intumescent interior paints in FY 1985 and FY 1987.

(U) Project S0348, Deep Components: [

(U) In FY 1982, [

(U) The FY 1983 program consists of:

Program Element: 63561N

Title: Submarines (Advanced)

(U) For FY 1984, it is planned to continue:

(U) Program to completion will consist of: Complete development, test, evaluation, and certification of piping systems by 1987, emergency deballasting and heat exchangers by FY 1989 and pumps and shaft seal by FY 1991, and the remaining by FY 1997.

(U) Project S0364, Submarine Damage Prevention: This project addresses fire prevention, detection, containment, and extinguishment. Included in this is development of fire fighting hardware and agents, identification of fire threats and weaknesses, vulnerability of materials which constitute significant fuel loads, identification and or development of fire hardened replacement materials and guidance in fire fighting training.

(U) In FY 1982, [] a portable Aqueous Film-Forming Foam extinguisher has been identified for fleet use, a prototype quick don fire fighter suit has been evaluated in simulated submarine compartment, Aqueous Film-Forming Foam and water mist fixed suppression systems have undergone simulated submarine application tests, five contracts have been awarded to perspective manufacturers of a new fire safe hull insulation material and a revised chapter for the damage control manual has been issued to all submarines.

(U) The FY 1983 program consists of:

- o Delivery of 200 ft³ of insulation from five manufacturers of a possible material.
- o Delivery of portable Aqueous Film-Forming Foam fire extinguishers into the fleet.

Program Element: 63561N

Title: Submarines (Advanced)

- o Issue a change to the allowance list of fire extinguishers to submarines.
- o Delivery of quick don fire fighting suit for fleet evaluation.
- o Issue a shipalt for a chlorate candle locker.

(U) For FY 1984, it is planned to continue:

- o Delivery of a pilot plant run from two or more manufactures of hull insulation for evaluation of FIRE I, a 10,000 cu ft fire test chamber, at the Naval Research Laboratory.
- o Deliver a quick reaction water hose for fire fighting to the fleet.
- o Conduct shipboard testing of electrostatic precipitator capable of filtering fire smoke.

(U) Program to completion will consist of: Replacement of fire vulnerable materials of construction which represent a fire threat. Use of most modern fire protection equipment available in submarines where suitable. Identify possible fire threats and take corrective action.

(U) Project S0971, Submarine Shock: []

(U) In FY 1982, []

(U) The FY 1983 program consists of.

[]

(U) The FY 1984 program will continue the efforts discussed above. The increase in funding from FY 1983 to 1984 is due to project acceleration.

(U) Program to completion will consist of: []

Program Element: 63561N

Title: Submarines (Advanced)

(U) ✓

FY 1983

FY 1984

FY 1985

FY 1986

FY 1987

FY 1988

FY 1989]

(U) Project S1122, Titanium-100: In FY 1982, Phase I of the fabrication demonstration contracts was initiated. The Navy laboratory developed gas metal-arc welding technology was being transferred to industrial fabricators through written documentation of procedures and on-site training. The contractors were developing production-oriented procedures applicable to shipyard construction. Detailed drawings and fabrication plans were being completed by each fabricator.

(U) In FY 1983, the termination of contracts with Babcock and Wilcox and Lockheed Missile and Space Company, Inc., will be elected. All materials (T-100 plate and welding electrode) will be received and placed in storage at David Taylor Naval Ship Research and Development Center, Bethesda, MD.

(U) In FY 1984, the program has been terminated.

(U) Project S1266, Submarine Propellers: In FY 1982, ✓

(U) The FY 1983 program consists of:

o ✓

(U) FY 1984, it is planned to continue:

o ✓
o

(U) Program to completion will consist of: /

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project S0923, Improved Performance Machinery

1. (U) DESCRIPTION (Requirement and Project): The objectives of this project are to increase power density of future attack submarines by reducing the size and weight of the steam propulsion plant and associated auxiliary equipments while maintaining current standards of quieting, reliability, shock hardening, safety and maintainability. The approach is to investigate exploitation of existing technology for near-term payoff, low risk gains and investigate longer term technology developments which may permit significant long-term gains.

Program Element: 63561N

Title: Submarines (Advanced)

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued design/technology development under contracts awarded for components selected in FY 1979 and FY 1980. Completed preliminary design of advanced propulsion turbines/reduction gears. Started and continued advanced condenser, advanced heat exchanger, advanced ship service motor generator and advanced ship service turbine generator sets preliminary design(s). Continued geared ship service turbine generator set detail design and started fabrication. Continued integrated land base engineering facility planning and engineering effort and started conceptual design.

b. (U) FY 1983 Program: Continue design/technology development under contracts awarded for components selected in FY 1979 and FY 1980. Start detail design of advanced propulsion turbines/reduction gears. Complete advanced condenser, advanced heat exchanger, advanced ship service motor generator and advanced ship service turbine generator set preliminary design and start fabrication(s). Complete geared ship service turbine generator set detail design, fabrication and test. Continue integrated land base engineering facility planning and engineering effort, complete conceptual design and start preliminary design.

c. (U) FY 1984 Planned Program: Continue design/technology development under contracts awarded for components selected in FY 1979 and FY 1980. Complete detail design and start fabrication of advanced propulsion turbine/reduction gears, advanced service motor generator set, advanced ship service turbine generator set, advanced condenser and advanced heat exchanger. Continue integrated land base engineering facility planning and engineering effort, complete preliminary design, start detail design, order long lead time material and start fabrication. The increase in funding from FY 1983 to FY 1984 is due to program restructuring to support the design of a new SSN.

d. (U) Program to Completion: This is a continuing program. Complete prototype component fabrication and factory testing in parallel with construction of integrated land base engineering facility. Integrate components at test site and conduct system and component tests necessary to support approval for incorporation into submarine acquisition programs. FY 1985 reassessment of existing/advanced technology (the first since 1978) is expected to result in program additions.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63562N Title: Submarine Tactical Warfare Systems (Advanced)
DoD Mission Area: 233 - Anti-Submarine Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	98,550	7,012	13,863	14,887	Continuing	Continuing
S0210	Submarine Acoustic and Torpedo Countermeasures	705	2,391	3,753	4,314	Continuing	Continuing
S0221	Target Strength Reduction	5,768	1,536	7,336	7,226	Continuing	Continuing
S0311	MK 48 Advanced Capabilities (Advanced)	91,922	*	*	*	*	*
S0320	Submarine Weapons Stowage/Launch	135	0	0	0	0	135
S1686	Attack Submarine Combat Control Systems Improvement Program (Advanced)	**	3,085	2,774	3,347	Continuing	Continuing

* Project S0311 Torpedo Advanced Development transfers to Program Element 63691N in FY 1983.

** Funded in FY 1982 and prior years as the Low Ship Impact Ranging sub-task of the Wide Aperture Array (Advanced) program (project S0222 of Program Element 63504N).

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the advanced development of submarine tactical warfare systems which include submarine launched torpedoes, acoustic and torpedo countermeasure systems, the reduction of own-submarine target strength, and attack submarine combat system improvements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1984, the Project S0210 increase of 1,332 is due to start-up of (400) and Advanced Countermeasures Devices Development (932) transitioning from conceptual development. All other minor changes are due to revision of cost estimates including inflation. The decrease of -4,213 in Project S0221 in FY 1984 results from restructuring of the program to fund other higher priority programs and results in a delay in broadband coating installation for 2 years.

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Program Element: 63562N

Title: Submarine Tactical Warfare Systems (Advanced)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	91,943	98,415	7,032	17,033	Continuing	Continuing
S0210	Submarine Acoustic and Torpedo Countermeasures (Quantities; Sub-Tasks)	903	705	2,411	2,421	Continuing	Continuing (*)
S0221	Target Strength Reduction (Quantities; Sub-Tasks)	7,169	5,788	1,536	11,549	Continuing	Continuing (*)
S0311	MK 48 Advanced Capabilities (Advanced) (Quantity - Advanced Development Models)	83,871	91,922	(20,483)**	.0)**	**	(226,795)** (16)****
S1686	Attack Submarine Combat Control Systems Improvement Program (Advanced) (Sub-Tasks)	0***	0***	3,085	063	Continuing	Continuing (*)

* Sub-Tasks and Test Item Quantities for project S0210, S0221 and S1686 are too numerous to tabulate.

** Project S0311 MK 48 Advanced Capabilities transfers to Program Element 63691N in FY 1983.

*** Funded in FY 1982 and prior years as the Low Ship Impact Ranging sub-task of the Wide Aperture Array (Advanced) program (project S0222 of Program Element 63504N).

**** Advanced Development Models for DT&E/10T&E procured prior to FY 1981.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Project S0210, Submarine Acoustic and Torpedo Countermeasures: The Submarine Sonar Improvement program (Program Element 64503N, project S0219) integrates acoustic intercept receivers developed in this project into the AN/BQQ-5 series Sonars. Expendable countermeasure devices completing advanced development in this program are transitioned to engineering development in Program Element 64562N, project S0235, Submarine Acoustic Warfare Systems. To avoid duplication of effort, the program is coordinated with Program Element 11221N, project S1265, Ballistic Missile Submarine Unique Countermeasures Development. Project S0221, Target Strength Reduction: Program Element 62543N, Project SF43-452, Acoustical Silencing, addresses technology development at the exploratory level. Project S0311 of this Program Element (MK-48 Advanced Capability) and Program Element 63610N, Project S0199, Advanced Lightweight Torpedo, use the results of Target Strength Reduction technology in support of weapon sensor system development. Project S1686, Attack Submarine Combat Control Systems Improvement Program (Advanced): Continues the Low Ship Impact Ranging sub-task (funded in Program Element 63504N, project S0222 (Wide Aperture Array (Advanced)) in FY 1982 and prior years). Ranging techniques completing advanced development in this program will be incorporated in the AN/BQQ-5 series sonars by the Submarine Sonar Improvement program (project S0219 of Program Element 64503N) or in the MK 117 Fire Control System by the Attack Submarine Combat Control System Improvement Program (Engineering) (project S0236 of Program Element 64562N) as appropriate.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Research Laboratory, Underwater Sound Reference Division, Orlando, FL; Defense Advanced Research Projects Agency, Arlington, VA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD (Lead Laboratory; Target Strength Reduction program); Naval Underwater Systems Centers, Newport, RI (Lead Laboratory, Project S1686) and New London, CT; Naval Coastal Systems Center, Panama City, FL; Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Undersea Warfare Engineering Station, Keyport, WA; Naval Ocean Systems Center, San Diego, CA and four others. CONTRACTORS: Firestone, Akron, OH; Aerojet ElectroSystems Company, Azusa, CA; Vought Corp., Advanced Technology Center, Dallas, TX; General Dynamics Corp., Electric Boat Division, Groton, CT; Applied Research Laboratories, University of Texas, Austin, TX and Pennsylvania State University, State College, PA; Rockwell International, Rocketdyne Division, Canoga Park, CA; Gould, Inc., Cleveland, OH; Westinghouse Electric Corp., Annapolis, MD; Tracor Inc., Austin, TX; Burke Rubber Co., San Jose, CA; Vector Research Corp., Bethesda, MD.

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Program Element: 63562N

Title: Submarine Tactical Warfare Systems (Advanced)

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0210, Submarine Acoustic and Torpedo Countermeasures: This project provides requirements, definitions, investigations, and advanced development of devices to provide submarines with an acoustic warfare capability (detection, localization, classification, command and control, countermeasures devices, and launchers) so as to survive the threat through the year 2000. New developments include: improved acoustic warfare sensors, processors, and command and control functions; system integration; new countermeasure devices; and countermeasure device launchers. In FY 1982, development continued on: improved acoustic warfare processors, and command and control (display) improvements; the multi-function, expendable, countermeasure device; and countermeasures effectiveness, simulation, analysis, and integration efforts.

(U) The FY 1983 program consists of:

- o Completing advanced development model design, fabricating and testing the acoustic warfare display (processors; command and control) improvement.
- o Starting-up and preparing the design specification, and contract award for the acoustic warfare localization (sensors) improvement advanced development model.
- o Testing a prototype model of the multi-function countermeasure devices, and completing the advanced development model specification.
- o Conducting countermeasures effectiveness, simulation, and analysis efforts.
- o Conducting integration efforts.

(U) For FY 1984, it is planned to:

- o Transition the acoustic warfare display improvement to Project S0235 in Program Element 64562N for engineering development.
- o Complete fabrication of the localization improvement model.
- o Complete the design, and commence fabrication of the multi-function devices advanced development models.
- o Start-up and conduct feasibility investigations for a special sonar countermeasure device.
- o Start-up, procure, and test transducers for the General Noise and Tonal System.
- o Continue countermeasures effectiveness, simulation/analysis, and integration efforts.
- o The increase from FY 1983 to 1984 is due to start up of General Noise and Tonal System Project and Advanced Countermeasures Devices Development transitioning from conceptual development.

(U) Program to Completion:

- o This is a continuing program.

Program Element: 63562N

Title: Submarine Tactical Warfare Systems (Advanced)

(U) Project S0221, Target Strength Reduction: The purpose of this program is the development of technology and system designs to reduce the vulnerability of U.S. submarines to detection by enemy sonar systems. The goals are reduction of both the submarines echo characteristics (i.e., detectability by active enemy search sonars and acoustic homing weapons), and the submarines radiated noise (i.e., detectability by enemy passive sonar systems). Reduction of the U.S. submarine's vulnerability to detection and tracking by enemy sonars is vital to the future effectiveness of the U.S. submarines.

(U) In FY 1982, analysis was completed on the effectiveness of the first Target Strength Reduction Prototype on [] Redesign of the system [] at deep depths was completed and preparation of Ship Alteration documentation for incorporation in the fleet was begun. Investigations were started on identification and elimination of SSN 637 Class submarines with the [] system installed. Work was continuing on a [] that would meet the requirements over both []

(U) The FY 1983 program consists of:

- o Conduct at-sea acoustic Target Strength trial of a SSN 688 submarine to establish a baseline for design of a Target Strength Reduction system for this class.
- o Install additional coverage on [] to correct a []
- o Continue SHIPALT-related efforts directed to SSN 637 class submarines.
- o Select one [] material concept (from the five being investigated) for further development.

(U) For FY 1984, it is planned to:

- o Start development of system modifications to [] identified in tests of [] Prototype. (The resulting modification would be incorporated as an R&D add-on to the first SSN 637 Class SHIPALT installation or back-fitted onto [])
- o Start system engineering for a [] Target Strength Reduction system based on the selected [] material.
- o Complete development of a [] and start material producibility tasks.
- o Start investigation of appendage structural modifications as part of the [] system.

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

(U) Project S1686, Attack Submarine Combat Control Systems Improvement Program (Advanced): Project provides more accurate rapid ranging [] to support delivery of the MK-48 torpedo and tactical ASW standoff weapon missiles, [] Present fire control systems require up [] to generate a solution against an assumed non-maneuvering target. Project responds to Operational Requirement AS-55 by development of software changes to host sonar or fire control systems which utilize existing acoustic arrays in SSN 594/637/688 and later class attack submarines, including Submarine Advanced Combat System (FY 1982 and prior effort funded as a sub-task in Program Element 63504N, Project S0222 (Wide Aperture Array (Advanced))). Techniques of current interest include []

Program Element: 63562N

Title: Submarine Tactical Warfare Systems (Advanced)

(U) In FY 1982, development continued to participate in Range Exercise 1-83 sea test for FY 1983.

(U) The FY 1983 program consists primarily of participating in Range Exercise 1-83 and providing data reduction.

(U) For FY 1984, it is planned to continue validation of ☐

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

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63564N
DoD Mission Area: 238 - Other Naval Warfare

Title: Ship Development (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,794	15,803	16,246	28,074	Continuing	Continuing
S0408	Ship Development (Advanced)	7,794	15,803	16,246	25,818	Continuing	Continuing
S1705	FX 1052 Successor	0	0	0	2,256	TBD	TBD

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Performs first three phases of design (Advanced Concepts Studies, Feasibility, and Preliminary) for new ships in the Navy's Shipbuilding Program and the Extended Planning Annex. Develops the data and tools required by government naval architects and marine engineers for the design of ships in the Navy's Shipbuilding Program.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: FY 1982 decreased by 2,200 due to reprogramming to Gas Turbine Propulsion Systems (PE 63508N, Project S0379) and other minor adjustments. FY 1983 decreased by 3,007 due to a Congressional reduction (-3,000) and Navy application of a general Congressional reduction (-7). FY 1984 decreased by 10,611 due to decrease in total requirements for feasibility and preliminary design phases.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	28,632	9,994	18,810	26,857	Continuing	Continuing
S0408	Ship Concept Formulation	14,339	9,994	18,810	26,857	Continuing	Continuing
S1508	New Class Carrier Design	14,293	0	0	0	0	14,293

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Ships, Subs, and Boats Technology (PE 62543N); Submarines (Advanced) (PE 63561N); Ship Subsystem Development/Land Based Test Site (PE 64567N); Attack Submarine Development (PE 63569N); Amphibious Assault Craft (PE 63566N).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Coastal Systems Center, Panama City, FL; Naval Surface Weapons Center, White Oak, Silver Spring, MD; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; and others. CONTRACTORS: American Planning Corporation, Alexandria, VA; Rockwell International, Arlington, VA; Designers and Planners, Arlington, VA; Baham Corp., Columbia, MD; Softech, Waltham, MA; and others.

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Program Element: 63564N

Title: Ship Development (Advanced)

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project S0408, Ship Development (Advanced)

1. (U) DESCRIPTION (Requirement and Project): The purpose is accomplishment of the first three phases in the development of new surface ship designs for the Navy's Shipbuilding Program. During the first phase, Advanced Concepts Studies, requirements for future ship types established in the Extended Planning Annex are determined early so that related development of components, subsystems, and platforms will be compatible with these requirements. The second phase, Feasibility, commences at least three years prior to the award of the contract for construction of the lead ship. During this phase, a technical effort is undertaken, in response to stated military requirements, to correct shortfalls in the capabilities of current ships, to establish alternative ship types which will provide a range of performance capabilities and to establish principal characteristics such as length, displacement, speed, type propulsion, major weapons systems, sensors, etc., and comparative acquisition costs. The third phase, Preliminary Design, commences at least two years prior to the award of lead ship contract. During this phase the alternative(s) chosen from the Feasibility Design Phase are developed and further refined to establish top level requirements and specifications which uniquely define performance characteristics, including payload, and which provide the basis for budget quality estimates of ship acquisition costs. This program also develops data and tools needed by government naval architects and marine engineers to design ships in the Navy's Shipbuilding Program. Surface Ship Continuing Concept Formulation develops whole ship concepts to meet future requirements and identifies technology needs for their development. Its major emphasis is the identification of feasible ship designs through the integration of mission requirements and technology developments early in the whole ship planning and acquisition process. Although the program is not designed to establish either mission requirements or technology developments, its primary effort is concentrated on the interface between the two, and the whole Ship Concept Synthesis. Results are used to identify candidate ships to meet the requirements of the Extended Planning Annex period and to recommend the R&D programs and priorities which are needed to support the plans. Computer Supported Design exploits computer based technology to benefit all government developed ship designs. It provides programs enabling Ship Design Managers to quickly develop the best ship to meet stated operational requirements. Advanced Concepts Studies are executed for ships in the Extended Planning Annex to identify requirements and develop alternatives early enough that equipment and system research and development can be influenced as an integral part of total ship development.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program:

- o Completed Amphibious Assault Ship (LHD-1) preliminary design.
- o Completed Minesweeper/Hunter feasibility phase.
- o Commenced Amphibious Transport Dock feasibility phase.
- o Ship designs studied under Surface Ship Continuing Concept Formulation include Battle group Escort, Light Battle Group Escort, Rapid Deployment Force Surface Effect Ship Tug/Barge, and Underway Replenishment Ship.
- o Mission/Requirements studies executed include Dispersed Strike, Landing Vehicle Tank Carrier, and Salvage/Rescue Ship.
- o Computer Support Design project carried out include Amphibious Assault Ship and Auxiliary Ship Synthesis Models, Hull Design System Integration, ship vulnerability model, Combat System Compartment design, hull form systems, and ship iterative magnetic field analysis.

Program Element: 63564N

Title: Ship Development (Advanced)

- o Advanced concepts studies were begun for two ship types in the Extended Planning Annex.
- o A Small Waterplane Area Twin Hull data base, a Reliability, Maintainability, and Availability model of a submarine, a small ship design model, and graphics applications were developed.
- b. (U) FY 1983 Program:
 - o Complete Guided-Missile Destroyer (DDG-51) preliminary design.
 - o Complete Amphibious Transport Dock feasibility phase.
 - o The Surface Ship Continuing Concept Formulation task area will develop approximately sixteen alternatives for six separate mission areas including Major Battle Group components, Amphibious Force, Rapid Deployment Force, Mobile Logistics Support Force, and Mine Countermeasures.
 - o Computer Supported Design projects to be carried out include Ship Synthesis Model Interface, Hull, Structure, and Arrangements programs, Shipboard Electrical Systems Simulator, Automated Test Development for Design, review and revision of ship weight estimating methods, as well as continuation of development of design practices and techniques for general ship design.
 - o Under the Extended Planning Annex seven ship design studies in three ship applications will commence. These include: Guided-Missile Cruiser (CGM), Frigate (FFSX); Amphibious Cargo Ship (LKA(LX)), Amphibious Command Ship (LCC), Salvage and Research (ATS), Oceanographic Research (T-AGOR), and Miscellaneous Auxiliary (T-AC).
 - o Development will commence on a Rigid Inflatable Boat.
- c. (U) FY 1984 Planned Program:
 - o Complete Amphibious Transport Dock preliminary design.
 - o The Surface Ship Continuing Concept Formulation task area will complete approximately fifteen advance ship design alternatives. Studies will include combatant, amphibious, logistics, mine warfare and special forces whole ship designs.
 - o Computer Supported Design projects to be carried out include integration of computer programs to form a design system, upgrade of ship synthesis models, ship manning requirements models, machinery design programs, combat system performance analysis models, as well as continuation of review and revision of ship weight estimating methods.
 - o Under the Extended Planning Annex the seven ship design studies commenced in FY 1983 will be updated to reflect changes in operational requirements as well as changes in the projected availability of subsystems being developed for shipboard application.
- d. (U) Program to Completion: This is a continuing program.
- e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63566N Title: Amphibious Assault Craft
DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,740	11,884	7,961	6,813	Continuing	Continuing
S0241	Amphibious Assault Craft	8,740	11,884	7,961	6,813	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) The Amphibious Assault Landing Craft Program is an advanced development effort. The Program objective is to define, develop, demonstrate and document a system of advanced landing craft which will improve the mission effectiveness of ship-to-shore movement of men, vehicles, equipment and material during amphibious assault. Current program emphasis is focused on Navy system trials of the JEFF Craft in direct support of the Landing Craft Air Cushion program. In addition, these trials are directed towards the conduct of technology development tasks and the demonstration of the operational utility of advanced craft for amphibious warfare and related alternate missions. Results of this program will provide essential air cushion vehicle technology data in such areas as skirts, fans, engine inlet air filtration, craft control and overall system performance to support Landing Craft, Air Cushion design verification. Concurrent efforts and subsequent program emphasis will focus on preplanned product improvements to support the acquisition of follow-on Landing Craft, Air Cushion Vehicles; and identification of requirements for the development of future amphibious craft to satisfy functional requirements within the amphibious assault echelon not completely in the domain of Landing Craft, Air Cushion.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in FY 1983 Descriptive Summary and this Descriptive Summary are as follows: FY 1982 decreased 500 due to reprogramming to Swimmer Delivery Vehicle Development. In FY 1983 Congress added 1563 for alternative mission evaluation. In addition, -208 was due to Navy application of a general Congressional reduction resulting in a new total of 11,884. FY 1984 decreased by 178 due to a downward inflation adjustment.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14,362	9,240	10,437	8,139	Continuing	Continuing
S0241	Amphibious Assault Craft	14,362	9,240	10,437	8,139	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
SCN	98,400	62,100	161,100	266,000	TBD	TBD
Quantity	(3)	(3)	(6)	(12)		

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Program Element: 63566N

Title: Amphibious Assault Craft

F. (U) RELATED ACTIVITIES: Ship Propulsion Systems (Advanced), PE 63508N; Ships, Subs and Boats Technology, PE 62543H; Logistics Technology, PE 62760N.

G. (U) WORK PERFORMED BY: IN-HOUSE: David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Coastal Systems Center, Panama City, FL; Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA; Naval Air Propulsion Center, Trenton, NJ; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: Bell Aerospace Company, New Orleans, LA and Panama City, FL.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project 80241, Amphibious Assault Craft: The Amphibious Assault Landing Craft Program was established to define and demonstrate advanced landing craft which will improve the mission-effectiveness of the ship-to-shore movement of men, vehicles, equipment and material during amphibious assault. Particular emphasis is placed upon the capability to launch amphibious operations from ships located at a considerable distance from the beachhead.

(U) Operational analyses and simulation studies were conducted as guides to selected possible developments: a 60-ton payload, 50-knot air cushion vehicle (JEFF Craft), a 15-ton payload, 5-knot air cushion vehicle or 35-knot planing craft (JIM Craft); and 160-ton payload, 35-knot planing craft (JOE Craft). The 60-ton payload, 50-knot air cushion vehicle, the JEFF Craft, was selected for initial development.

(U) Funding since 1971 has been directed toward design, construction and testing of two differently configured JEFF craft. In addition to operations with well-deck ships, operational tests included JEFF craft interfaces with the M198 howitzer, three lanes of vehicles (M54 trucks with M114 howitzers), the M60A1 tank, and the Light Amphibious Container Handler. Trials of the JEFF Craft are being conducted in direct support of the follow-on Landing Craft, Air Cushion Acquisition Program.

(U) While developed as landing craft, they can be readily modified to serve in other amphibious warfare roles such as mine laying/sweeping, defense against high speed small boat attack, reconnaissance, medical evacuation and initial assault element force insertion.

(U) Subsequent phases for this program will define the characteristics and develop the technology for the complete family of future advanced landing craft.

(U) In FY 1982, Navy System Trials were continued to establish a craft operating envelope in support of Landing Craft, Air Cushion design requirements. Beach and amphibious shipping interface tests were conducted in support of Landing Craft, Air Cushion requirements definition. Replacement crews were trained and contributions were made to the development of the training program for initial operating personnel.

(U) The FY 1983 program consists of:

- o Continuation of Navy System Trials to support the follow-on acquisition program and subsystem testing.
- o Conduct of Amphibious Assault Landing Craft missions to support tactics development for amphibious operations and to investigate alternative mission potential for air cushion vehicles.
- o Provision of support for pre-planned product improvement for Landing Craft, Air Cushion lead production.
- o Completion of requirements analysis and craft characteristics studies for JOE and JIM landing craft concept.
- o Evaluation and selection of candidate approaches for JOE/JIM craft.

Program Element: 63566N

Title: Amphibious Assault Craft

(U) For FY 1984, it is planned:

- o The Amphibious Assault Landing Craft Development Program will continue to focus its efforts on providing Landing Craft, Air Cushion follow-on Acquisition Program product improvement engineering, test and trials support.
- o Analysis will continue to identify future amphibious mission support craft to be developed.
- o The Amphibious Assault Landing Craft Development effort supporting follow-on Landing Craft, Air Cushion acquisition will provide technology and engineering data for composite fan blades, propellers, and shroud development; and for integrated control system, fan and propeller erosion development and tests. The JEFF craft located at the Naval Coastal Systems Center, Panama City, Florida will continue Navy Systems trials in direct support of the Landing Craft, Air Cushion Follow-on Acquisition Program.
- o Operations of JEFF craft will demonstrate low risk hardware improvements, support integrated logistics support planning and concurrently provide for air cushion vehicle operator training of initial crews for lead Landing Craft, Air Cushion.

(U) Program to Completion: The program will continue through FY 1987 to provide support for the development of advanced amphibious assault craft (JOE, JEFF and JIM). Navy System Trials of the JEFF craft will continue in support of the Landing Craft, Air Cushion lead and follow-on production in the areas of subsystem testing and in providing initial air cushion vehicles training and familiarization for the first Landing Craft, Air Cushion crews. Required JOE and JIM craft characteristics will be defined and technology development conducted in support of a program decision in FY 1984. Selected concepts will be constructed and tested as advanced development craft in FY 1985 through FY 1989.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) The JEFF Craft are full scale advanced development craft necessary to fully assess the feasibility of applying air cushion vehicle technology to amphibious landing craft capable of meeting the requirements of the 1980's, within the dimensional constraints imposed by the well decks of amphibious ships. The principal areas of technical risk are craft control techniques, air cushion seal concepts, powering and structural concepts and certain material developments. Test results provide design criteria and resolve major technical problems to permit feasibility and cost/performance trade-offs leading to low risk acquisition of the follow-on production configuration, Landing Craft Air Cushion.

b. (U) Construction of these craft was completed in FY 1977. Contractor checkout tests and shakedown trials to insure that the craft and their subsystems functioned satisfactorily and conformed to design specifications were completed in June 1979. Navy Systems Trials are being conducted to evaluate craft technical characteristics, establish the operating envelope, evaluate critical interfaces with Marine Corps personnel and equipment and Navy amphibious shipping, evaluate craft performance in hostile operating environments and evaluate the ability of Navy personnel to operate and maintain the craft. Craft accomplishments to date include in excess of 100 operating hours attained, operation at speeds up to 75 knots, operation in sea state 4, and operation at 370,000 pounds maximum weight. Test results have been and continue to be used during design of the Landing Craft Air Cushion vehicle. Operator training and reliability and maintainability data collection are included in this test and trials program. Testing of the JEFF Craft in other roles is also planned.

c. (U) The JEFF Craft developed in this program will not be delivered to the Fleet. Tests and trials of these craft are providing decision data which are being used to define the follow-on production craft configuration. These decisions will be validated by Operational Test and Evaluation of the follow-on production craft.

Program Element: 63566N

Title: Amphibious Assault Craft

d. (U) The JEFF craft will continue to be used in support of the Development Test-IIIA testing of the Landing Craft Air Cushion. This testing will result in the demonstration of selected subsystems and components relative to their suitability for service use, and will result in reduced test requirements for the Landing Craft Air Cushion.

2. (U) Operational Test and Evaluation

a. Operational Test and Evaluation Accomplished to Date:

(1) (U) Operational Test-0 (December 1964-August 1965) validated the Air Cushion Vehicle concept for certain naval missions in amphibious, unconventional, special and mine warfare, and Search and Rescue operations. Test items were the initial Navy air cushion vehicle test craft, SKMR-1, and the commercial air cushion vehicles, SRN-5, and VA-3. Testing was conducted by the Commander, Operational Test and Evaluation Force in the Norfolk operating area utilizing Navy personnel. Results of Operational Test-0 testing were used to exploit the Air Cushion Vehicle concept in amphibious warfare; maintainability and reliability test results were not an issue.

(2) (U) Operational Test-IA (November 1978) involved assessing the potential operational effectiveness and operational suitability of the Amphibious Inhaul Device as an amphibious craft handling device. The Amphibious Inhaul Device system is representative of equipments to be procured, if needed, for Fleet Amphibious ships. Based upon its demonstrated capability to control both conventional landing craft and the JEFF craft aboard the USS SPIEGEL GROVE (LSD-32), Commander, Operational Test and Evaluation Force recommended that full scale development of the Amphibious Inhaul Device system be commenced.

(3) (U) Operational Test-IB testing was structured to provide confidence in the Air Cushion Vehicle concept for amphibious warfare operations and to support a decision for the follow-on lead production Landing Craft Air Cushion. Operational Test-IB consisted of a series of tests covering all applicable phases of an amphibious operation. In all phases of Operational Test-IB Commander, Operational Test and Evaluation Force participated in and supported all testing, and Navy crews operated and maintained the craft. Commander, Operational Test and Evaluation Force submitted an independent assessment of the projected operational effectiveness and operational suitability of air cushion vehicles in amphibious operations upon completion of each phase. Testing in the vicinity of Panama City, FL, (Naval Coastal Systems Center Experimental Trials Unit) in August 1979, April 1980, July 1980, November-December 1980, and June 1981 demonstrated the air cushion vehicle's potential to be operationally effective based on its capability to: (1) operate from the well deck of an LSD, up to and including sea state three; (2) conduct ship-to-shore movement of assault equipment; (3) operate over typical beach terrain and discharge cargo at a prepared site and conduct cargo and vehicle transfers/handling ashore; (4) support the Logistics Over the Shore program; and (5) respond to positive control and information from surface ships, aircraft, and shore installations; (6) operate in well deck of an LPD. Testing included well deck entries and exits with the USS SPIEGEL GROVE (LSD-32) in sea states 0-3 and at underway ship speeds to 16 knots. Craft overwater operations have been conducted at over-hump speeds in sea states 0-3. Also, testing demonstrated the air cushion vehicle's potential to be operationally suitable, provided that: (1) adequate protection is provided to exposed hydraulic lines and electrical/electronic systems; (2) some form of shelter is provided to protect personnel on the craft deck from the effects of spray and debris; (3) craft are designed to be fully compatible with designated amphibious shipping; (4) craft are designed to handle all designated assault equipment in the Marine Corps inventory, current and projected, both in terms of loading and securing for transportation; and (5) a Naval Training Plan and Integrated Logistic Support Plan for the Landing Craft Air Cushion are developed concurrently with Landing Craft Air Cushion design. Reliability, Maintainability, Availability for the JEFF craft as reported by Commander, Operational Test and Evaluation Force cannot be extrapolated for Landing Craft Air Cushion as they are not prototypes.

b. (U) Additional Planned Operational Test and Evaluation

(1) (U) Commander, Operational Test and Evaluation Force will observe and comment on, as applicable, future developmental test and evaluation with JEFF craft which impacts operational effectiveness and operational suitability and the design of Landing Craft Air Cushion. Also, Commander, Operational Test and Evaluation Force will identify needed modifications, if required, and provide information on tactics, doctrine, organization, and personnel requirements. Future Operational, Test and Evaluation with the JEFF craft remains to be determined.

Program Element: 63566N

Title: Amphibious Assault Craft

(2) (U) Final Operational Test and Evaluation with the lead production Landing Craft Air Cushion will be conducted in the form of an Operational Evaluation.

3. (U) System Characteristics

Characteristics of the JEFF Craft:

	<u>OBJECTIVES</u>		<u>DEMONSTRATED (Developmental Test-1)</u>	
	<u>JEFF (A)</u>	<u>JEFF (B)</u>	<u>JEFF (A)</u>	<u>JEFF (B)</u>
Length	96 feet	86 feet, 9 inches	N/A	N/A
Beam	48 feet	47 feet	N/A	N/A
Climb	11.5% grade	13% grade	9%	13%
Payload	60 tons	60 tons	40 tons	60 tons
Speed	50 knots (Sea State 2)	50 knots (Sea State 2)	58 knots (Sea State 2)	75 knots (Sea State 2)
Range	200 nautical mi.	200 nautical mi.	140 nautical mi.	210 nautical mi.
Negotiate	8 feet plunging surf, sand, swamp, ice and grasslands	8 feet plunging surf, sand, swamp, ice and grasslands	4'-5' surf 12' dunes	4'-5' surf 12' dunes

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63568N
DoD Mission Area: 238 - Other Naval Warfare

Title: Combat System Architecture
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,847	0	0	0	0	23,116
S1231	Combat System Architecture	3,847	0	0	0	0	23,116

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Combat System Architecture was a program which would have resulted in the definition of upgraded/improved surface ship combat systems and would have provided the technical/programmatic direction to guide combat system designs for new construction, modernization and overhauls. This effort considered relative mission priorities for surface ships and the threats which may confront these ships during their operational lifetimes. This Program was to provide the standards and performance requirements necessary to allocate combat system functions, establish subsystem interface requirements and structure the battle organizations of emerging combat systems. Additionally, Combat System Architecture was focused at resolving long standing combat system and subsystem management and interoperability problems by developing and implementing standards to be used in generating designs for both combat system element development efforts and combat system engineering for specific combat system designs. The Program was not responsible for the direct management of specific equipment development efforts or specific ship class combat system design/engineering but would have recommended requirements for specific new and upgraded combat systems.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Congress deleted all funds requested for this program in FY 1983. The program has been terminated.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63569N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Attack Submarine Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,818	8,256	9,785	23,540	Continuing	Continuing
S1255	Advanced Submarine Technology	268	1,978	2,761	9,395	Continuing	Continuing
S1256	Submarine Cost Reduction	2,050	802	1,154	1,208	Continuing	Continuing
S1570	SSN 688 Class Development	2,500	5,476	5,870	12,937	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Attack Submarine Development program provides for the development of SSN 688 Class improvements, the conduct of design efforts in systems integration and arrangements for candidate new design attack submarines for the future, and the development of design modifications and construction methods to reduce submarine acquisition costs. The project composition of the program has been formulated to support major decisions regarding the maintenance of attack submarine force levels and individual submarine capabilities while effectively dealing with adverse trends in submarine acquisition costs.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 150 in FY 1982 in Project S1256 as a result of revision of cost estimates including inflation. A decrease of 2703 in FY 1983 in Project S1256 due to Navy application of a general Congressional reduction. The FY 1984 Program Element estimate has decreased by 11,189 due primarily to restructuring of the Program Element (-4,029, -26, and -7,134 in Projects S1255, S1256, and S1570, respectively) to reflect continued procurement and improvements to the SSN 688 Class and later start of a new SSN design.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	28,908	4,968	10,959	20,974	Continuing	Continuing
S1255	Advanced Submarine Technology	13,107	268	1,978	6,790	Continuing	Continuing
S1256	Submarine Cost Reduction	4,850	2,200	3,505	1,180	Continuing	Continuing
S1257	Follow-On Attack Submarine	0	0	0	0	0	7,131
S1570	SSN 688 Class Development	10,951	2,500	5,476	13,004	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: Program Element 63588N (Strategic Submarine Subsystem Technology Program), Project S0001, identifies and develops cost-effective subsystem concepts for future strategic submarines. Program Element 64567N (Ship Subsystem Development) provides for the engineering development and testing of SSN 688 Class improvements.

Program Element: 63569N

Title: Attack Submarine Development

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ocean Systems Center, San Diego, CA; Mare Island Naval Shipyard, Vallejo, CA; Naval Underwater Systems Center, Newport, RI. CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Newport News Shipbuilding, Newport News, VA; Advanced Marine Enterprises, Arlington, VA; General Electric, Pittsfield, MA; Bolt, Beranek, and Newman, Cambridge, MA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S1255, Advanced Submarine Technology: This project will provide: design efforts in system integration and arrangements to determine the potential benefits of selected concepts for potential inclusion in future attack submarine classes; and feasibility studies and preliminary designs of new attack submarines as directed by the Chief of Naval Operations.

(U) In FY 1982, the benefits of utilizing high strength steel for pressure hulls, shock resistant racks, and cabinets for electronics equipment were examined.

(U) The FY 1983 program consists of:

- o Conceptual design studies of a new SSN.
- o Advanced sonar dome concepts for improved sonar performance.
- o Hydrodynamic model tests and analyses to determine optimum propulsor and control surface configurations for the candidate new SSN designs.

(U) For FY 1984, it is planned to continue with the new SSN design effort as follows:

- o Complete the conceptual design studies.
- o Start the preliminary design phase.

(U) The program to completion consists of completing the preliminary design of a selected new SSN and conducting related advanced development including: hydrodynamic and acoustic model tests; machinery system design; combat system design; and total ship system integration.

(U) Project S1256, Submarine Cost Reduction: The objective of the cost reduction program is to reduce the acquisition cost of future attack and ballistic missile submarines. By appropriately modifying ship system, subsystem, component, fabrication, material testing and other types of specifications, procedures and construction requirements, cost reduction initiatives can be incorporated without undue penalty to performance or safety. Although cost reduction is implicit in all submarine related research and development programs, a formal submarine construction cost reduction effort focuses Navy technical and design efforts toward reduction of actual ship fabrication costs. The approach to achieving this objective includes solicitation of shipbuilding/construction talent to provide cost reduction suggestions, a systematic review of requirements, a functional assessment of operational needs, and a review of construction (shipbuilder) procedures and testing requirements to identify the high cost areas warranting technical analysis.

(U) In FY 1982, selected sub-projects to develop the high pay-off cost reduction areas that were identified and selected in FY 1981 (foundations, support systems, welding and inspection) were begun.

Program Element: 63569N

Title: Attack Submarine Development

(U) The FY 1983 program consists of:

- o Continued development in the four above mentioned high pay-off cost reduction areas.
- o Incorporation of approved cost reduction items into the general specifications for submarines, into the SSN 688 Class as applicable, and into new submarine designs.

(U) For FY 1984, it is planned to continue:

- o The development of high pay-off cost reduction concepts.
- o To incorporate approved cost reduction items into the general specifications, the SSN 688 Class and new design submarines, as applicable.

(U) The program to completion consists of continuing to identify and develop cost reduction concepts and incorporate them into the general specifications and specific submarine designs. This is a continuing program.

(U) Project S1570, SSN 688 Class Development: The Navy plans to continue procurement of the SSN 688 Class, and has placed a high priority on increasing the capability of the class. This project provides for the ship design studies necessary to evaluate and develop potential class improvement concepts for the SSN 688 Class.

(U) In FY 1982, continued design studies of candidate SSN 688 class improvements including: an improved sonar dome; communication system improvements; a longer life main propulsion shaft seal; an improved electrical power system; and hydrodynamic improvements derived from the use of retractable bow planes.

(U) The FY 1983 program consists of:

- o Continued development of the SSN 688 Class improvements described above.
- o Other improvements to be identified.

(U) For FY 1984, it is planned to continue the development of new SSN 688 Class improvements, identified in FY 1983.

(U) The program to completion consists of the continued identification and advanced development of SSN 688 class improvements. This program will continue as long as the SSN 688 Class remains in the shipbuilding program.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: None.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63570N
DoD Mission Area: 238 - Other Naval Warfare

Title: Advanced Nuclear Reactor Components and Systems Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,090	11,536	31,381	25,797	Continuing	Continuing
SI258	Advanced Nuclear Reactor Components and Systems Development	9,090	11,536	31,381	25,797	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element is directed toward the design, advanced development and testing of new and improved components and their related systems for use in naval nuclear propulsion plants. A growing share of naval nuclear propulsion research and development effort is directed toward work common to several types of reactor plant components and systems. Work under this program involves efforts in the areas of pumps, valves, instrumentation and control, heat transfer, reactor servicing equipment, shielding, and plant chemistry.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profiles shown in the FY 1983 Descriptive Summary and this Descriptive Summary is as follows: the 16,215 increase for FY 1984 results from 10,000 being added for the transfer of work from Program Element 62542N, Nuclear Propulsion Technology; 7,000 being added for new work incident to the new design nuclear attack submarine, and a 785 reduction due to a revised inflation index.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands)

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	5,226	9,090	11,536	15,166	Continuing	Continuing
SI258	Advanced Nuclear Reactor Components and Systems Development	5,226	9,090	11,536	15,166	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None

F. (U) RELATED ACTIVITIES: Work conducted under this element is closely coordinated with other naval nuclear propulsion research and development projects and research and development work on nuclear reactor plants conducted by the Department of Energy and Office of the Deputy Assistant Secretary of Defense for Naval Reactors.

G. (U) WORK PERFORMED BY: CONTRACTORS: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA and General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

Program Element: 63570N

Title: Advanced Nuclear Reactor Components and Systems Development

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S1258, Advanced Nuclear Reactor Component and Systems Development

1. (U) DESCRIPTION (Requirement and Project): The Naval Nuclear Propulsion Program is an integrated research and development program which encompasses both Department of the Navy and Department of Energy research and development funds, with the bulk of the funds provided by the Department of Energy. The overall research and development program is dedicated to the continued development of safe, reliable, high performance, long life, advanced nuclear propulsion plants and components. The establishment of this program element in FY 1981 was necessary because in the future an increasing amount of effort will be directed toward development work common to several types of reactor plant systems and components. The funding for this program has been accomplished by realigning other research and development funds already contained within the Five-Year Defense Plan and represents no overall increase in funding for this effort.

(U) This element supports a program for the design, development and testing of new and improved reactor components and systems for use in all types of naval nuclear propulsion plants and includes the following:

- o Work to enhance heat transfer technology is performed in order to improve the reliability and performance of steam generator components. This work also provides an in depth understanding of various steam generator changes and alternate component conditions which are identified as a result of this analysis.
- o Chemical and radiochemical behavior of reactor plant system coolant is evaluated and analysis is performed to determine causes and prevention of corrosion in the system. Development and qualification of improvements in steam generator water chemistry control are pursued.
- o Component backfit studies are conducted for shipboard operating plants. Efforts to redesign heat transfer components and to improve valve performance are a part of this backfit work. The valve effort focuses on advancing the current state-of-the-art in valve design, testing and analytical techniques. Various tests, including full scale laboratory testing, are used to understand component failure mechanisms, to evaluate and improve performance and reliability, and to ensure satisfactory operation of these components over the lifetime of their operating plants.
- o Better instrumentation and control systems are developed to upgrade equipment reliability and performance, to ensure safe operation of naval nuclear-powered ships, and to ensure service life of equipment is consistent with the life of the ship.
- o Shielding designs for reactor plants are developed to assure that radiation exposures for operating and maintenance personnel fall within established radiation limitations. Focus is directed toward reduction of radiation levels, ease of installation and minimizing weight. Shield designs for refueling equipment and shipping casks are provided to meet radiation guidelines during refueling operations and subsequent shipment of irradiated components.
- o The required technology and capability to perform reactor servicing functions for naval nuclear propulsion plants are developed. Decontamination procedures are developed for reducing radiation levels of reactor plants. This program element also provides for the design and development of lead unit refueling equipment and shipping containers for irradiated structural components.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued to develop advanced instrumentation and control equipment using microprocessor, digital, and integrated circuitry to meet the more demanding requirements of new, advanced, long life cores and to provide

required supervisory, monitoring, and alarm features and further improve reliability and maintainability. Development and testing efforts, also focused on increasing shock and vibration resistance. Continued advanced valve design, evaluation, and testing efforts, including the completion of shock and vibration testing and continuation of analysis.

Continued efforts in the steam generator area to analyze alternate materials and designs to improve reliability and useful life of steam generators. Engineering models for assessing steam plant performance, strain analysis of dented tubes, and stress corrosion cracking tests of steam generator materials were some of the work efforts included in this program. Continued laboratory and prototype testing of improved methods of steam plant chemistry control, particularly in the areas of chemical cleaning and corrosion control.

b. (U) FY 1983 Program: Continue steam generator redesign effort. Special emphasis will be placed on saturation pressure, moisture carryover, and fabricability. Evaluate the results of steam generator eddy current inspections as part of the effort to extend the useful life of steam generators. Evaluate problems in commercial nuclear plant components, such as steam generators, turbines, condensers, and pressurizers to assess the potential for similar types of problems in naval steam plant components. Continue steam generator performance testing to develop improved methods to calculate thermal and hydraulic performance. This effort will aid in understanding existing steam generator performance variations, and in the development of higher power density steam generators. Perform steam generator shock test and evaluate test data to confirm and improve component integrity. Develop improved methods and procedures to be used for cleaning the secondary side of steam generators. Conduct laboratory testing to understand how chemicals contained in the secondary side react with corrosion products in steam generators in order to reduce the corrosion of steam plant components. Complete testing and evaluation of steam generator materials exposed to current cleaning processes. Continue stress corrosion cracking tests to evaluate corrosion susceptibility of steam generator materials in both normal and abnormal environments. Continue alternate secondary water chemistries qualification program.

Perform scale model tests relating swing check valve internal geometry to disc stability, to provide a basis for advanced check valve designs. Develop valve design manuals. Develop advanced reactor instrumentation and control equipment using microprocessor, digital, and integrated circuitry. Develop advanced design power distribution and control elements. Design advanced steam generator water level control systems.

c. (U) FY 1984 Planned Program: Continue steam generator redesign in order to upgrade performance margin and improve fabricability. Extend steam generator useful life determined through evaluating naval steam generator tube/eddy current data as well as assessing commercial steam plant component problems. Develop design improvements for steam generators based on knowledge gained from shock testing. Continue steam generator thermal and hydraulic performance tests. Continue stress corrosion cracking tests to evaluate susceptibility of steam generator materials in both normal and abnormal environments. Continue to develop improved methods and procedures to be used for cleaning the secondary side of steam generators. Continue a materials test program to determine optimum secondary water chemistry control methods to minimize the potential for degradation of steam generator tubes. Complete qualification testing for alternate secondary water chemistries. Continue accelerate steam generator tube corrosion tests to establish the corrosion rate due to thermal, hydraulic, chemical, and design variables. Establish design models and develop procedures for the prediction of pitting and intergranular attack in steam generators. Evaluate and conduct tests of potential modifications to

Develop and update valve design manuals. Initiate design of advanced primary plant instrumentation and reactor protection systems. Continue design of advanced steam generator water level control systems. Develop advanced microprocessor indication, monitoring, and alarm instruments which will provide increased accuracy in determining the effective full power hours expended by the reactor core. Continue development of new materials for shielding, and continue evaluation of

Program Element: 63570N

Title: Advanced Nuclear Reactor Components and Systems Development

corrosive liquid leakage } Analyze shielding designs for new radiation sources as part of the effort to assure that adequate radiological precautions are provided. Develop analytical models to determine shielding requirements for plant arrangements. Develop, test, and certify for use improved shielding materials and arrangements. Continue to develop reactor servicing equipment in order to support nuclear warship refuelings on a regular and emergency basis. The increase in funding from FY 1983 to FY 1984 results from the transfer of work from P.E. 62542N, Nuclear Propulsion Technology and for new work incident to the new design nuclear attack submarine.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: S3571N
DoD Mission Area: 235 - Naval Warfare Support

Title: Shipboard Physical Security
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,594	6,122	5,321	6,182	Continuing	Continuing
S0812	Nuclear Weapons Security	4,594	5,950	5,229	5,456	Continuing	Continuing
	Quantity		(D/OT&E)	(D/GT&E)			(3)
S1580	Radiological Control and Health	0	172	92	99	Continuing	Continuing
T1581	Personnel Protection and Survivability	0	0	0	627	Continuing	Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEEDED: S0812 - Nuclear Weapons Security - Within the U.S. Navy a need exists for a physical security system which is capable of detecting, classifying and providing a response to threats targeting ship's nuclear weapon assets. Such a system should be compatible with and integrated into the ship's total physical security system. This program element includes all measures, technical and procedural, for the improvement of shipboard nuclear weapons security. These measures will provide for the development, test, and evaluation of technology for the physical security of nuclear weapons aboard ships and submarines. Typical efforts will include investigation of intrusion detection devices, barriers, exclusion areas, and automatic non-lethal devices for use within the shipboard environment. Recognizing the immediacy of the problem, the program element will include the investigation and identification of those items, both technical and procedural, which may be rapidly implemented to improve the current level of shipboard nuclear weapon security in the fleet. S1580 - Radiological Control & Health (RADCON) - Provides required improvement in nuclear weapon intrinsic radiation (gamma and neutron) shielding, calculations and mixed field (neutron and gamma) dosimetry. T1581 - Personnel Protection and Survivability - Provides for test and evaluation of protective clothing and accessories for shipboard personnel against all climatic conditions and exposures such as fire, radiation, explosions and chemical warfare.

C. (U) COMPARISON WITH FY 1983 RDT&E DESCRIPTIVE SUMMARY: The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: S0812 - Nuclear Weapons Security - Decrease of 165 in FY 1984 reflects minor adjustments for revision of cost estimates including inflation. Development models have been changed to three for FY 1985 at-sea tests under advanced development. S1580 - Radiological Control and Health - The decrease in FY 1984 of 70 reflects a Navy directed program adjustment. The nature of the work to be performed has not changed, but the rate of performance will be slowed. T1581 - Personnel Protection and Survivability - The reduction of 438 in FY 1983 is due to a Congressional reduction. The start of this program has been delayed two years resulting in a reduction of 535 in FY 1984.

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Program Element: 63571N

Title: Shipboard Physical Security

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		4,016	4,594	6,560	6,091	Continuing	Continuing
S0812	Nuclear Weapons Security	4,016	4,594	5,950	5,394	30,733	60,801
	Quantity			(D/OT&E)	(D/OT&E)		(6)
S1580	Radiological Control and Health	0	0	172	162	Continuing	Continuing
T1581	Personnel Protection and Survivability	0	0	438	535	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
S1580	Radiological Control and Health						
	OP,N (Various Equipment)	4,215	3,884	4,190	1,456	5,714	23,874

F. (U) RELATED ACTIVITIES: S0812 - Nuclear Weapons Security - The engineering development phase of this program will be sponsored under PE 64563N Shipboard Physical Security (Engineering). The first components (detectors, alarms, and controls) are being designed, fabricated, and readied for Technical Evaluation, Operational Evaluation and Approval for Service Use. To support the early introduction of equipment to the Fleet, Operation and Maintenance PE 78016N will support near term improvements in shipboard internal security force communications and alarm control panel by the introduction of secure voice radios and more secure panel doors. Effort is coordinated with Physical Security Equipment Action Group in the Office of the Under Secretary of Defense for Research and Engineering, Air Force Physical Security Systems Directorate, Army Program for Physical Security Equipment, Defense Nuclear Agency, and related Navy work coordinated through the Office of the Chief of Naval Operations.

G. (U) WORK PERFORMED BY: S0812 - Nuclear Weapons Security - IN-HOUSE: Naval Surface Weapons Center, White Oak, Silver Spring, MD; OTHER: Naval Civil Engineering Laboratory, Port Hueneme, CA; and Navy Personnel Research and Development Center, San Diego, CA. CONTRACTORS: Dynatrend, Inc., Woburn, MA; BDM CO., McLean, VA; and Mission Research Corp., Santa Barbara, CA; Analytic Advisory Group, Inc., McLean, Va.; R. Carson and Assoc., Rockville, MD; RJA Corp., Somerville, NJ. S1580 - Radiological Control and Health - IN-HOUSE: Naval Surface Weapons Center, White Oak Laboratory, Silver Spring, MD; Naval Research Laboratory, Washington, DC.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(1) Project S0812, Nuclear Weapons Security - The nuclear weapons security program is directly related to the world wide terrorist threat culminating in the use of a nuclear weapon for international blackmail. In addition, Existing shipboard security depends upon guards and simple electrical circuits, locks, and h-aps. [

] A substantial and successful effort has gone into development of more sophisticated physical security devices for land based applications. None of this effort has been directed to the testing of this technology in the shipboard environment.

(2) In FY 1982, new detectors and intruder trackers were demonstrated in the laboratory. A first level system based upon modification of existing components was specified for engineering development. The second level system was initiated with procurement of signal processing components. Procedures and tactics for improving security responses aboard ships were documented and provided to the Fleet prior to commencement of a training program.

Program Element: 63571N

Title: Shipboard Physical Security

(U) In FY 1983, the project consists of:

- o initial engineering design of first level system components (detectors, alarms, and controls).
- o assembly of advanced development models of the second level system in laboratory.
- o review and approval of the Navy Training Plan.
- o initiation of training course development for shipboard security forces.
- o continuation of the top level system formulation for the post 1990 threats.

(U) For FY 1984, it is planned to continue:

- o system formulation for the fully capable system.
- o testing of the technological feasibility model.
- o delivery of an advanced development model of a shipboard nuclear security system for ship test.
- o pilot security training courses for Fleet personnel.

(U) Program to Completion: The advanced development models of the intermediate and top level system using all technology required for post 1990 capability will both be tested at sea during FY 1985 - FY 1989.

(U) Project S1580, Radiological Control and Health - The Nuclear Weapons Radiological Controls Program was established to reduce the ionizing radiation dose to personnel from nuclear weapons handling, stowage, and maintenance. To achieve this result without impairing operations, the program must obtain better knowledge of the mixed radiation fields present, calculational methodologies to predict radiation levels from new weapons systems, and better knowledge of shielding parameters to be incorporated into new constructions (including new candidate shielding materials).

(U) In FY 1982, no funding was programmed (new start FY 1983).

(U) The FY 1983 program consists of:

- o Initiate shielding studies and shielding development efforts of carriers, tenders, and attack submarines.
- o Initiate improvements in computer code for shielding programs, as applied both to shielding calculations for new constructions and to prediction of radiation levels from new weapons systems.
- o Characterize mixed (gamma and neutron) radiation fields from weapons intrinsic radiation in shipboard environments.
- o Initiate dosimetry development efforts addressing problems of carriers, tenders and shore activities.

(U) For FY 1984, it is planned to:

- o Continue shielding development efforts for carriers, non-FBM tenders, surface combatants, attack submarines, and shore activities.

Program Element: 63571N

Title: Shipboard Physical Security

- o Continue efforts toward development of improved field dosimetry.
- o Initiate studies to develop a flexible highly-neutron-attenuating plastic shielding material for use during maintenance operations.
- o Initiate development of improved equipment for the measurement of neutron energy spectra.

(U) Program to completion consists of:

- o Development of computer code for calculation of mixed gamma and neutron dose from weapons intrinsic radiation suitable for application to the shipboard environment.
- o Development of an accurate, locally-readable (field) dosimetry system for use in mixed gamma and neutron fields.
- o Completion of shielding development for all nuclear-capable platforms to reduce the personnel radiation dose to As Low As Reasonably Achievable (ALARA).

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63576N Title: Chalk Eagle
 DoD Mission Area: 237 - Naval Warfare Surveillance and Reconnaissance Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	6,401	14,533	52,476	Continuing	Continuing
R1578	Chalk Eagle	0	6,401	14,533	52,476	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63578N

Title: A4W/A1G Nuclear Propulsion Plant

DoD Mission Area: 238 - Other Naval Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11,849	12,238	12,396	12,617	Continuing	Continuing
S0387	A4W/A1G Aircraft Carrier Type Dual Reactor Nuclear Propulsion Plant	11,849	12,238	12,396	12,617	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element is an integral part of an overall joint Department of Navy/Department of Energy effort directed toward the development, testing, and evaluation of a two reactor plant for use in NIMITZ Class aircraft carriers. The Department of Energy effort focuses on the development of reactor technology, while the Navy effort concentrates on the unique naval features of this technology and on the propulsion plant and related systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary is as follows: the FY 1984 decrease of 310 is due to a downward adjustment in the inflation index.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands)

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,624	11,849	12,238	12,706	Continuing	Continuing
S0387	A4W/A1G Aircraft Carrier Type Dual Reactor Nuclear Propulsion Plant	10,624	11,849	12,238	12,706	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: The CVN 68 Class Selected Acquisition Report, which is updated on a quarterly basis, identifies other appropriation funding provided in support of NIMITZ Class Aircraft Carriers.

F. (U) RELATED ACTIVITIES: Work conducted under this project is closely coordinated with other naval nuclear propulsion research and development projects and research and development work on nuclear reactor plants conducted by the Department of Energy, Office of the Deputy Assistant Secretary for Naval Reactors.

G. (U) WORK PERFORMED BY: CONTRACTORS: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, Pennsylvania.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable

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Program Element: 63578N

Title: A4W/A1G Nuclear Propulsion Plant

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project S0387, A4W/A1G Aircraft Carrier Type Dual Reactor Nuclear Propulsion Plant

1. (U) DESCRIPTION (Requirement and Project): This project is a comprehensive program directed toward the development, test, and evaluation of a two-reactor, nuclear propulsion plant for use in aircraft carriers (NIMITZ Class and future CVN's). The two-reactor plant has about / installed in the USS ENTERPRISE, while incorporating simplicity of operation and reduced requirements for operating personnel. The A4W plant is the largest naval nuclear propulsion plant yet developed.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued development of an / for A4W propulsion plants to improve system reliability and flexibility. Initiated development of improved designs for propulsion plant instrumentation and control equipment incorporating the latest advances in electronics. Continued development and testing of lead unit refueling and servicing equipment for A4W plants; this equipment included the / Conducted thermal and hydraulic analyses to determine whether propulsion plant performance met design objectives. Reviewed, evaluated, and revised fluid system designs in order to improve plant integrity.

b. (U) FY 1983 Program: Develop inverter and programmer circuit designs / Evaluate and test new concepts in instrumentation and control for compatibility with existing components and systems. Continue development and testing of lead unit refueling and service equipment, such as cell disassembly/reassembly stand, cell disassembly tooling, and housing disassembly tooling. Initiate efforts to determine reactor core lifetime and power capability versus time, to evaluate / Conduct thermal and hydraulic analyses to confirm that propulsion plant components will maintain integrity and reliability beyond the original design life of the reactor.

c. (U) FY 1984 Planned Program: Evaluate and test layouts / to ensure the design meets performance objectives. Continue development and testing of lead unit refueling and servicing equipment. Continue efforts to determine reactor core lifetime and power capability versus time. Continue tests to ensure that plant components will maintain integrity and reliability throughout the entire reactor lifetime. Initiate testing to confirm the shock-hardening design adequacy of propulsion plant components and supporting structures.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63579N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: D2W Nuclear Propulsion Reactor
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,449	9,337	-	-	-	95,200
S0388	D2W Nuclear Propulsion Reactor	10,449	9,337	-	-	-	95,200

The above funding includes escalation and encompasses all work and development phases now planned or anticipated through FY 1983.

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: The D2W nuclear propulsion plant project supported development of improved propulsion plant systems and components which are compatible with the longer life D2W reactor core currently under development by the Department of Energy. Current plans also call for installation of the D2W reactor core in CGN's 36 through 41 during refueling.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: The funding and associated work scope for this program element have been transferred to Program Element 25675N, Operational Reactor Development.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63582N
DoD Mission Area: 239 - Naval Unassigned

Title: Combat System Integration
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,958	7,920	17,128	29,997	Continuing	Continuing
S0164	Combat System Integration	3,032	1,944	3,522	2,745	Continuing	Continuing
S1085	Combat System Engineering	3,926	3,376	5,186	12,546	Continuing	Continuing
S1591	Combat System Interface	*	2,600	8,420	14,706	Continuing	Continuing

* Funded in O&M,N prior to FY 1983

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program integrates anti-air, anti-surface and anti-submarine capabilities by design and implementation engineering of tactical computer program interfaces. Included in the interface process is the coordination and control of software development and configuration. The integration involves major surface systems and carrier combat systems upgrades.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1982 a net decrease of 382 consisted of a decrease of 295 in Project S0164 (Combat System Integration) and 87 in Project S0185 (Combat System Engineering) as a result of a Navy-directed reprogramming. FY 1983 decreases of 2,034 in Project S0164, 1,541 in Project S1085 and 5,643 in Project S1591 (Combat System Interface) were a result of Congressional reductions totaling 9,218. The FY 1984 estimate shows a net decrease of 2,202 primarily due to a reduction of 2,355 in Project S1591 in the course of FY 1984 budget development. Project S0164 was increased by 86 due to upward revision of contractor cost support estimates and Project S1085 was increased by 67 for increased testing for the CGN 38 Combat System Upgrade.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	988	7,340	17,138	19,330	Continuing	Continuing
S0164	Combat System Integration	0	3,327	3,978	3,436	Continuing	Continuing
S1085	Combat System Engineering	988	4,013	4,917	5,119	Continuing	Continuing
S1591	Combat System Interface	*	*	8,243	10,775	Continuing	Continuing

* Funded in O&M,N prior to FY 1983

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

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Program Element: 63582N

Title: Combat System Integration

F. (U) RELATED ACTIVITIES: This program performs technical integration and engineering evaluation of combat systems and combat system design concepts in order that integration concepts developed under multiple efforts can be efficiently and effectively applied to ship modernization. For Project S0164 these activities are: PE 64369N, 5" Rolling Airframe Missile; PE 24221N, Light Airborne Multi-Purpose System MK III for FFG and CG 47; and PE 64361N, NATO SEA SPARROW. Computer programs for which interfaces are developed under Project S1591 and tested at the Integrated Combat System Test Facility under Project S1085 are produced under the following programs: PE 64372N, New Threat Upgrade; PE 64508N, Radar Surveillance Equipment; PE 64554N, Surface Electronic Warfare (Engineering); PE 25620N, ASW Combat System Integration; PE 64367N, TOMAHAWK Missile System; PE 24221N, Light Airborne Multi-Purpose System MK III; PE 64652N, Gun Fire Control System Improvement Program; and PE 25604N, Joint Tactical Information Distribution System. In addition, Project S1591 develops Navy Tactical Data System computer program changes to incorporate new interfaces to systems developed under PE 64518N, Combat Information Center Conversion.

G. (U) WORK PERFORMED BY: Project S0164, IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; and Fleet Combat Direction System Support Activity, Dam Neck, VA and San Diego, CA. CONTRACTORS: Raytheon Electronics Systems Division, Goleta, CA; SYSCON Corporation, Washington, DC; EG&G Incorporated, Washington, DC; and DCS Incorporated, Rosslyn, VA. Project S1085, IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; and Fleet Combat Direction System Support Activity, Dam Neck, VA, and San Diego, CA; Integrated Combat System Test Facility, San Diego, CA; Naval Surface Weapon Systems Engineering Station, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; and Naval Air Development Center, Warminster, PA. CONTRACTORS: SYSCON Corporation, Washington, DC; and Automation Industries, Incorporated, Vitro Lab, Silver Spring, MD. Project S1591, IN-HOUSE: Fleet Combat Direction System Support Activity, Dam Neck, VA, and San Diego, CA; and Puget Sound Naval Shipyard, Bremerton, WA. CONTRACTORS: Automation Industries, Incorporated, Vitro Lab, Silver Spring, MD; SYSCON Corporation, Washington, DC; and Sperry UNIVAC, Saint Paul, MN.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0164, Combat System Integration: This project provides for the development and installation of the computer program in the AN/SLQ-32 Electronic Warfare System so as to digitally interface with Combat Direction Systems on major combatants, escorts and selected support service ships. This includes changes to the AN/SLQ-32 Electronic Warfare System computer program necessary to process Light Airborne Multi-Purpose MK III Electronic Support Measures data and to support Rolling Airframe Missile targeting and designation.

(U) In FY 1982 development continued on software modifications to interface AN/SLQ-32(V)2 Electronic Warfare System with Combat Direction Systems in FFG-7 and DD-963 class.

(U) The FY 1983 program consists of:

- o Continue development and commence testing of the AN/SLQ-32(V)2 Electronic Warfare System and necessitated program modifications for integration in FFG-7 and DD-963 class ships.
- o Initiate development of the software programs necessary to interface AN/SLQ-32(V)3 Electronic Warfare System with Combat Direction Systems in CGN-38, DDG-993, CG-27, and CG-16 class ships.

(U) For FY 1984 it is planned to:

- o Continue development and commence operational testing of the AN/SLQ-32(V)3 Electronic Warfare System and necessitated program modifications.
- o Complete operational evaluation of AN/SLQ-32(V)2 Electronic Warfare System and necessitated program modifications.

(U) Program to completion will consist of fully testing AN/SLQ-32(V)2 and (V)3 computer programs and commencement of system software modifications necessary for integration of SLQ-17 systems onboard aircraft carriers.

Program Element: 63582N

Title: Combat System Integration

(U) Project S1085, Combat System Engineering: This project provides for development of the capabilities required to integrate and test network of combat system tactical computer programs ashore at the Integrated Combat System Test Facility prior to Fleet introduction. Preparations for this testing cover the development of weapon system simulations and the development of plans and procedures for testing. The site simulations and procedures provide a complete test bed for combat system life cycle support.

(U) In FY 1982, development continued on the test bed including the simulations for the STANDARD Missile 2, Gun Fire Control System MK 86, Underwater Fire Control System MK 116, AN/WSN-5 Inertial Navigation System and AN/SLQ-32 Electronic Warfare System necessary for FY 1984 testing for the DD 963 and CGN 38 class combat system tactical computer programs.

(U) The FY 1983 program consists of:

- o Complete test bed and simulation development for test of DD 963 and CGN 38 class combat system tactical computer programs.
- o Complete test site validation in preparation for FY 1984 testing.

(U) For FY 1984, it is planned to:

- o Complete testing of DD 963 and CGN 38 combat system tactical computer programs for FY 1984 upgrades and initiate development of test bed and simulations for planned FY 1986 upgrades for CGN 38, DDG 993 and DD 963 classes.
- o Initiate development of test bed for the CG 16/26 classes New Threat Upgrade ships integrating STANDARD Missile 2, AN/SLQ-32 Electronic Warfare System, AN/SYS-2 Integrated Automatic Detection and Tracking System and Navy Tactical Data System upgrade programs for FY 1986 testing of combat system tactical computer programs.

(U) Program to completion will consist of:

- o Complete development of combat system test bed and conduct testing for planned upgrades to CGN 16, CG 26, CGN 38, DDG 993 and DD 963 class combat system tactical computer programs.
- o Develop capability at the Integrated Combat System Test Facility to test and integrate Advanced Combat Direction System, Over-the-Horizon Targeting and Joint Tactical Information Distribution System into surface combat systems.
- o Determine interface requirements and necessary designs which will provide integration of developing systems.
- o This is a continuing program.

(U) Project S1591, Combat System Interface: This project provides for the development of those new capabilities in the Navy Tactical Data System computer programs required to implement digital interfaces with emerging weapon and sensor systems or changes thereto, including the Navy Tactical Data System interface with AN/SLQ-32 Electronic Warfare System, TOMAHAWK Weapon Control System, Light Airborne Multi-Purpose System MK III, the New Threat Upgrade systems and Anti-Submarine Warfare Control System. In FY 1982 and prior, these changes to the Navy Tactical Data System computer programs were funded in O&M,N under the Fleet Modernization Program. The shift of funding was mandated by a recent Comptroller of the Navy decision that computer software improvements of this type are to be budgeted under the RDT&E,N appropriation.

(U) The FY 1983 program consists of:

- o Continue development for Navy Tactical Data System computer program interfaces with AN/SLQ-32 Electronic Warfare System for the DD 963 class and with STANDARD Missile 2 System for the CGN 38 and DDG 993 classes.
- o Initiate development of Navy Tactical Data System computer program interfaces with: (1) AN/SLQ-32 Electronic Warfare System, AN/SYS-2 Integrated Automatic Detection and Tracking System and the New Threat Upgrade systems for FY 1986

Program Element: 63587N

Title: Combat System Integration

integration in the CG 16/26 classes; (2) AN/SLO-32 Electronic Warfare System, TOMAHAWK Weapon Control System and Underwater Fire Control System MK 116 for FY 1986 integration in the CGN 38 and DDG 993 classes; and (3) TOMAHAWK Weapon Control System, Anti-Submarine Warfare Control System, Light Airborne Multi-Purpose System MK III and Target Acquisition System/Improved Point Defense for FY 1986 integration in the DD 963 class.

(U) For FY 1984, it is planned to:

- o Complete development of Navy Tactical Data System computer program interfaces with AN/SLO-32 Electronic Warfare System for the DD 963 class and with STANDARD Missile 2 System for the CGN 38 and DDG 993 classes.
- o Continue development for those Navy Tactical Data System computer program interfaces initiated in FY 1983.
- o Initiate development of Navy Tactical Data System computer program interfaces with Light Airborne Multi-Purpose System MK III and Anti-Submarine Warfare Control System for FY 1986 integration in the DD 963 class; with the New Threat Upgrade systems for FY 1986 integration in the CGN 38 and DDG 993 classes; and with Joint Tactical Information Distribution System for FY 1987 integration in the CV/CVN classes.

(U) Program to completion will consist of:

- o Continue development of new capabilities in Navy Tactical Data System computer programs required to interface with new weapon and sensor systems.
- o This is a continuing program.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63539Z
DOD Mission Area: 738 - Other Naval Warfare

Title: DDG-51
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	101,960	138,339	110,960	129,812	TBD	TBD
1314	Electric Propulsion Systems	5,500	*	*	*	*	*
S1336	DDGX Ship Design	15,100	**	**	**	**	**
S1337	DDG-51 Combat System	52,873	138,339	110,960	129,812	TBD	TBD
S1449	Light Weight AEGIS	9,988	***	***	***	***	***
S1451	Light Weight Sonar (AN/SQS-53C)	18,499	****	****	****	****	****

- * Program will continue in PE 63573N Electric Drive in FY 1983 and beyond. Project description contained in PE 63573N.
- ** Ship contract design funded in PE 64567N, S1803 Ship Contract Design, in FY 1983 and beyond.
- *** Program continues in PE 64307N, CG 47 Product Improvement, Project S1275 SPY-1 Radar Improvement.
- **** Program continues in PE 64575N, AN/SQS-53C Sonar, in FY 1983 and beyond.

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Perform Preliminary Ship Design phases and conduct engineering development for selected systems/subsystems for the new multi-mission guided-missile destroyer (DDG 51). The combat suite for DDG 51 is being designed to provide the ship with Strike, Anti-Air, Anti-Surface and Anti-Submarine Warfare Capability. Intensive industry participation, competition and innovation in the ship and combat system design is planned. A critical need exists to develop and produce general purpose, multi-mission surface combatants to operate with all the Navy's Battle Forces and to maintain the Navy force level objectives through the year 2000. DDG 51 will be less expensive and will complement CG-47 Class cruisers in the Battle Group and Surface Action Groups. It will also provide multi-mission capability to the Underway Replenishment Groups and the Amphibious Groups. DDG 51 construction must start in FY 1985 to maintain the necessary force levels.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The increase of 1,116 in the Program Element for FY 1982 is the net result of a 2,883 decrease in Project S1337, and a 3,999 increase in Project S1451. The decrease in Project S1337 results from a Navy decision to reprogram funds to support the New Threat Upgrade Program and Advanced Signal Processor. The increase in Project S1451 results from reprogramming funds to accommodate the restructured AN/SQS-53C sonar program which had funds reduced by Congressional action. The decrease of 256 in Project S1337 in FY 1983 is due to Navy application of a general Congressional reduction. The reduction of 6,634 in Project S1337 in FY 1984 was caused by a decision to delay some effort until FY 1985 (-4,000) plus a reduction of 2,254 due to budget constraints.

Program Element: 63589N

Title: DDG-51

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	75,300	100,844	138,595	117,614	TBD	TBD
S1314	Electric Drive	0	5,500	*	*	*	*
S1336	DDGX Ship Design **	8,500	15,100	0	0	0	23,600
S1337	DDGX Combat System	26,800	55,756	138,595	117,614	TBD	TBD
S1449	Light Weight AEGIS	0	9,988	***	***	***	***
S1451	Light Weight Sonar	0	14,500	****	****	****	****
S1558	AEGIS Product Improvement (Advanced)	40,000	*****	*****	*****	*****	*****

* Program will continue in PE 63573N Electric Drive in FY 1983 and beyond. Project description contained in PE 63573N.

** Ship contract design to be SCN funded in FY 1983 and beyond.

*** Program continues in PE 64307N, CG 47/AEGIS Product Improvement, Project S1275 SPY-1 Radar Improvement.

**** Program will continue in PE 64575N SOS-53C Sonar in FY 1983 and beyond. Project description contained in PE 64575N.

***** FY 1981 Congressional add-on to start SPY-1B radar development. Program continues in PE 64307N CG 47/AEGIS Product Improvement, Project S1275, SPY-1 Radar Improvement.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
SCN (DDG 51) Quantity			99,500	1,363,700 (1)	TBD	TBD

F. (U) RELATED ACTIVITIES: Ship Development (Advanced), 63564N; Surface Ship Sonar Modernization, PE 25624N; Anti-Submarine Warfare Combat System Integration, PE 25620N; Surface Anti-Submarine Warfare, PE 63553N; Shipboard Propulsion Systems (Advanced), PE 63508N; AN/SQS-53C, PE 64575N; CG 47 Product Improvements, PE 64307N; Vertical Launching System, PE 64353N; AEGIS Area Air Defense, PE 64303N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ships Weapons Systems Engineering Station, Port Hueneme, CA; Naval Underwater Systems Center, Newport, RI; Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Surface Weapons Center, Dahlgren, VA; Naval Underwater Systems Center, New London, CT. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Silver Spring, MD; RCA, Moorestown, NJ; General Electric, Syracuse, NY. Others to be determined.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project S1337 DDG-51 Combat System:

1. (U) DESCRIPTION (Requirement and Project): The inventory of Battle Group capable surface combatants (cruisers and destroyers) is currently below required strength and will continue to decrease as older ships are retired. The multi-mission guided missile destroyer (DDG-51) is a new design with lead ship authorization for FY 1985. This program provides the engineering required to develop the DDG 51 combat system. This system encompasses the mission areas of Strike, Anti-Air, Anti-Surface, and Anti-Submarine Warfare, giving DDG 51 the capability to operate with all the Navy's battle forces in various threat environments.

Program Element: 63589N

Title: DDG-51

In addition, this program develops elements of the Strike, Anti-Air, Anti-Submarine and Surface Weapon and fire-control systems permitting a balanced and effective multi-warfare combat system.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Initiated Full Scale Engineering Development of warfare area systems. Initiated development of combat direction systems and interface design specifications. Selected a Combat System Engineering Development Site and initiated procurement of long-lead equipment for this site. Conducted a combat system level Preliminary Design Review. Initiated design of the DDG 51 configuration of the improved SPY-1 derivative radar. Initiated computer program development for Weapon Control System and Combat Direction System.

b. (U) FY 1983 Program: Continue Engineering Development of warfare area systems. Complete Computer Program Performance Specifications. Hold Combat System Level Critical Design Review. Continue procurement of Combat System Engineering Development Site equipment. Complete Phase I (System Definition) of Combat System Engineering contract. Begin Phase II (Design Engineering) of Combat System Engineering contract. Initiate computer program development for SPY-1 derivative radar (AN/SPY-1D) and Operational Readiness Test System.

c. (U) FY 1984 Planned Program: Continue equipment and computer program development of combat system elements (SPY-1D Radar, UYK-43 computer, Command and Decision System and Weapons Control System). Complete Combat System Engineering Development site modifications. Continue procurement of warfare area equipment and initiate installation of equipment in Combat System Engineering Development site. Develop system plans and procedures to support element warfare level and combat system level test requirements. Continue Combat System Engineering Agent Contract.

d. (U) Program to Completion: Complete warfare area equipment procurement, computer program development of system elements and installation of the combat system and equipment at the Combat System Engineering Development Site. Complete computer program certification of system elements. Conduct element, warfare area, combat system and special function test to identify and resolve configuration element and system level problems. Demonstrate total combat configuration system engineering and integration of effectiveness.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program element: 63601N Title: Mine Development
DoD Mission Area: 234 - Mine Warfare/Mine Countermeasures Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	9,935	9,521	0	1,572	Continuing	Continuing
S0258	Anti-Sweeper/Anti-Hunter Systems	3,293	0	0	0	0	3,837
S0267	Mine Improvements	3,041	3,966	*	*	*	*
S1556	Medium Depth Mine	3,601	5,555	0	0	TBD	TBD
S1592	Advanced Mine Development	0	0	0	1,572	Continuing	Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

*Transitions to PE 64601N in FY 1984.

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program element provides for components and support systems necessary for the development of mines and mine warfare required to complement the Navy's sea control mission. Projects are included for: a new medium depth mine; systems to counter mine countermeasures efforts; improved mine components such as flight gear, power supplies, and sensor systems; data-acquisition ranges for mine performance and target characteristics information; development of computer-assisted planning models for minefields and mine countermeasures; and mine simulators for minelaying, mine countermeasures, and threat analysis exercises.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Engineering Development for Project S0267, Mine Improvements, will continue in Program Element 64601N in FY 1984. Project S1592, Advanced Mine Development, will start in FY 1985. Project S0258, Anti-Sweeper/Anti-Hunter Systems, has been terminated.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63610N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Advanced Lightweight Torpedo (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	104,212	97,098	4,128	0	0	464,664
S0199	Advanced Lightweight Torpedo (ALWT)	104,212	97,098	4,128	0	0	464,664

The above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1990 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element is developing the advanced development model of a new lightweight torpedo capable of countering the projected submarine threat of the post-1985 period. Improvements in Soviet submarine performance characteristics necessitate the development of the Advanced Lightweight Torpedo as a replacement for the MK 46 torpedo as soon as possible.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: the decrease of 1,202 in FY 1982 was a payback for a reprogramming increase received in FY 1981; the increase of 40,314 in FY 1983 was due primarily to a delay in the transition to engineering development; the decrease of 92 in FY 1984 is due to various adjustments including inflation; and the net result of those three actions is a 39,020 increase in the Total Estimated Cost for the program element.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	98,929	105,414	56,784	4,220	0	425,644
S0199	Advanced Lightweight Torpedo (ALWT)	98,929	105,414	56,784	4,220	0	425,644

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: See Descriptive Summary for Program Element 64610N.

F. (U) RELATED ACTIVITIES: Program Element 63562N, Submarine Tactical Warfare Systems (Advanced) - Development of improvements to

Program Element 63367N, Submarine Anti-Submarine Warfare Standoff Weapon - Development of a long range, submarine launched anti-submarine warfare weapon system which will deliver a lightweight torpedo against threat submarines. Program Element 52633N, Undersea Warfare Weaponry Technology -

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (technical agent and lead laboratory); Naval Surface Weapons Center, White Oak, Silver Spring, MD (warhead and exploder); Naval Underwater Systems Center, Newport, RI (Advanced Mobile Acoustic Torpedo Target); Naval Undersea Warfare Engineering Station, Keyport, WA; and Naval Coastal Systems Center, Panama City, FL. CONTRACTORS: Applied Research Laboratory, Pennsylvania State University, State College, PA; Applied Physics Laboratory, University of Washington, Seattle, WA; Applied Research Laboratory, University of Texas, Austin, TX;

Program Element: 63610N

Title: Advanced Lightweight Torpedo (Advanced)

Honeywell, Inc., Hopkins, MN (prime torpedo contractor); and Rockwell International, Anaheim, CA (prime contractor for the Advanced Mobile Acoustic Torpedo Target).

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0199 Advanced Lightweight Torpedo: This project provides for the design, fabrication and testing of advanced development prototype models to verify that the design concept chosen for the Advanced Lightweight Torpedo is sound. It also provides for a fleet weapon detailed design as a basis for the system to be continued into full-scale development.

(U) In FY 1982, the project commenced the subsystem in-water test program and completed guidance and control integration of the first full system torpedo. The project also commenced design upgrades required for transition to the next full system design iteration.

(U) The FY 1983 program consists of:

- o Commencing the full system torpedo test program.
- o Completing the fabrication of the advanced development prototype models.
- o Completing the fleet weapon detailed design.
- o Initiating the transition from advanced development to full-scale engineering development.

(U) The FY 1984 planned program consists of:

- o Completing the full system torpedo (advanced development prototype) test program.
- o Completing all advanced development efforts and transitioning into full-scale engineering development.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: The objectives of the test and evaluation program are to assess and reduce the acquisition risks throughout the system acquisition process and to evaluate the operational effectiveness and suitability of the Advanced Lightweight Torpedo. Early developmental testing focused on evaluating the technology associated with several torpedo subsystems: warheads; various combinations of guidance sensors, processors and controls; three propulsion systems; and three types of torpedo shapes. The subsystems were developed and evaluated at varying levels due to the difference in maturity of each. Mobile targets were used during early testing to test torpedo terminal homing algorithms by developmental testing to support full scale development is emphasizing laboratory pit tests and in water runs complemented by extensive series of real time, hardware-in-the-loop hybrid simulation tests. The contractor will be required to develop and provide twenty units (100S series) for the validation phase test programs. Based upon the evaluation of the validation tests and analyses, the Advanced Lightweight Torpedo configuration models (200A) will be fabricated and tested. Subsequently, thirty-four units (200B series) will be fabricated for use during technical evaluation to certify that the design meets specified requirements and is ready for operational evaluation.

2. (U) Operational Test and Evaluation: Will be conducted in Program Element 64610N, Advanced Lightweight Torpedo (Engineering).

3. (U) Systems Characteristics: See Program Element 64610N, Advanced Lightweight Torpedo (Engineering).

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63611M
DoD Mission Area: 211 - Direct Fire Combat

Title: Marine Corps Assault Vehicles
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	46,772	39,318	61,165	53,221	TBD	TBD
C0016	Mobile Protected Gun System (MPGS)	18,004	19,806	30,080	19,939	TBD	TBD
C0020	Landing Vehicle Tracked (Experimental) (LVT(X))	6,378	8,416	20,428	21,670	TBD	TBD
C1555	Light Armored Vehicle (LAV)	13,627	11,096	10,657	11,612	TBD	TBD
C1293	Stratified Charge Rotary Combustion Engine (SCRCE)	8,763	*	*	*	*	*

* Funded in Program Element 64656M, Marine Corps Assault Vehicles in FY 1983 and subsequent years.

The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides funds to design, develop and test selected wheeled and tracked vehicles and engines which will meet the firepower and mobility requirements for amphibious operations and subsequent operations ashore in the 1980's and 1990's.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The significant changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Mobile Protected Gun System: The FY 1982 decrease of 1,693 was due to Congressional action and the FY 1984 decrease of 19,060 is due to the joint program status of the requirement and a commensurate reduction in the Marine Corps' share of the effort in terms of cost. Landing Vehicle Tracked (Experimental): The decreases of 6,473 in FY 1982 and 6,425 in FY 1984 occur because the Initial Operational Capability (IOC) is delayed from 1990 to 1994. Some program efforts planned for FY 1984 are delayed to accommodate planning for an IOC of 1994. Light Armored Vehicle: FY 1982 increase of 3,576 funds Research and Development contracts for additional test mission role vehicles (Anti-tank, Mortar, Logistics and Recovery, and Command and Control). FY 1984 increase of 845 is the result of an independent government cost estimate which has determined that more additional funds are needed to purchase sufficient vehicles for testing. Congressional Action: Due to the slip in the Initial Operating Capability of the Landing Vehicle Tracked (Experimental) the FY 1983 requirements for this project decreased from 31,625 to 8,416. The FY 1983 Budget Amendment tendered 20,900 of Navy Research and Development funds citing this program as the source. Additionally, the project was reduced 2,309 in the FY 1983 Defense Appropriation Bill. The Bill also reduced the Light Armored Vehicle program 110 and the Mobile Protected Gun System 10,777.

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Program Element: 63611M

Title: Marine Corps Assault Vehicles

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	38,591	56,299	73,414	85,805	TBD	TBD
C0016	Mobile Protected Gun System (MPGS)	10,599	23,697	30,583	49,140	TBD	TBD
C0020	Landing Vehicle Tracked (Experimental) (LVT(X))	2,215	12,851	31,625	26,853	TBD	TBD
C1555	Light Armored Vehicle (LAV)	17,986	10,051	11,206	9,812	TBD	TBD
C1293	Stratified Charge Rotary Combustion Engine (SCRCR)	7,791	9,700	*	*	*	*

* Funded in Program Element 64656M, Marine Corps Assault Vehicles in FY 1983 and subsequent years.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Procurement, Marine Corps Light Armored Vehicle (LAV)	41,267	94,723	78,472	81,915	249,252	545,629
(Quantity)	(60)	(134)	(113)	(117)	(320)	(744)
Mobile Protected Gun System (MPGS)	-	-	-	-	TBD	TBD
(Quantity)	-	-	-	-	TBD	TBD

F. (U) RELATED ACTIVITIES: Mobile Protected Gun System: Effort is related to the Army's Tank and Automotive Technology (PE 63635A) which is the Army's share of this joint program. Landing Vehicle Tracked (Experimental): This program is related to the Marine Corps Landing Vehicle Tracked-7A1 program (PE 26623M) in that the Landing Vehicle Tracked (Experimental) is a Mission Element Need Statement follow-on replacement alternative. Light Armored Vehicle: The Light Armored Vehicle program is related to the Army's Mobile Protected Gun System (Near Term).

G. (U) WORK PERFORMED BY: Mobile Protected Gun System: Contractors: Advanced Technology Incorporated, McLean, VA; FMC Corp., San Jose, CA; Chrysler Corp., Sterling Heights, MI; Pacific Car and Foundry Corp., Renton, WA; Alvis Limited, England; General Motors, Canada; Cadillac Gage Company, Warren, MI; ARES Corp., Fort Clinton, OH; Teledyne Continental, Muskegon, MI; Bell Aerospace, Buffalo, NY; AAI Corp., Baltimore, MD. In-House: Naval Surface Weapons Center, Dahlgren, VA; U.S. Army Tank and Automotive Command, Warren, MI; Naval Sea Systems Command, Washington, D.C.; Marine Corps Development and Education Command, Quantico, VA; Army Armament Research and Development Command, Dover, NJ; Landing Vehicle Tracked (Experimental): Contractors: Potomac General Research Group, Alexandria, VA; Advanced Technology, Incorporated, McLean, VA; In-House: Naval Coastal Systems Center, Panama City, FL; Naval Surface Weapons Center, Dahlgren, VA; Naval Ocean Systems Center, San Diego, CA; Naval Ship Systems Engineering Station, Philadelphia, PA; Naval Sea Systems Command, Washington, D.C.; Marine Corps Development and Education Command, Quantico, VA; Light Armored Vehicle: In-House: U.S. Army Tank and Automotive Command, Warren, MI; Naval Surface Weapons Center, Dahlgren, VA; U.S. Army Yuma Proving Grounds, Yuma, AZ; U.S. Army Waterways Experiment Station, Vicksburg, MS; U.S. Army Test and Evaluation Command, Aberdeen Proving Grounds, MD; Marine Corps Air Ground Combat Center, 29 Palms, CA. Contractors: Advanced Technology, Inc., McLean, VA; Alvis Limited, England; General Motors of Canada; Cadillac Gage Company, Warren, MI.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not Applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

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Program Element: 63611H

Title: Marine Corps Assault Vehicles

(u) Project C0016, MOBILE PROTECTED GUN SYSTEM

1. (U) DESCRIPTION (Requirement and Project): This project is to develop a helicopter transportable, highly mobile/agile, armor protected, and lethal direct fire weapons system to be used by amphibious landing forces. It will be capable of defeating most projected 1990's armored, materiel and personnel targets.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The Army and Marine Corps evaluated design proposals, performed trade-off analysis, developed a joint requirement document, and prepared for a joint Defense Systems Acquisition Review Council I. Additionally, an assessment of other armament candidates was performed.

b. (U) FY 1983 Program: Information generated by ongoing developments and concluded studies, such as the Armored Combat Vehicle Technology Program, Field Analysis Concept Test, Advanced Anti-Armor Vehicle Evaluation Test, the 75mm automatic cannon development program, and the hybrid/conceptual design studies will be assessed to aid in developing a more affordable and effective Mobile Protected Gun System and assist in the Milestone I decision. A Joint Statement of Requirement (JSOR) will be prepared and development will continue on the 75mm Automatic Cannon. A Defense Systems Acquisition Review Council I (DSARC I) will be conducted with the Army so that the two services have the Department of Defense's concurrence in proceeding into the Demonstration and Validation phase of the program. Also, a decision will be made on the optimum gun system to put on the vehicle. Demonstration and Validation contracts will be awarded.

c. (U) FY 1984 PLANNED PROGRAM: Continue Demonstration/Validation phase of the program. Commence building of prototypes. Continue development of optimum weapon system to integrate into vehicle.

d. (U) Program to Completion: Complete Demonstration and Validation phase and conduct Defense System Acquisition Review Council II during FY 1985. Award Full-Scale Engineering Development contracts for approximately nine vehicles as the result of Defense Systems Acquisition Review Council II. Conduct Developmental Test/Operational Test II during FY 87-88. Conduct Full Scale Engineering Development and Defense Systems Acquisition Review Council III in FY 1988.

e. (U) Milestones

MIILESTONE	DATE
(1) Mission Element Need Statement	FY 1981
(2) Design Study Contract Award	FY 1981
(3) Defense System Acquisition Review Council I (Milestone I) *(FY 1982)	FY 1983
(4) Defense System Acquisition Review Council II (Milestone II)*(FY 1985)	FY 1986
(5) Defense System Acquisition Review Council III (Milestone III)	FY 1989
(6) Initial Operational Capability	*(FY 1988) FY 1992

* Dates shown in FY 1983 Descriptive Summary. The change (slip) in Milestone I from FY 1982 to FY 1983 and Milestone II from FY 1985 to FY 1986 and the slip in the Initial Operational Capability from 1988 to 1992 are due to a delay in the publication of a U. S. Army/U. S. Marine Corps Joint Service Operational Requirement.

(u) Project C0020, LANDING VEHICLE TRACKED (EXPERIMENTAL) (LVT(X))

1. (U) DESCRIPTION (Requirement and Project): This program is to develop a follow-on assault amphibian vehicle family for the current LVT7A1 family when it reaches the termination of its service life in 1994. This vehicle will be compatible with concepts of amphibious operations and shipping of the time frame.

Program Element: 6311M

Title: Marine Corps Assault Vehicles

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The efforts included the issuance of a Request for Proposal to industry for conceptual designs, conducting of the source selection process, the awarding of conceptual design contracts to industry, and the preparation for installation of a Stratified Charge Rotary Combustion Engine in a prototype vehicle for form and fit design engineering.

b. (U) FY 1983 Program: Continue Conceptual Design effort with three contractors. Conduct sustaining engineering phase with two contractors that are selected to participate in the Demonstration and Validation phase. Conduct Marine Corps System Acquisition Review Council I prior to entering Demonstration and Validation in FY 1984.

c. (U) FY 1984 PLANNE PROGRAM: Complete Conceptual Design effort. Enter into the Demonstration and Validation Phase with two contractors. Continue independent government analysis in areas of vulnerability, armor, armament, corrosion control, propulsion, safety, human engineering and communications.

d. (U) Program to Completion: Continue Demonstration and Validation Phase. Conduct Developmental Test/Operational Test I. Initiate Full Scale Engineering Development in FY 1988. Continuation of Full Scale Engineering Development effort.

e. (U) Milestones

<u>MILESTONE</u>	<u>DATE</u>
(1) Mission Element Need Statement,	FY 1979
(2) Marine Systems Acquisition Review Council/Milestone I	FY 1983
(3) Marine Systems Acquisition Review Council/Milestone II	FY 1985
(4) Marine Systems Acquisition Review Council/Milestone III	FY 1988
(5) Initial Operational Capability (Early 1990's)*	FY 1994

* Date shown in FY 1983 Descriptive Summary. The slip in the Initial Operational Capability is due to the Service Life Extension Program (SLEP) and new production of the LVT7A1. The Marine Corps will not require a replacement amphibian vehicle until the FY 1994 time frame.

(u) Project C1555 LIGHT ARMORED VEHICLE (LAV)

1. (U) DESCRIPTION (Requirement and Project): This program is an acquisition effort directed toward the procurement of modified "off the shelf" light armored vehicles which have the potential, as a result of minor alterations, of being used in a number of mission roles. These lightweight, armor protected, helicopter transportable vehicles will increase the mobility and firepower of the Marine Corps ground combat elements.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Test and Evaluation of the Light Armored Vehicle (25mm) and Assault Gun was completed. A production decision was made and contract awarded.

b. (U) FY 1983 Program: Test and evaluation of those mission role vehicles purchased in FY 1982 (Anti-Tank, Mortar, Logistics, Recovery) will commence in FY 1983. Complete supplemental testing of Light Armored Vehicle (25mm).

c. (U) FY 1984 Program: Complete integration and testing of anti-tank, mortar, logistics and recovery vehicles. Conduct production decision on these vehicles. Commence testing of Command/Control vehicles.

Program Element: 6311M

Title: Marine Corps Assault Vehicles

d. (U) Program to Completion: Continue evaluation of the mission roles and preplanned product improvement.

e. (U) Milestones

<u>MILESTONE</u>	<u>DATE</u>
(1) Milestone I	FY 1981
(2) Milestone III	FY 1982
(3) Initial Operational Capability (One Company of Vehicles)	FY 1984

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63634N
DOD Mission Area: 244 - Sea Control Theater Nuclear Warfare

Title: Tactical Nuclear Development
Budget Activity: 4 - Tactical Programs

A. FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
S0342	TOTAL FOR PROGRAM ELEMENT Tactical Nuclear Development	723 723	3,440 3,440	3,573 3,573	10,447 10,447	Continuing Continuing	Continuing Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provide the necessary Phase 1 (conceptual), Phase 2 (technical feasibility), and other studies to support modernization of Navy and Marine Corps tactical nuclear weapons. These studies are by Joint Department of Energy - Department of Defense agreement as a mandatory prerequisite to nuclear weapon engineering development. Develop naval nuclear warfare simulation to analyze the effectiveness of tactical nuclear forces in extended duration campaigns. Studies will support the Chief of Naval Operations and Joint Chiefs of Staff directed modernization program.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary are as follows: A net increase of 24 in FY 1983 is due to an inflation adjustment. The reduction of 610 in FY 1984 is the result of programmatic rebalancing.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
S0342	TOTAL FOR PROGRAM ELEMENT Tactical Nuclear Development	792 792	723 723	3,464 3,464	4,183 4,183	Continuing Continuing	Continuing Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: PE 63367N Submarine ASW Standoff Weapon. The Phase 2 study for the common ASW nuclear warhead will result in the nuclear payload for the Submarine ASW Standoff Weapon.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Weapons Center, China Lake, CA; Naval Weapons Evaluation Facility, Albuquerque, NM; DOE Laboratories. CONTRACTOR: John Hopkins University (Applied Physics Laboratory), Silver Spring, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0342, Tactical Nuclear Development: This project provides the necessary studies to support the Joint Chiefs of Staff and the Chief of Naval Operations - directed modernization of Navy-Marine Corps theater nuclear force weapons. These studies are required by Joint Department of Energy - Department of Defense agreement and are prerequisites to nuclear weapon engineering development.

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Program Element: 63634N

Title: Tactical Nuclear Development

(U) In FY 1982, development continued on Phase 2 feasibility studies on common ASW nuclear warhead and continuation of Nuclear Warfare Publication 28 update efforts. Completed naval nuclear warfare simulation Phase 3 development. Commenced Phase 4 naval nuclear simulation development to expand and refine campaign analysis capabilities. Continued tactical nuclear system trade off analysis.

(U) In FY 1983 plan to:

- o Commence insertable nuclear component study to determine their applicability to Navy weapon systems.
- o Continue Phase 2 Feasibility Study and 2A Cost Analysis Study on common ASW nuclear warhead.
- o Establish Navy-Marine Corps nuclear weapon planning, acquisition, acceptance, and logistic support model for all future Navy-Marine Corps nuclear weapon programs.
- o Complete Naval Warfare Publication 28 update efforts.
- o Complete naval nuclear warfare simulation Phase 4.
- o Continue use of naval nuclear warfare simulation to examine tactical nuclear weapons system and force trade offs in varying tactical nuclear campaign scenarios.
- o Determine requirements for reestablishing in-house Navy capability to design modular nuclear weapon fuzes, adaption kits, and/or microcircuitry that are hardened to electromagnetic pulse and other adverse nuclear environments.
- o Commence establishing standards and criteria for nuclear safety analysis of nuclear weapon - unique software.
- o Formulate and develop CNO or CMC "preferred" emergency denial actions or various potential threats.

For FY 1984, it is planned to:

- o Complete Phase 2 feasibility study and Phase 2A Cost Analysis Study for common ASW nuclear warhead.
- o Incorporate vulnerability/survivability assessment criteria into the Navy/Marine Corps nuclear weapon acceptance program model.
- o Complete Phase 1 study of supersonic antiship weapon.
- o Complete feasibility study of advance concepts for emergency denial actions.
- o Commence development of modular, invulnerable fuzes, adaption kits and/or microcircuitry.
- o Promulgate standards and criteria for nuclear safety analysis of nuclear weapon-unique software.
- o Develop standards and criteria for nuclear reliability safety design of future Tactical Nuclear Warfare weapons.
- o Develop model for conduct of nuclear safety analysis, e.g., depth, scope, and specific analytical tools to be used.

Program Element: 63634N

Title: Tactical Nuclear Development

- o Determine utility of a [
- o Commence feasibility study [

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 6435M
DoD Mission Area: 211 - Direct Fire Combat

Title: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,164	7,666	5,445	6,627	Continuing	Continuing
C0008	8-Inch Laser Homing Ordnance	-	2,220	*	*	*	*
C0011	Marine Corps Ground Weaponry	2,062	69	70	72	Continuing	Continuing
C0014	Joint Service Small Arms Program	1,883	3,306	3,626	3,479	Continuing	Continuing
C1294	Field Artillery Rocket System	*	1,219	*	*	*	*
C1295	Artillery Direct Fire Sight	219	374	-	-	TBD	TBD
C1598	Nuclear/Biological/Chemical Equipment	**	478	1,261	1,123	Continuing	Continuing
C1699	Remotely Piloted Vehicles	-	-	488	1,953	Continuing	Continuing

* Funded in Program Element 64657M, Marine Corps Ground Combat/Supporting Arms Systems (Engineering).

** This new project was a subproject of C0011, Marine Corps Ground Weaponry in FY 1981 and FY 1982. Efforts also include monitoring U.S. Army RDT&E projects.

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element includes Research, Development, Test and Evaluation efforts for the advanced development of Marine Corps equipment and systems required for the conduct of close combat and fire support and the provision of battlefield mobility.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: 8-Inch Laser Homing Ordnance: The decrease in FY 1982 of 994 is due to restructuring of the program, including redefinition of the requirement. Joint Service Small Arms Program: The FY 1982 decrease of 177 was the result of cost refinements. The FY 1983 decrease of 83 is due to a reduction in management support contracts, and the FY 1984 increase of 147 is due to increased emphasis on Small Arms Development. Field Artillery Rocket System: This program is funded here in FY 1983 only, the decrease of 79 is due to a reduction in management support contracts. Nuclear/Biological/Chemical Equipment: A FY 1983 new program initiation. The FY 1984 increase of 470 will support test and evaluation of the Portable Electrostatic Collective Protective System, Chemical Agent Electrostatic Filtration System, Chemical Agent Detoxification System and Foam Sacrificial Coatings for chemical agent protection. Marine Corps Ground Weaponry: Due to cost growth and technical problems in VIPER, Congress directed a joint test and evaluation of all Lightweight Anti-Armor Weapons as alternatives to VIPER. The Congressionally directed testing increased the FY 1982 line by 2000. The FY 1984 decrease of 1 is due to an inflation adjustment. Artillery Direct Fire Sight: FY 1982 decrease of 1 due to cost refinements, and the FY 1983 decrease of 24 is due to a reduction in management support contracts. Remotely Piloted Vehicles: FY 1984 new start. Funds will provide for initial air platform and sensor packages for evaluation and integration.

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Program Element: 63635M

Title: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,401	3,336	7,812	4,341	Continuing	Continuing
C0008	6-Inch Laser Homing Ordnance	1,475	994	2,220	*	*	*
C0011	Marine Corps Ground Weaponry	81	62	69	71	Continuing	Continuing
C0014	Joint Service Small Arms Program	845	2,060	3,389	3,479	Continuing	Continuing
C1294	Field Artillery Rocket System	-	*	1,258	*	*	*
C1295	Artillery Direct Fire Sight	-	220	358	*	*	*
C1598	Nuclear/Biological/Chemical Equipment	**	**	475	791	TBD	TBD

* Funded in Program Element 64657M, Marine Corps Ground Combat/Supporting Arms Systems (Engineering).

** This new project was a subproject of C0011, Marine Corps Ground Weaponry in FY 1981 and FY 1982; however, efforts also include monitoring U.S. Army RDT&E projects.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Procurement Marine Corps

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Machine Gun (SAW)	6,374	8,447	3,788	3,073	12,388	34,076
Quantity	(2117)	(2907)	(1000)	(1000)	(3132)	(10,156)
Machine Gun (.50 Cal)	4,013	2,512	9,636	-	-	150,061
Quantity	(408)	(273)	(1,184)	-	-	(4,086)
Rifle (5.56mm M16A2)	18,120	28,457	18,114	18,618	49,635	132,944
Quantity	(38,717)	(54,725)	(36,999)	(35,561)	(179,083)	(345,065)
9mm Hand Gun	-	-	1,958	3,194	23,252	28,404
Quantity	-	-	(6,053)	(9,430)	(62,065)	(77,548)
Machine Gun (7.62 M60)	11,426	209	-	-	-	11,635
Quantity	(3,598)	(60)	-	-	-	(3,658)
Machine Gun (40mm MK19)	19,094	15,061	5,511	8,913	20,192	68,771
Quantity	(792)	(570)	(200)	(250)	(122)	(2,334)

F. (U) RELATED ACTIVITIES: Remotely Piloted Vehicles: U.S. Army and foreign Remotely Piloted Vehicle programs.

G. (U) WORK PERFORMED BY: Marine Corps Ground Weaponry: In-House: Marine Corps Development and Education Command, Quantico, VA.; Naval Surface Weapons Center, Dahlgren, VA.; Army Test and Evaluation Command, Aberdeen Proving Ground, MD.; U.S. Army Missile Command, Redstone Arsenal, ALA. Joint Service Small Arms Program: In-House: Small Caliber and Fire Control Laboratory, Picatinny Arsenal, Dover, NJ. Nuclear/Biological/Chemical Equipment: In-House: Marine Corps Development and Education Command, Quantico, VA.; Naval Surface Weapons Center, Dahlgren, VA.; U. S. Army Chemical Systems Laboratory, Aberdeen Proving Ground, MD. Contractor: TBD. Remotely Piloted Vehicles: TBD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0011, Marine Corps Ground Weaponry: Monitor and participate in Marine Corps unfunded tasks relating to ground combat weaponry and ancillary equipment. This includes munitions, artillery and naval gunfire weapons, tank weapon systems, anti-tank systems and infantry weapons. The program element provides for monitoring the results of national and international ground weaponry program developments.

Program Element: 63635M

Title: Marine Corps Ground Combat/Supporting Arms Systems (Advanced)

- (U) In FY 1982, this program:
- o Made efforts to integrate rationalization, standardization and interoperability, foreign development, and domestic capabilities into the development of ground combat system.
 - o Initiated joint tests/evaluations of Lightweight Anti-Armor Weapon as an alternative to the VIPER with the Army.
- (U) The FY 1983 program consists of continuing to monitor and test all ground combat systems.
- (U) For FY 1984, it is planned to:
- o Pursue target acquisition devices, survey/metro improvements, anti-tank weapons, tank developments, extended range munitions, hypervelocity weapon and emerging small arms technology.
 - o Monitor mortar developments pursued by the U.S. Army and foreign developers.
- (U) Project C0014, Joint Service Small Arms Program: This program manages and administers the development of small arms weapons systems required by the Services (Army, Navy, Marine Corps, Air Force and Coast Guard). The objective is to harmonize joint service requirements, coordinate development activities, reduce cost, and improve the efficiency of the material acquisition process.
- (U) In FY 1982, this program:
- o Monitored/participated in the development of Squad Automatic Weapon, the Personal Defense Weapon evaluation, the Saboted Light Armor Penetrator concept feasibility modeling/testing, ammunition for the MK19 40MM machine gun, MK19 machine gun, improved M-16, general purpose heavy machine gun, M60 light weight machine gun, combat shotgun, protective coatings, improved sights and fire control device, and improved sniper rifle.
- (U) o FY 1983 program consists of:
- o Continuing ongoing joint efforts to include product improvement of the M16A1 Rifle and MK-19 40MM machine gun. Continue development of General Purpose Heavy Machine Gun and 50 Cal Saboted Light Armor Penetrator (SLAP), protective coatings, improved sights and fire control devices, combat shotgun, and improved sniper rifle.
- (U) For FY 1984, it is planned to:
- o Continue to support ongoing small arms efforts of interest to the Marine Corps.
 - o Initiate support for the Advanced Rifle System.
- (U) Project C1598, Nuclear/Biological/Chemical Equipment: This program is to conduct research, development, testing and evaluation necessary to produce items of equipment unique to the Marine Corps amphibious mission. This will provide the capability to operate in a toxic environment. Also will participate in Nuclear/Biological/Chemical efforts of other Services.
- (U) This program was part of project C0011, Marine Corps Ground Weaponry in FY 1982.
- (U) The FY 1983 program consists of:
- o Evaluating U.S. and foreign made items of individual protection and decontamination equipment including the UK Chemical Agent Monitor, Norwegian Nuclear/Biological/Chemical Senator Lightweight Decontamination Apparatus, collective protection systems for shelters, and a family of protective masks.

Program Element: 63635H

Title: Marine Corps Ground Combat/Supporting Arms
Systems (Advanced)

(U) For FY 1984, it is planned to:

- o Continue evaluating items of individual protective equipment.
- o Continue development efforts on the following projects transitioning from Exploratory Development: Portable Electrostatic Collective Protection System, Chemical Agent Electrostatic Filtration System and Chemical Agent Detoxification System. This effort accounts for the funding increase from FY 1983 to FY 1984.
- o Continue to coordinate efforts with U.S. Army.

(U) Project C1699, Remotely Piloted Vehicle: (New Start) This program will evaluate available systems that could be modified to meet the Marine Corps requirement for a remotely piloted vehicle for use as a target acquisition/designation and battlefield surveillance system.

(U) In FY 1982/1983, this program:

- o Monitors other Service and foreign remotely piloted vehicle program.
- o Defines the requirement.
- o Prepares the program initiation documentation.
- o Prepares the concept of operation/employment.

(U) For FY 1984, it is planned to:

- o Initiate program.
- o Obtain test vehicles and sensor packages for evaluation and integration.
- o Test candidate systems and concepts of operations.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63702N
DoD Mission Area: 235 - Naval Warfare Support

Title: Ocean Engineering Systems Development
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1983 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,994	2,312	2,205	2,320	Continuing	Continuing
S0394	Shallow Depth Diving Equipment	1,984	2,312	2,205	2,320	Continuing	Continuing
S1092	Deep Rescue Chamber System	10	-	-	-	-	1,675

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops Navy Ocean Engineering Systems which include: Navy diver equipment, underwater salvage and recovery systems, and advanced submarine rescue systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net decrease of 1,105 in FY 1982 due to termination of Project S1092, a net decrease of 8 in FY 1983 due to Navy application of a general Congressional reduction and a net decrease of 52 in FY 1984 due to downward adjustments in inflation.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,327	3,099	2,320	2,257	Continuing	Continuing
S0394	Shallow Depth Diving Equipment	1,662	1,984	2,320	2,257	Continuing	Continuing
S1092	Deep Rescue Chamber System	1,665	1,115	-	-	-	2,780

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN						
Ocean Engineering (Diving)	1,682	1,231	2,233	979	Continuing	Continuing
(Various Equipments)						

F. (U) RELATED ACTIVITIES: Program Element 63713N, Ocean Engineering Technology Development, pursues efforts on buoyancy materials, electric/electronic equipment for underwater use, underwater power systems, hydraulic systems, and related/supporting efforts. The element also funds the development of deep ocean diver tools/equipments and provides divers medical technology.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; Naval Coastal Systems Center, Panama City, FL; Navy Experimental Diving Unit, Panama City, FL. CONTRACTORS: United Technologies, East Hartford, CT; Lockheed, Sunnyvale, CA; Battelle Memorial Institute, Columbus, OH; General Electric Corporation, Philadelphia, PA; and Westinghouse Electric, Annapolis, MD.

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Program Element: 63702N

Title: Ocean Engineering Systems Development

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0394, Shallow Depth Diving Equipment: This project provides for the development of U.S. Navy diver life support equipment and diver tools necessary to perform such underwater tasks as salvage, recovery, inspection, ship husbandry and repair, rescue and object emplacement.

(U) In FY 1982, the Mixed Gas Recirculator Module for use with the MK-12 Surface Supported Diving System was Approved for Service Use. The diver passive thermal protection system was Approved for Navy Use. Development continued on the Standard Diving System Module for use aboard U.S. Navy diving boats.

(U) The FY 1983 program consists of:

- o Conducting operational evaluation and obtaining Approval for Service Use on the Through-Water Acoustic Communication System.
- o Conducting at-sea tests of the Standard Diving Boat Module.
- o Continuing development of active thermal protection system.
- o Continuing development of the integrated surface supported diving system (EX 20).
- o Continuing development of mobile diver transfer and decompression system and diver tool package.

(U) For FY 1984, it is planned to continue all developments being conducted in FY 1983. The following developments are planned for completion in FY 1984:

- o Through-Water Acoustic Communications System (Approval for Service Use)
- o Standard Diving Boat Module. (Approval for Service Use)

(U) This is a continuing program.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63705M
DOD Mission Area: 262 - Sealift

Title: Logistics
Budget Activity: 4-Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13,915	3,335	1,224	946	Continuing	Continuing
Y0242	Offshore Bulk Fuel System	3,373	2,316	**	**	**	**
S0378	Merchant Ship Naval Augmentation Program	8,451	*	*	*	*	*
S0398	Underway Replenishment	1,696	1,019	1,224	946	Continuing	Continuing
S1554	Sea Sheds	395	0	0	0	0	1,149

* Transferred to PE 63726N (Merchant Ship Naval Augmentation Program) in FY 1983.

** Transferred to PE 63719N (Container Offloading and Transfer System) in FY 1984 as a part of Project Y0816.

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Y0242 Offshore Bulk Fuel System fills a gap created by the retirement of Navy shallow draft tankers. Sustained amphibious assault fuel supply is now dependent on deep draft commercial tankers moored approximately two miles offshore. The current system is limited to one mile offshore. The development includes (a) ship-transportable and quickly installable single point mooring buoy capable of expeditious tanker mooring, (b) high capacity and reliable explosive anchors and techniques for implantation in various sea bottoms, (c) pumps and piping systems and (d) storage of petroleum products ashore with an afloat option. This system will be transportable by military and/or commercial ships to advanced areas and be compatible with the projected Navy and Marine Corps bulk fuel systems ashore. S0398 Underway Replenishment This project develops Navy Standard Underway Replenishment Equipment including: (a) fueling-at-sea systems, (b) dry cargo replenishment-at-sea systems and (c) intra-ship handling systems such as winches, ram tensioners, sliding blocks, sliding padeyes, cargo drop reels, nuclear weapons floatation devices, and cargo and weapons elevators. This equipment will be for new ship construction with backfit in selected ships.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Y0242 (Offshore Bulk Fuel System) -1108 in FY 1984 due to the transfer of this effort to Project Y0816 in PE 63719N. S0398 (Underway Replenishment) +6 in FY 1982, -4 in FY 1983 and +475 in FY 1984 result from refinement of cost estimates and adjustment for inflation. S0378 (Merchant Ship Naval Augmentation Program) +1,694 in FY 1982 represent funds transferred to Naval Sea Systems Command from Naval Facilities Engineering Command and dedicated to the development of a motion compensation system and other aspects of the auxiliary crane ship.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,788	12,215	3,339	1,844	Continuing	Continuing
Y0242	Offshore Bulk Fuel System	1,890	3,373	2,316	1,095	Continuing	Continuing
S0378	Merchant Ship Naval Augmentation Program	2,764	6,757	*	*	*	*
S0398	Underway Replenishment	1,380	1,690	1,023	749	Continuing	Continuing
S1554	Sea Sheds	754	395	0	0	0	1,149

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Program Element: 63705N

Title: Logistics

* Transferred to PE 63726N in FY 1983

E. (U) OTHER FY 1985 APPROPRIATIONS FUNDS:

	<u>FY 1982</u> <u>Actual</u>	<u>FY 1983</u> <u>Estimate</u>	<u>FY 1984</u> <u>Estimate</u>	<u>FY 1985</u> <u>Estimate</u>	<u>Additional</u> <u>to</u> <u>Completion</u>	<u>Total</u> <u>Estimated</u> <u>Cost</u>
OPN (Procurement)						
Underway Replenishment (Various Items)	8,665	0	10,370	14,155	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Sealift Support Facilities, Program Element 63719N; USMC Field Logistic System, Program Element 63635N; Exploratory Development on Navy/Marine Corps Amphibious and Advanced Base Petroleum, Oil and Lubricants System (1975-1990) in Program Element 62760N, Logistics Technology.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ordnance Station, Indian Head, MD; Naval Coastal Systems Center, Panama City, FL; Naval Sea Systems Command, Washington, D.C.; Naval Weapons Handling Center, Earle, N.J.; Naval Ship Systems Engineering Station, Philadelphia, PA; Norfolk Naval Shipyard, Portsmouth, VA. CONTRACTORS: INODCO, Los Angeles, CA; Dunlop Ltd., U.K.; Energy Analysis Inc., Norman, OK.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project Y0242, Offshore Bulk Fuel System: This project, which transfers to Program Element 63719N in FY 1984, provides means to transfer fuel from modern, deep-draft tankers from about two miles offshore. The primary component, the Amphibious Tanker Terminal Facility, consists of a Single Point Mooring Fuel buoy with attached bottom-laid steel pipelines to the beach. Another component, the Amphibious Assault Fuel Supply Facility, supplies fuel to the beach by augmenting current inventory floating six-inch hoses with pumps and bladders which are shuttled from deep-draft tankers offshore.

(U) In FY 1982, development continued on both components, and technical evaluation was conducted on the Tanker Terminal Facility. The Large Propellant Embedment Anchor for the Single Point Mooring buoy failed in test, and development continued on the Single Point Mooring Buoy using an interim replacement, a Large Drag Embedment Anchor.

(U) The FY 1983 program consists of:

- o Continued development of the Large Propellant Embedment Anchor for the Single Point Mooring Buoy.
- o Technical Evaluation and Operational Evaluation of the Amphibious Tanker Facilities using the drag embedment anchor.
- o Technical Evaluation and Operational Evaluation of the Amphibious Assault Fuel Supply Facility.

(U) For FY 1984 refer to Program Element 63719N.

(U) Project S0398, Underway Replenishment: This project provides for the continuing advanced development of specialized equipment required to replenish surface ships at-sea with fuel, ammunition, food and supplies vital to maintaining the Fleet at-

Program Element: 63705N

Title: Logistics

sea. The equipment developed will provide standardized machinery components which are inherently more reliable, maintainable, and resistant to the rigors of the sea environment. In FY 1982 initiated Technical Evaluation of standard high line/spanwire winches, standard hauling winches, tensioners, and sliding block drives. Started test of prototype models of alternatives to standard hydraulic transmission, such as Variable Speed Electric Drive. Completed design and prototype test work for standard elevator components such as platform safety devices, control systems and watertight doors.

(U) The FY 1983 program will consist of:

- o Complete Technical Evaluation and start Operational Evaluation of standard winches, sliding blocks and tensioners.
- o Complete prototype testing variable speed electric drive.
- o Complete design work for standard elevator drive system and initiate development of new solid state control system interlock sensor.

(U) For FY 1984, it is planned to:

- o Complete Operational Evaluation of standard winches, sliding blocks and tensioners.
- o Develop nuclear weapon floatation equipment for use during transfer at-sea.
- o Continue development of fueling-at-sea equipment, variable speed electric drive, and elevator drive system and sensor including prototype fabrication and test.

(U) Program to completion will consist of: Fueling-at-sea development will continue toward the ultimate goal of increasing fuel transfer rates and reduction of fueling stations needed. Variable speed electric drive will eventually be able to replace some of the standard hydraulic transmissions presently used, reducing equipment complexity, maintenance and power consumption onboard ship. Elevator drive system and sensor will complete in FY 1985, including Technical and Operational Evaluation.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63708N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Anti-Submarine Warfare Signal Processing
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	7,626	5,185	3,949	10,174	Continuing	Continuing
S0821	Advanced Acoustic Processing	3,954	1,925	1,915	5,400	Continuing	Continuing
S0823	Acoustic Performance Prediction	3,672	3,260	2,034	4,774	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Advanced Acoustic Processing project independently evaluates Anti-Submarine Warfare (ASW) signal processing systems aboard tactical air, surface and subsurface platforms. This evaluation will be used to reduce duplicative effort and permit technology transfer among advanced development platform-related signal processing programs. Project RADIUS COPPER, which is of a higher classification, is also funded under Advanced Acoustic Processing. Acoustic Performance Prediction will develop a computer based, on-board capability to provide acoustic performance predictions and mode selection guidance for all tactical ASW platforms based on in-situ measurements and environmental data bases. This capability is required as ASW sensor and weapon systems become more complex since their optimal tactical applications are based on knowledge of the effects of current acoustic environmental conditions.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a decrease of 17 in FY 1983 in Project S0823 due to Navy application of a general Congressional reduction and a decrease of 2,597 in FY 1984 (-42 in Project S0821 and -2555 in Project S0823) due to funding constraints.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,138	7,626	5,202	6,546	Continuing	Continuing
S0821	Advanced Acoustic Processing	6,791	3,954	1,925	1,957	Continuing	Continuing
S0823	Acoustic Performance Prediction	3,347	3,672	3,277	4,589	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: None.

F. (U) RELATED ACTIVITIES: Program Elements 24311N, Undersea Surveillance System; 64261N, Acoustic Search Sensors; 64503N, Submarine Sonar Development; 64219N, Airborne ASW Developments; 64713N, Tactical Towed Array Sonar; 24313N, Surveillance Towed Array Sensor; 63788N, Rapidly Deployable Surveillance System; development of advanced acoustic processing capabilities for various air, surface, submarine, and surveillance platform applications. Program Element 63785N, Long Range Acoustic Propagation, provides basic environmental acoustic and system performance models. Carrier and ASW Operational Center acoustic prediction software will be implemented in the Tactical Environmental Support System, Program Element 63207N.

Program Element: 63708N

Title: Anti-Submarine Warfare Signal Processing

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Underwater Systems Center, New London, CT (Lead Laboratory for S0823); Naval Surface Weapons Center, White Oak, MD (Lead Laboratory for S0821); Naval Underwater Systems Center, Newport, RI; Naval Ocean Research and Development Activity, Bay St. Louis, MS; Naval Oceanographic Office, Bay St. Louis, MS. CONTRACTORS: TRW Systems, McLean, VA; The Energystics Corporation of Virginia, Arlington, VA; IHM Corporation, Manassas, VA; General Electric Co. Inc., Syracuse, NY; Analysis and Technology Inc., North Stonington, CT; Analytic Disciplines Inc, Vienna, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project S0821, Advanced Acoustic Processing: As signal processing systems increase in data throughput and software complexity, it has become necessary to ensure that this capability is validated by an independent technical review authority for all tactical air, surface and submarine platforms. This project will evaluate operator performance in signal and post processing systems for ASW detection and classification as well as localization using acoustic data sets. Efficient operator interaction with the hybrid hardware/software acoustic sensor system will be developed so that a less skilled operator, assisted by the computer, is able to perform as well as an experienced operator.

(U) In FY 1982, airborne ASW Automated Detection/Computer Assisted Classification (AD/CAC) systems were validated and testing was initiated on the Fast Time Analyzer System and Advanced Signal Processor (AN/UYS-1) to support Major System Mode 11 software development.

(U) The FY 1983 program consists of:

- o Continuation of the test and evaluation of the Fast Time Analyzer System and Major System Mode 11.
- o Additional validation testing of surface and submarine tactical sonars with emphasis placed on incorporation of detection algorithms in passive sonar software.

(U) For FY 1984, it is planned to continue:

- o Performance tests of the operational surface ship and submarine sonar systems to provide a baseline for evaluation of system improvements.

(U) Program to completion: This is a continuing program. Efforts will continue to support required system modifications identified during baseline testing.

(U) Project S0823, Acoustic Performance Prediction: To achieve the full performance potential of systems, operators and commanders must be provided with accurate, real-time estimates of performance based on local environmental conditions. System complexity requires the use of these predictions to select optimum operating modes and ASW system/suite lineup and to evaluate various employment alternatives. This requirement will be met by an onboard Acoustic Performance Prediction system for ASW surface ships (including carriers), submarines and ASW Operations Centers. Acoustic Performance Prediction computer software, tailored to the specific needs of the operational user, will utilize measured acoustic/environmental data, supplemented by historical data and system/target characteristics to yield system and suite performance predictions, and mode selection guidance.

(U) In FY 1982, development and laboratory/sea testing of surface ship, submarine and air ASW prediction and suite lineup products continued.

Program Element: 63708N

Title: Anti-Submarine Warfare Signal Processing

(U) The FY 1983 program consists of:

- o Continued development and laboratory/sea testing of long term advanced development models for each platform type.
- o Update/improvement of existing models and data bases based upon system improvement and changing tactics.
- o Initiation of development of a new state-of-the-art propagation loss model.
- o Provision of Acoustic Performance Prediction software for integration into host systems.
- o Evaluation and update of operational software as required.

(U) For FY 1984, it is planned to continue:

- o Development and laboratory/sea testing of comprehensive Acoustic Performance Prediction surface ship package.
- o Turnover of upgraded software to the host system for integration.
- o Evaluation of near term surface ship operational software.

(U) Program to completion: This is a continuing program. Emphasis will shift to further development, incorporation and evaluation of Acoustic Performance Prediction software in host air and submarine systems.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63711N
DoD Mission Area: 235 - Naval Warfare Support

Title: Fleet Tactical Development and Evaluation Program
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,596	5,201	5,246	8,742	Continuing	Continuing
R0138	Tactical Development Support	4,596	5,201	5,246	8,742	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program encompasses the Navy's major system for standardized collection of fleet operational data elements and for analysis/reconstruction of exercise and real-world operations events, and provides a central library for tactical information and doctrine.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The change between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: +706 in FY 1982 and +650 in FY 1983 were due to adjustments in material costs to support development of automatic data collection devices. The reduction of 1,432 in FY 1984 results from adjustments during budget development.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,661	3,896	4,551	6,678	Continuing	Continuing
R0138	Tactical Development Support	3,661	3,896	4,551	6,678	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: None.

F. (U) RELATED ACTIVITIES: This work is coordinated with Navy laboratory programs and equipment, and Naval Material Command project managers with equipment and software installed on fleet units and at fleet accessible major computer centers. This project is extremely important in order to reduce the effort required for data collection and processing. With this equipment, the efforts of both ship and support personnel can be devoted to the process of assessing tactical capability in the fleet leading to the ultimate goal of improving fleet tactical capability. Equipments and software developed under this program support the effort in tactical development and evaluation conducted under Program Element 65155N, Fleet Development and Evaluation Program.

G. (U) WORK PERFORMED BY: IN-HOUSE: Office of Naval Research, Arlington, VA; Naval Underwater Systems Center, Newport, RI, and New London, CT; Naval Weapons Center, China Lake, CA; Fleet Analysis Center, Corona, CA; Naval Ocean Systems Center, San Diego, CA; Director of Navy Laboratories, Arlington, VA. CONTRACTORS: Teledyne Brown Inc., Huntsville, AL; Tetra Tech, Inc., Pasadena, CA; and Applied Physics Laboratory, Columbia, MD.

Program Element: 63711N

Title: Fleet Tactical Development and Evaluation Program

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project R0138, Tactical Development Support: This project supports prototype development, enhancement and evaluation of automatic data collection devices. The Fleet Tactical Development and Evaluation Master Plan identifies over 900 tactical deficiencies. Fleet commands develop projects aimed at solving these deficiencies. Gathering data on exercises/operational events for analysis and reconstruction are man-hour intensive and detain personnel from performing their primary duties. Utilization of automatic devices results in more accurate data being gathered and permits personnel to perform their assigned operational duties with minimal distractions. Finally, analysis of the gathered data provides the basis for the development of new and/or improved tactics for the Navy (i.e., single ship to Battle Group). An expansion of the present automatic data devices program is necessary due to the shortage of skilled Navy personnel.

(U) In FY 1982, data collection requirements and operational data forms were updated to provide reconstruction standardization in all warfare activities. The Mini Shipboard Automatic Recorder System prototype has been tested at sea giving the Submarine community their first device to accomplish automatic data collection. The Fleet Library has been expanded to include observed tactical procedures from potential adversaries.

(U) The 1983 program is anticipated to continue development of the Mini Shipboard Automatic Recorder System, further expand the Fleet Tactical Library as Fleet units are more responsive to requests for tactical documentation and to upgrade the Tactical Reconstruction Information Pod to allow more accurate data to be obtained from aircraft involved in tactics development.

(U) FY 1984 will continue to develop methods of standardizing data collection and reconstruction efforts to allow means of assessing readiness and developing new or revised tactics.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not Applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63717N
DoD Mission Area: 353 - Naval Warfare

Title: Command and Control Systems (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,823	32,949	30,264	18,254	Continuing	Continuing
X0709	Navy Command and Control System Afloat	10,823	11,379	11,844	6,215	Continuing	Continuing
X0798	Over-the-Horizon Targeting	*	11,661	10,611	8,806	Continuing	Continuing
S1573	Electromagnetic Pulse Survivability of Navy Command and Control Systems**	-	409	-	-	-	409
X1744	Battle Force Warfare Commander/Coordinator Software Modules Development	-	-	2,935	2,939	Continuing	Continuing
K1784	Theater Mission Planning Center	-	9,500	4,874	294	Continuing	Continuing

As this is a continuing program, the above funding profile includes outyear escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

* Funded under Program Element 63530N in FY 1982.

** Project terminated in FY 1984.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Navy Advanced Command and Control program development consists of four projects in FY 1984. The principal project, X0709 Navy Command and Control System Afloat, has been ongoing since 1977, and provides for tactical situation displays of both ashore and afloat surveillance information, software planning aids for tactical decision-making, access to supporting communications, and promulgation of threat information and coordination of forces. Project X0798, Over-the-Horizon Targeting, explores and determines the best methods to maximize use of existing organic sensor information combined with all source ocean surveillance to enhance the Battle Group's capability to employ long range weapon systems. Project X1744, Battle Force Warfare Commander/Coordinator Software Module Development will provide Battle Force commanders with processing, evaluation and display capabilities better than that available from the Navy Tactical Data System which supports each individual ship's combat system. A separate software module will be developed for each warfare commander/coordinator. Project K1784, Theater Mission Planning Center supports the continuing evolution of the TOMAHAWK Theater Mission Planning Center.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: an increase in FY 1982 of 2,043; an FY 1983 increase of 8,843; and an FY 1984 net increase of 9,937. The FY 1982 increase was a result of reprogramming from other program elements to support software upgrades under project X0709. The FY 1983 increase is due to Navy application of a general Congressional reduction in Projects X0798 (-14) and S1573 (-643) and addition of 9,500 when project K1784 was moved to this program element from PE 64367N, Project K0545. The FY 1984 increase is due to the addition of 5,672 to project X0709 to support Tactical Flag Command Center Increment 2 software improvements and operational testing, and Increment 3 preparing for the CNO Executive Board planned in early FY 1984. Project X0798 decrease of 659 is due to refined cost estimates. A FY 1984 addition of 4,874 resulted when project K1784 was moved to this program element and 2,885 was removed from the program element when Navy cancelled project S1753 for FY 1984 and beyond. A FY 1984 addition of 2,935 results from the new start of project X1744.

Changes in other appropriations: Project X0709: There are decreases in OPN funding of 4,333 in FY 1983, 3,947 in FY 1984 and 2,954 in FY 1985. These decreases eliminate funding for conversions to Navy standard computers pending a decision by the Chief of Naval Operations Executive Board scheduled for early FY 1984. Increases in SCN funds of 336 in FY 1983 and 336 in FY 1985 are to cover Increment 1 shipboard equipment for CV-62 (ship alteration to be accomplished during SLEP) and CVN-71 (new construction). Project K1784 was added to the program element during this year.

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Program Element: 63717N

Title: Command and Control Systems (Advanced)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,452	8,780	24,106	20,327	Continuing	Continuing
X0709	Navy Command and Control System Afloat	10,452	8,780	11,379	6,172	Continuing	Continuing
X0798	Over-the-Horizon Targeting	*	*	11,675	11,270	Continuing	Continuing
S1573	Electromagnetic Pulse Survivability of Navy Command and Control Systems	-	-	1,052	2,885	Continuing	Continuing

* Funded under PE 63530N.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN (B.A.2) (332608)	16,149	19,046	-	-	-	35,195
SON Funds	-	336	-	336	-	672
WPN Funds	0	0	7,800	0	0	7,800

F. (U) RELATED ACTIVITIES: Navy Command and Control System Ashore, PE 64711N; TOMAHAWK Missile System, PE 64367N; Combat Control System MK I, PE 64562N; Combatant Development DDC-51/Combat System, PE 63589N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Electronics Systems Engineering Center, Portsmouth, VA; Naval Electronics Systems Engineering Activity, St. Inigoes, MD; Naval Avionics Center, Indianapolis, IN; Naval Electronics Systems Command, Arlington, VA. CONTRACTORS: Lockheed Missiles and Space Company, Inc., Sunnyvale, CA; Science Applications, Inc., Arlington, VA; Vitro Laboratories, Silver Springs, MD; Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; MacDonnell Douglas, Inc., St. Louis, MO; Tiburon Systems Inc., Mountain View, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(1) Project X1744, Battle Force Warfare Commander/Coordinator Software Modules Development: (NEW START) This effort will define architectural alternatives for implementing the recommendations of the Navy Tactical Data System functional allocations studies and the functional specifications for preliminary development of software modules. The principal development effort will focus on completing the ASW Commander module specification for a FY 1986 initial operational capability of the CV upgrade of aircraft carriers and the AAW Commander module specification for a FY 1987 initial operational capability of Block 4 improvements to the CG-47 class cruisers. Other priority efforts will concentrate on defining those other modules which will be integrated on board the CV and CG-47 platforms. The ASW Commander module will incorporate inputs from the Electronic Warfare Commander and will integrate Air Element Coordinator and the Carrier Intelligence Center functions. The AAW Commander module for the CG-47 will also include provision for the integration of electronic warfare inputs.

(U) In 1982, program consisted of: Not applicable.

(U) The FY 1983 program consists of: Not applicable.

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Program Element: 63717N

Title: Command and Control Systems (Advanced)

(U) For FY 1984, it is planned to:

- o Commence preliminary software development of the ASM and AAM Commander modules.
- o Begin integration of software modules into the Navy Tactical Data System.

(U) This is a continuing program.

(U) Project K-784, Theater Mission Planning Center: The Theater Mission Planning Centers are the Commanders-in-Chief's sites for the Theater Mission Planning System. This system develops digitized mission data for interpretation by the TOMAHAWK Cruise Missile Guidance System. Included also is the Communication System, Shore which transmits Mission Data Update via Communications net.

(U) In FY 1982, Theater Planning/Mission Data Preparation System and Communications System, Shore installation was begun; Rapid Targeting Software was completed; and Rapid Strike Planning System Phase II was initiated. Terrain contour matching and digital scene matching area correlation improvement efforts were also continued. (The FY 1982 program was conducted under PE 64367N, TOMAHAWK).

(U) The FY 1983 program consists of:

- o Completion of Commander-in-Chief, Atlantic Theater Mission Planning System.
- o Installation and test of Rapid Strike Planning System Phase II.
- o Initiation of Rapid Strike Planning System Phase III.
- o Continuation of Terrain and Digital Scene Matching improvements.
- o Transition to Officer in Tactical Command Information Exchange System.

(U) For FY 1984, it is planned to:

- o Continue terrain matching improvements.
- o Complete testing of Rapid Strike Planning System Phase II
- o Continue Rapid Strike Planning System Phase III development.
- o This program will continue with terrain matching improvements, conversion to Officer in Tactical Command Information Exchange System/Tactical Data Information Exchange System.

(U) This is a continuing program.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project N-709, Navy Command and Control System Afloat

1. (U) DESCRIPTION (Requirement and Project): The Tactical Flag Command Center is the battle station for the Officer in Tactical Command and supports the tactical commander in his decision making process by receiving and displaying information relative to the current tactical situation. In August 1979, the Chief of Naval Operations approved the use of an evolutionary approach and a plan for accelerated deployment of the baseline system (i.e. Increment 1 and 2) was approved in March 1980. A Rapid Development Capability designation was given in July 1980. Increment 1 is the establishment of the command center spaces

Program Element: 63717N

Title: Command and Control Systems (Advanced)

equipped with extension of existing flagship capabilities such as the Navy Tactical Data System Consoles and access to communications. Increment 1 provides an austere essential command center capability and stands alone as a requirement. Increment 2 Flag Data Display System provides the initial automated command and control support including capability to receive, process and display consolidated information from remote and organic sources. Increment 3 provides for application of enhanced technology and improvements to the Flag Data Display System through software enhancements. In November 1981, the Chief of Naval Operations approved program actions as follows: continue Increment 1 ship alterations aboard 14 designated flagships; procure two Flag Data Display System prototypes - one for installation aboard the USS AMERICA for at-sea testing and one for installation at the Naval Ocean Systems Center, San Diego, for land based testing and operator training; procure six Flag Data Display Systems in advance of Approval for Service Use (approved by Assistant Secretary of the Navy (Shipbuilding and Logistics) on 3 February 1982) for installation aboard five carriers and at the Software Support Activity, Washington Navy Yard; perform sustained software maintenance and development; expedite addition of large screen display; and perform Battle Group Command and Control Architecture Study to develop system design for Increment 3. Approval of a Tactical Flag Command Center Top Level Requirement occurred in first quarter, FY 1983.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Increment 1 ship alteration completed on the USS AMERICA. Increment 2 prototype installed at the Naval Ocean Systems Center, San Diego, and technical evaluation of hardware and software has commenced. Specification/sizing study for Increment 3 has commenced. Four Increment 2 Flag Data Display Systems have been procured with OPN funds.

b. (U) FY 1983 Program: Conduct Increment 1 ship alterations aboard three carriers. Install Increment 2 Flag Data Display Systems prototype aboard the USS AMERICA and commence installation of three OPN funded Flag Data Display Systems (Software Support Activity and two carriers). Procure two OPN funded Flag Data Display Systems and six large screen displays (for five carriers and the Software Support Activity). Complete Increment 3 specification and development proposal for a CNO Executive Board scheduled in early FY 1984. Continue Flag Data Display System software improvements.

c. (U) FY 1984 Planned Program: Install baseline Increment 1 on two additional carriers and commence installation of Increment 2 on two additional carriers. Conduct operational testing aboard USS AMERICA. Chief of Naval Operations Executive Board will decide Flag Data Display System deployment for remaining shipboard installations and will approve Increment 3 program. Continue development in accordance with Chief of Naval Operations Executive Board direction. An increase of \$465K in FY 1984 provides for enhancement of deployed systems.

d. (U) Program to Completion: Complete installation of remaining Increment 1 and 2 systems. Install large screen display on board six carriers. Continue development of Increment 3 and enhancement of deployed systems. This is a continuing program.

(U) Project X0798 Over the Horizon Targeting

1. (U) DESCRIPTION (Requirement and Project): Over-the-Horizon Targeting is a research and development effort designed to explore and identify the best methods of supporting over-the-horizon targeting by making maximum use of existing and programmed sensors, fire control systems, command and control supporting systems, and communications systems. The program consists of three phases which are concept definition, fleet demonstrations, and a capability assessment. The results of the research and development efforts are used as the basis for over-the-horizon targeting improvements to the Navy Command and Control System. Equipment procurement and system changes to implement improvements are initiated by the appropriate program sponsors. The over-the-horizon detection, classification and targeting program was restructured to fall into a single R&D project beginning in FY 1983.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued block improvements to Navy Command and Control System over-the-horizon targeting capability. Initiated development of an over-the-horizon capability for F-3 aircraft and supporting Anti-Submarine Warfare Operations Centers. Began expansion of the over-the-horizon capability to include long range air threats. Conducted

Program Element: 63717N

Title: Command and Control Systems (Advanced)

communications research to enhance over-the-horizon network connectivity and own force locating. Continued exercise analysis and advanced concepts research. Provided over-the-horizon targeting support to anti-ship TOMAHAWK as that system achieved initial operational capability.

b. (U) FY 1983 Program: Provide over-the-horizon targeting support to surface launched anti-ship TOMAHAWK as that system achieves initial operational capability. Continue integration of over-the-horizon targeting improvements into the Navy Command and Control System. Support command and control/over-the-horizon targeting tactical data display system operation at the land based test site. Conduct advanced concept research in selected areas. Continue development of P-3 and other platform HARPOON over-the-horizon targeting system. Continue communications research required to interface over-the-horizon targeting system with developing communications systems. Develop improved ship tracking and missile engagement planning software.

c. (U) FY 1984 PLANNED PROGRAM: Commence preparation for missile over-the horizon targeting evaluation. Implement improved targeting and tracking software. Continue support of ship launched cruise missile testing and development of improved HARPOON over-the-horizon targeting capability. Commence support of implementation/systems interface of the Tactical Data Information Exchange Subsystem.

d. (U) Program to Completion: Continue block improvements/expansion of the over-the-horizon targeting capability to support the employment of all long range weapons in all theaters.

e. (U) Milestones Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63719N
DoD Mission Area: 262 - Sealift

Title: Container Offloading and Transfer System
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		6,345	3,667	1,773	1,493	502	16,574
Y0816	Container Offloading and Transfer System	6,345	3,667	1,773	1,493	502	16,574

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Logistics support to sustain major contingency operations relies extensively on the utilization of commercial ships. This element develops advanced systems to accommodate the use of modern commercial ships for the transfer of cargo over-the-beach where response time precludes port development. Since the mid 1960's commercial shipping has shifted from breakbulk ships and medium size tankers to non-self sustaining containerhips, Roll-on-Roll-off ships, barge ships, and very large deep draft tankers. Without the equipment provided by this program element, most ships loaded with military cargo would have to be off loaded at established deep-draft ports.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: (Projects are addressed separately, except for program element shift of Y0242 in FY 1984, to facilitate document comparison).

Y0816 Container Offloading and Transfer System. The decreases of 1,700 in FY 1982 and 2,400 in FY 1983 are due to a Navy decision to transfer development of containerhip offloading platform (the Temporary Container Discharge Facility) to Program Element 3726N. The new offloading platform now is designated the "Auxiliary Crane Ship." Also, in FY 1982 Project Y1576 effort was combined into Project Y0816 resulting in a 5,993 decrease to project Y1576 and a corresponding increase to project Y0816. In FY 1984, the Offshore Bulk Fuel System project was transferred from PE 63705N to PE 63719N and combined with project Y0816. +1,773 in FY 1984 and +1,995 in FY 1985 and the out years resulted from that transfer.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		1,336	8,045	6,067	0	0	16,906
Y0816	Container Offloading and Transfer System	1,336	2,052	6,067	0	0	30,913
Y1576	Sealift Enhancement	0	5,993	0	0	0	5,993
(Y0242)*	(Offshore Bulk Fuel System)*				(1,095)*	(Continuing)*	(Continuing)*

* Funding shown for comparison sake. This project was funded in PE 63705N in the FY 1983 Descriptive Summary. It has been transferred to Project Y0816 in this PE in FY 1984.

Program Element: 63719N

Title: Container Offloading and Transfer System

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional** to Completion	Total** Estimated Cost
OPN (Program Element 28036N)*	11,767	-	40,183	10,867	TBD	TBD
Procurement Quantities						
Powered Causeways/Warping Tugs	7		29	94		
Elevated Causeways	1		1	1		
Roll-on/Roll-off Offload Facilities				2		

* - Includes only those items developed under PE 63719N and to be procured to support the Assault Follow-on Echelon mission part of the Strategic Sealift Support Program.

** - Procurement will be "completed" as shown to meet inventory objectives, but will resume in later years to replace items as they reach end of service life.

F. (U) RELATED ACTIVITIES: Auxiliary Crane Ship Project of the Merchant Ship Naval Augmentation Program, Program Element 63726N; USMC Field Logistic System, Program Element 63615M; Exploratory Development on Navy/Marine Corps Amphibious and Advanced Base Petroleum, Oil and Lubricants Systems (1975 - 1990) in Program Element 62760N, Logistics Technology.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Laboratory is the Naval Civil Engineering Laboratory, Port Hueneme, CA, OTHERS: Naval Ship Weapons System Engineering Station, Port Hueneme, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ordnance Station, Indian Head, MD; Naval Sea Systems Command, Washington, DC; Naval Weapons Handling Center, Earle, NJ; Norfolk Naval Shipyard, Portsmouth, VA. CONTRACTORS: INODOCO, Los Angeles, CA; Dunlop Ltd., U.K.; J. J. Henry Company, Moorestown, NJ; EG&G Washington Analytical Services Center, Rockville, MD; Tracor Marine, Jacksonville, FL; Man Tech of N.J. Corporation, Rockville, MD; VSE Corporation, Alexandria, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project Y0816, Container Offloading and Transfer System: This project provides hardware and techniques to interface with containership offloading platforms offshore and transfer cargo over the beach, and to offload Roll-on/Roll-off ships offshore. The development includes: Elevated Causeways; Powered Causeways and Side-Loadable Warping Tugs; and Roll-on/Roll-off offloading facilities. In FY 1984, Project Y0242 will be transferred from PE 63705N and be incorporated in this project. This added task will complete development of the Large Propellant Embedment Anchor.

(U) In FY 1982, Approval for Limited Production was obtained for the Powered Causeway/Side-Loadable Warping Tug and deficiency corrections continued toward achievement of Approval for Production. Developmental testing was conducted on the Roll-on/Roll-off Offloading Facility.

Program Element: 63219N

Title: Container Offloading and Transfer System

(U) The FY 1983 program consists of:

- o Follow-on Test and Evaluation of the Powered Causeway/Side-Loadable Warping Tug and obtaining Approval for Production
- o Technical Evaluation and Operational Evaluation of the Roll-on/Roll-off Drive-off Facility and obtaining Approval for Production.

(U) The FY 1984 program consists of:

- o Commence full production of the Powered Causeway/Side Loadable Warping Tug.
- o Conduct Follow-on Test and Evaluation of the Roll-on/Roll-off Facility.
- o Continue development of the Large Propellant Embedment Anchor for the Single Point Mooring Buoy.
- o Achievement of Approval for Production for the Amphibious Tanker Terminal Facility using the drag anchor and for the Amphibious Assault Fuel Supply Facility.

(U) The FY 1985 program consists of:

- o Project wrap-up and completion of development.
- o Commencing full production of Roll-on/Roll-off Facility.
- o Technical and Operational Evaluation of the Large Propellant Embedment Anchor for the Single Point Mooring Buoy.

(U) The development program completes in FY 1986 with attainment of Approval for Production of the Large Propellant Embedment Anchor for the Single Point Mooring Buoy. Full production commences for both facilities in FY 1986, with procurement of the propellant anchor commencing when ready, to be backfitted for up-grade into Tanker Terminal Facilities.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63724N Title: Navy Energy Program (Advanced)
 DOD Mission Area: 235 - Naval Warfare Support Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	18,785	21,504	23,505	23,843	Continuing	Continuing
Z0829	Energy Conservation/Advanced	10,965	12,208	13,098	11,654	Continuing	Continuing
Z0838	Mobility Fuels/Advanced	7,820	9,296	10,407	12,189	Continuing	Continuing

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Program supports projects to evaluate, adapt and develop energy related technology for ship, aircraft, and land based operations to: (a) conserve energy and reduce energy costs; (b) develop a capability to use a wider variety of ship and aircraft fuels without affecting equipment performance or reliability (e.g. fuels with less tightly controlled properties and/or commercial grade fuels, and fuels derived wholly or in part from synthetic crudes) and (c) reduce Navy base dependence on petroleum fuels by pursuing energy technology efforts to apply alternate and advanced energy technologies to specific Navy base needs.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1982, 804 from Project Z0838 in this program element, 871 from Program Element 64710N, Project Z0347, and 436 from Program Element 64710N, Project Z0371 were reprogrammed into Program Element 63724N, Project Z0829 to support a joint Navy/Air Force program to modify the Detroit Diesel Allison T-56 aircraft engine and the marine version, designated DDA 501-K-17, used in DD-963, DDG-993, and CG-47 combatants. In FY 1984 Project Z0829 was reduced by 2,857 and Project Z0838 by 5,125 as a result of budget constraints during budget development.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	16,743	17,478	21,504	31,487	Continuing	Continuing
S0829	Energy Conservation/Advanced	7,290	8,854	12,208	15,955	Continuing	Continuing
S0838	Mobility Fuels/Advanced	7,891	8,624	9,296	15,532	Continuing	Continuing
S0840	Alternative Energy Systems/Advanced	1,562	0	0	0	0	5,476

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Projects and sub-projects in this program element transition to PE 64710N, Navy Energy Program (Engineering), after successful completion of their advanced development phases.

G. (U) WORK PERFORMED BY: IN-HOUSE: David W. Taylor Naval Ship Research and Development Center, Annapolis, MD; Naval Air Development Center, Warminster, PA; Naval Air Propulsion Center, Trenton, NJ; Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Weapons Center, China Lake, CA; Naval Ship Systems Engineering Station, Philadelphia, PA; Naval Air Engineering Center, Lakehurst, NJ. CONTRACTORS: Acurex, Mountain View, CA; United Technologies, West Palm Beach, FL; Detroit Diesel Allison, Indianapolis, IN; General Electric Corporation, Cincinnati, OH; Southwest Research Institute, San Antonio, TX; EXXON Research and

Program Element: 63724N

Title: Navy Energy Program (Advanced)

Engineering Co., Linden, NJ; Grumman Aerospace Corp., Bethpage, NY; Lockheed California Co., Burbank, CA; McDonnell Douglas, St. Louis, MO; Sundstrand Corp., Rockford, IL; California Energy Co., Santa Rosa, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project 20829 Energy Conservation/Advanced

1. (U) DESCRIPTION (Requirement and Project): This project is designed to improve the energy efficiency of naval systems and thereby contribute to improved readiness, and increased combat capability, and to reduce the impact on Navy operations of escalating fuel costs and supply interruptions. Recent reductions in operating tempo have been necessary due in large part to escalating fuel costs. The Navy's fuel bill, which was \$0.3 billion in FY 1973, increased to \$3.6 billion in FY 1981. There is, therefore, an urgent need for efforts directed at increased operating efficiency and energy conservation. This project addresses three platform areas as follows: Ships: The major near term ship conservation task is directed at reduced hull drag caused by fouling. The development and use of advanced underwater hull cleaning techniques will provide over 8% savings in energy usage. This project includes development of cleaning equipment, techniques and optimum cleaning timetables for application Navy-wide, and development of improved anti-fouling hull coatings that will eliminate the requirement for hull cleaning between overhauls and provide an additional 10% reduction in energy usage. Other projects involve evaluation and development of more efficient ship hull designs in propulsion, power generating and consuming machinery (e.g. pumps, fresh water distillation, heating, ventilation and air conditioning equipment). Aircraft: The aircraft program is directed at modifying equipments and operating techniques for existing aircraft with emphasis on major fuel consuming aircraft (e.g. F-3, A-6, A-7, and F-14). Facilities: The major thrust is to meet the Department of Defense goals for reduction in facility energy use of 20% by 1985, 25% by 1990, 30% by 1995, 35% by 2000 in existing structures, and 45% in new structures by 1985. The primary emphasis is on thermal conservation in buildings, including micro-processor energy monitoring and control systems, electrical systems improvements, cogeneration of steam and electricity, and development of Naval systems to utilize non-petroleum, renewable energy resources.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Ship Conservation: Work continued on developing improved underwater hull cleaning tools and techniques and an environmental impact study for the advanced anti-fouling paints. Work accelerated on the development of high efficiency heating/air conditioning, lighting and auxiliary electric motors. Major efforts were initiated to improve the efficiency of the Detroit Diesel Allison 501-K17 gas turbine power generation on gas turbine powered ships and to develop an energy storage system for shipboard use. Testing of more efficient propulsor concepts such as "bearing in rudder post" commenced. Aircraft Conservation: Pocket-sized flight performance advisory computers for permanent use on F-4 and A-4 aircraft, and for interim use on aircraft which are candidates for on-board flight performance advisory/management systems (e.g. A-6, F-14, P-3, A-7), are being developed, as are ground based pre-flight planning computers for use throughout Naval aviation. Development of a fuel efficient T-56 engine modification for the S-2C and other Naval aircraft was initiated. Fuel dumping procedures by KA-6D tanker aircraft have been studied. Configurations of flight management systems for P-3 and S-3A aircraft were determined. Facilities Conservation: Project accomplishments included the following examples: In cooperation with the Air Force, existing hangar infrared heating techniques were evaluated and found to have potential for 30% to 50% energy savings; sensors to be used with microprocessor monitoring and control systems were evaluated and a newly developed commercial unit was identified with high potential for Navy savings; techniques for sizing and siting wind energy conversion systems were developed.

b. (U) FY 1983 Program: Ship Conservation: Continue environmental impact study for advanced anti-fouling paints. Efforts to evaluate potential near term hydrodynamic improvements and to develop energy storage and high efficiency heating/air conditioning systems will continue. Major effort to improve the 501-K17 turbo generator system efficiency by 10% will continue. Advanced hull configurations and optimized conventional hull and propeller configurations will commence demonstration. Certain auxiliary equipments (e.g. high efficiency lighting and electric motor) projects will be completed or transition to Engineering Development supported by PE 64710N. Aircraft Conservation: Continue development of pocket sized and ground based flight

Program Element: 63724N

Title: Navy Energy Program (Advanced)

planning/advisory systems. Survey other existing fleet aircraft to determine applicability of fuel conservation concepts already studied for the six highest fuel users: P-3, F-4, F-14, A-6, A-7, A-4. Facilities Conservation: Work will continue on cooperative efforts with the other services and other federal agencies to develop areas where the potential for cost savings and petroleum substitution is high. This will include: a Navy/DOE fluidized bed coal demonstration at Naval Training Center, Great Lakes, further efforts in energy monitoring and control systems development, a controlled burn test of solid waste for heat recovery applications (conducted in conjunction with the National Bureau of Standards), and geologic and thermal gradient studies for geothermal development at selected Navy sites.

c. (U) FY 1984 Planned Program: Ship Conservation: An updated environmental impact statement for advanced anti-fouling paints will be completed. Development of the improved 501-K17 turbo generator with fuel consumption reduced 10% will be completed thru operational evaluation in FY 1984. Advanced development of energy efficient hull and propulsor concepts will continue with emphasis on optimization of the conventional displacement hull and conventional propeller for near-term ship designs. Development of energy storage techniques or emergency power continues. Aircraft Conservation: Development of energy-saving technologies and subsystems needed to support advanced air vehicles designs and/or operations will continue. Fleet use of pocket size and ground based flight planning/advisory computers will be monitored and evaluated. Initiate altitude fuel efficiency testing of "Modern Technology (Turboprop) Engine" under joint development with Army. Facilities Conservation: Efforts will emphasize conservation and substitution projects with the greatest Navy-wide benefit. This will include development of facilities and utilities conservation techniques, including energy monitoring and control systems, and continued work on coal utilization, geothermal development, photovoltaic, and solar technologies.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

(U) Project Z0838, Mobility Fuels/Advanced

1. (U) DESCRIPTION (Requirement and Project): This project is designed to reduce the impact on Navy operations of escalating fuel costs, supply interruptions, and degrading fuel quality. There have been recent trends towards reduction in operating tempo (due in large part to escalating fuel costs) and reductions in fuel quality which have affected ship and aircraft performance and reliability. This project is developing: (1) a capability to operate on a wider variety of fuels (i.e. fuels with less tightly controlled properties and/or commercial grade fuels) including those produced wholly or in part from synthetics (the DoD has commitments under the Defense Production Act to procure the first commercially produced synthetic fuel products) and; (2) a capability to operate on the lower quality fuels that are currently entering the supply system, without compromising system performance and reliability. Recently, fuels which met specifications have caused serious aircraft and ship maintenance and operating problems. This project is designed to correct these problems. The project includes the conduct of tests on small scale experimental engine equipment and fuel handling systems to evaluate various fuel candidates for Navy use. An early task is the development of simplified, less costly fuels evaluation procedures which can be used for all future test and evaluation tasks in this project. Tests are also conducted to determine personnel exposure levels to new fuels to enable health comparisons to be made with conventional fuels.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Military engine test and evaluation efforts on the fuels produced from the joint Department of Defense/Department of Energy shale oil experiment were completed. Investigations of broadened specification fuels for ship and aircraft use were extended to determine the relationship of fuel characteristics to engine performance. A test matrix of six aircraft combustors and ten projected fuels, including those derived from oil shale, was developed to select fuel property sensitive engines to test in PE 64710N engine test program. Contracted efforts to develop improved, less costly, fuels acceptance procedures were continued. Toxicological studies involving the determination of shipboard personnel exposure levels of fuel vapors were completed.

Program Element: 63724N

Title: Navy Energy Program (Advanced)

b. (U) FY 1983 Program: Evaluation of broadened specification petroleum based fuels will continue. Combustor tests of fuels with widely varying properties and work on fuel thermal stability and cold flow properties will be completed. The data produced will be used to begin evaluation and validation of the improved fuels acceptance procedures being developed in a parallel portion of the program. All work that is mature enough to require full scale engine and boiler system tests will transition to Engineering Development.

c. (U) FY 1984 Planned Program: The final phase of the improved fuels acceptance procedures development program will be initiated. Begin component test work with military specification fuels from synthetic crude (shale oil) under Defense Production Act Agreement with Union Oil. Work on broadened specification conventional fuel will continue with small scale engine and boiler system tests of fuels with characteristics most typical of those which will enter the Navy supply system in the late 1980's.

d. (U) Program to Completion: This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63725N
DoD Mission Area: 235 - Naval Warfare Support

Title: Facilities Improvement
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,194	4,913	7,999	8,763	Continuing	Continuing
Y0995	Naval Facilities Systems	3,194	2,755	3,333	3,874	Continuing	Continuing
Y1077	Expeditionary Maintenance Hangar	-	362	-	-	-	362
Y1315	Dredge Sedimentation Reduction	-	0	1,452	1,259	3,889	6,600
Y1316	Improved Materials for Real Property Management	-	-	1,183	1,284	Continuing	Continuing
Y1606	New Construction Technology/Tools	-	1,796	2,031	2,346	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops validated engineering and operational data required for the systematic transition of new technology based concepts and products to military construction, operations and maintenance and procurement programs. The program provides test validated data on new materials, equipment, components, procedures, and facility concepts that show potential for improving the effectiveness and economy of naval facilities. Development is underway in the following areas: (1) concepts and hardening procedures to reduce existing explosive safety violations; (2) equipment and techniques to quickly assess the condition of critical facilities; (3) concepts and hardening procedures to improve security and reduce losses from crime and vandalism; (4) berthing concepts and criteria to meet the demands of Navy ships of the 1990's; (5) rapid erectable, relocatable maintenance hangar for forward-based ASW patrol and other aircraft; (6) sedimentation barrier systems to prevent siltation in Navy harbors/berths and reduce dredging costs; (7) longer lasting and less expensive materials for use in the aggressive waterfront environment; and (8) construction procedures and equipment hardening methods for operations in high threat, post attack environment.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a net decrease of 1,006 in FY 1983 resulting from a Congressional reduction (deleting project Y1315) and a reduction of 1,065 in FY 1984 due to budgetary constraints. The FY 1984 reduction includes termination of project Y1077, Expeditionary Maintenance Hangar.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,230	3,194	5,919	9,064	Continuing	Continuing
Y0995	Naval Facilities System	3,230	3,194	2,755	3,377	Continuing	Continuing
Y1077	Expeditionary Maintenance Hangar	-	-	362	962	TBD	TBD
Y1315	Dredge Sedimentation Reduction	-	-	1,006	1,469	TBD	TBD
Y1316	Improved Materials for Real Property Management	-	-	-	1,198	TBD	TBD
Y1606	New Construction Technology/Tools	-	-	1,796	2,058	TBD	TBD

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: Not Applicable.

F. (U) RELATED ACTIVITIES: Not Applicable.

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Program Element: 63725N

Title: Facilities Improvement

G. (U) WORK PERFORMED BY: IN HOUSE: Lead laboratory is the Naval Civil Engineering Laboratory, Port Hueneme, CA. OTHERS: Naval Surface Weapons Center, White Oak, Silver Spring, MD, and Dahlgren, VA; Naval Weapons Center, China Lake, CA. CONTRACTORS: TRW Defense and Space Systems, Redondo Beach, CA; Army Ballistics Research Laboratory, Aberdeen, MD; Mission Research Corp., Santa Barbara, CA; EG&G Washington Analytical Services Center, Inc., Rockville, MD; J. H. Wiggins Co., Los Angeles, CA; Flow Industries, Kent, WA; Stanford Research Institute, Palo Alto, CA; Southwest Research Institute, San Antonio, TX; Scripps Institute of Oceanography, San Diego, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project Y0995, Naval Facilities Systems: This project provides for the development of advanced facilities concepts, components, equipment and procedures to: (1) reduce existing explosive safety violations; (2) assess conditioning of existing facilities; (3) improve the security of facilities; and (4) meet the berthing requirements of Navy ships of the 1990's.

(U) In FY 1982 scale tests showed that soil cover can be used to greatly reduce siting requirements of explosive storage facilities; vents are not required in magazines, reducing construction and maintenance costs; developed handling system for shore-to-ship electrical cable that will reduce wear and tear of cable and manpower handling requirements; and developed new pier designs for combatant ships that will provide increased shore-to-ship services.

(U) The FY 1983 program consists of:

- * Continuation of field and laboratory tests to develop criteria for soil cover over explosive storage facilities and blast resistant windows.
- * Continuation of development of instrumentation and data reduction techniques to assess conditions of waterfront structures, roofing systems and underground utilities.
- * Continuation of development of intruder-resistant designs for windows and doors and methods for determining the appropriate level of facility security.
- * Development of model to forecast shore-side electrical power requirements of naval ships and continue evaluation of multi-level and floating pier concepts.

(U) For FY 1984, it is planned to:

- * Complete development of design standards for soil cover over cube-shaped explosive storage facilities and blast resistant windows. Initiate field tests to develop input data for a model to predict debris hazards from explosions in buildings.
- * Complete development of an instrumentation suite and procedures for inspecting built-up roofing systems; continue development on waterfront structures and underground utility inspection systems.
- * Complete development of design standards for intruder-resistant windows; continue development of intruder-resistant door concepts and methods for determining the appropriate facility security level.
- * Continue development of shore-side electrical power forecasting model and design standards for surface combatant piers; initiate development of power conditioning equipment for shore-to-ship power.

(U) This project will provide annually a number of significant products.

(U) This is a continuing program.

Program Element: 63725N

Title: Facilities Improvement

(U) Project Y1977, Expeditionary Maintenance Hangar: This project provides for the development of a relocatable structure arch supported membrane facility for use as a rapidly erectable maintenance hangar adaptable to all climatic environments.

(U) The FY 1983 program consists of:

- * Development and procurement of a prototype shelter with a clear span closure to permit entry of a 100-foot aircraft in the 120-foot archway. Erection and testing of the structure will be performed under separate funding.

(U) Project Y1315, Dredge Sedimentation Reduction: The project provides for the development of concepts to reduce siltation in Navy harbors/berthing areas and to reduce excessive maintenance dredging requirements, ship berthing delays, ships ingestion of sediment and fouling from bottom organisms and difficulties in operation of floating drydocks.

(U) The FY 1983 program consists of funds zeroed by Congress.

(U) For FY 1984, it is planned to:

- * Field tests on curtain barrier denial concept and waterjet re-suspension system at Mare Island Naval Shipyard.
- * Collection of site data at Naval Station, Mayport, FL, and Naval Station/Shipyard, Charleston, SC, for design of prototype units.
- * Initiate field and/or laboratory tests of waterjet array for berth at Naval Station, Charleston, SC.
- * Monitor sedimentation in aircraft carrier berths at Naval Station, Norfolk, VA, using a sedimentation trench concept.
- * Conduct field survey at Cumberland Sound and Kings Bay, GA.
- * Continue field tests of curtain barrier and waterjet array concepts at Mare Island Naval Shipyard.

(U) Project completion in FY 1989 with threshold capability to maintain five feet of clean water under keels of Navy ships at berths at affordable cost.

(U) Project Y1316, Improved Materials for Real Property Management: (NEW START) This project provides for the development of field validated data on promising materials for use by the naval shore establishment.

(U) For FY 1984, it is planned to initiate effort on:

- * Fuel tank lining materials
- * New single-ply roofing materials
- * Corrosion resistant reinforcing steel in concrete piles
- * Environmentally acceptable wood preservatives.

(U) This project will provide annually a number of significant products starting in FY 1986.

(U) This is a continuing program.

Program Element: 63725N

Title: Facilities Improvement

(U) Project Y1606, New Construction Technology Tools: The project has been established to provide the Naval Construction Force with expedient damage repair methods and productivity enhancing construction techniques. These include: rapid runway repair and restoration of petroleum flow at air fields; the enhancement of construction battalion mobility through improved loadout procedures; the repair or quick replacement of damaged piers; the development of harsh climate construction methods; the hardening of petroleum facilities at remote sites; development of rapid methods for construction planning and site survey and development of seawater-powered underwater hydraulic tools.

(U) The FY 1983 program consists of:

- Preparation of test plan for evaluation of winter arctic construction using large inflatable structure.
- Evaluation of applicable U.S. Air Force and U.S. Marine Corps rapid runway technology for Navy use.
- Development of operational deployment methods to increase mobility of Construction Battalion Air Detachment
- Development of engineering concepts for rapid repair of piers using steel jacket/pile construction methods.
- Preparation of specifications for and initiate procurement of underwater tool systems using seawater as hydraulic fluid.

(U) For FY 1984, it is planned to:

- Erect large 100-x-200 foot inflatable structures at Adak, AK, for evaluation in harsh climates.
- Specify prototype Navy rapid repair system.
- Develop new concepts, techniques, designs for reducing weight/cube of advanced base functional component.
- Design and fabricate prototype repair sections for selected pier facilities.
- Test prototype seawater-powered construction tools.
- Test and evaluate diver geotechnical tools.
- Test and evaluate underwater construction diver locator system.

(U) This is a continuing program.

1. (U) PROJECTS MORE THAN \$10 MILLION IN FY 1984: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63726N
DoD Mission Area: 262 - Sealift

Title: Merchant Ship Naval Augmentation Program
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RPSOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		(8,451)*	8,173	4,896	6,212	Continuing	Continuing
SO378	Merchant Ship Naval Augmentation Program	(8,451)*	8,173	4,896	6,212	Continuing	Continuing

* FY 1982 funded in Program Element 63705N (Logistics)

As this is a continuing program, the above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Merchant Ship Naval Augmentation Program will develop a means of rapidly providing capabilities in merchant ships to enable them to augment naval underway replenishment vessels in time of war, during contingencies, and during surge requirements. In general, the system would provide for the basic functions of cargo stowage and accessibility, lateral and vertical movement of cargo within the merchant ship, and the transfer of cargo to Navy ships. Other support roles contained in the operational requirement, including amphibious resupply, troop life, hospital/repair services, towing/diving and salvage, mine countermeasures, heavy lift capability, and other small auxiliary augmentation, will be analyzed and evaluated for future program support.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this summary are as follows: An increase of 1,694 in FY 1982 represents funds transferred to this program and dedicated to the development of a motion compensation system and other aspects of the Auxiliary Crane Ship, an increase of 2,400 in FY 1983 is due to transfer of funds from PE 63719N, Project Y0816 for development of Auxiliary Crane Ship, a decrease of 794 in FY 1984 due to Navy budget constraints.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		2,764	6,757	5,773	5,690	Continuing	Continuing
SO378	Merchant Ship Naval Augmentation Program	2,764*	6,757*	5,773	5,690	Continuing	Continuing

* FY 1981 and 1982 funded in Program Element 63705N (Logistics)

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN Funds (Sealift Support Equipment)	8,665	14,715	32,353	59,779	Continuing	Continuing

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Program Element: 63726N

Title: Merchant Ship Naval Augmentation Program

F. (U) RELATED ACTIVITIES: Container Offloading and Transfer System, PE 63719N; USMC Field Logistic System, PE 63635N; Exploratory Development on Navy/Marine Corps Amphibious and Advanced Base Petroleum, Oil and Lubricants System (1975-1990), PE 62760N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Weapons System Engineering Station, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Weapons Handling Center, Earle, NJ; Naval Coastal Systems Center, Panama City, FL. CONTRACTORS: Presearch, Inc. Arlington, VA; EG&G Inc., Gaithersburg, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project 50378, Merchant Ship Naval Augmentation Program: This program provides for the development of methods and modularized equipment suites to employ modern commercial ships, particularly container ships, to support forward deployed forces. Systems will be developed to modify merchant ships to augment Navy ships. The Auxiliary Crane Ship will unload non-self-sustaining cargo ships wherever required.

(U) In FY 1982, development continued on vertical strikeup systems for cargo handling, a modular Standard Tensioned Replenishment Alongside Method sending station, and a motion compensation system for the Auxiliary Crane Ship.

(U) FY 1983 program:

- o Fabrication of a barge-mounted Motion Compensating test rig for realistic environmental testing of components.
- o Commencement of assembly of the Standard Tensioned Replenishment Alongside Method sending station.
- o Fabrication and commencement of testing of prototype strikeup system.

(U) FY 1984 program:

- o Continue fabrication of large-mounted Motion Compensating test rig.
- o Continue assembly and test of the Standard Tensioned Replenishment Alongside Method sending station.
- o Continue testing of the prototype strikeup system.
- o The lead Auxiliary Crane Ship equipped with a Motion Compensating system will participate in the major logistics exercises JLOTS-II.

(U) The program to completion will consist of follow on systems developments such as:

- o Fire suppression and safety systems
- o Troop lift and casualty evacuation
- o Repair and salvage
- o Mine countermeasures.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63729H
DoD Mission Area: 216-Intra Theater Land Transportation

Title: Marine Corps Combat Services Support
(Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,336	4,244	6,320	7,158	Continuing	Continuing
C0051	Electronics Maintenance Complex	844	427	357	4	Continuing	Continuing
C0063	Power Source Systems	374	352	371	345	Continuing	Continuing
C0075	Tactical Motor Transport Vehicles (Advanced)	919	1,030	496	341	Continuing	Continuing
C0077	** Mine Warfare (Advanced)	432	1,846	4,390	5,857	Continuing	Continuing
C0078	Combat Logistics Support (Advanced)	432	325	366	253	Continuing	Continuing
C0082	Aviation Support Material and Equipment	335	264	340	362	Continuing	Continuing

* This project will be funded under Program Element 64717H Marine Corps Combat Services Support (Engineering) beginning in FY 1985.

** In FY 1983 and prior years this project was titled Mine and Boobytrap Countermeasures (Advanced).

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This Program Element provides RDT&E funds for the advanced development of Marine Corps equipment needed for the supply, maintenance, motor transport, engineer, and service support of operating forces.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Electronics Maintenance Complex: The FY 1984 decrease of 4 is due to a refinement of cost estimates. Power Source Systems: The decrease of 1 in FY 1982 and the decrease of 4 in FY 1984 are due to refinement of cost estimates. Tactical Motor Transport Vehicles (Advanced): The FY 1982 decrease of 43 is due to refinement of program strategy and revised cost estimates and the decrease of 508 in FY 1984 is due to completion of RDT&E on the Logistics Vehicle System and High Mobility Multipurpose Wheeled Vehicle. Mine Warfare (Advanced): The FY 1982 increase of 200 is due to additional costs associated with beginning RDT&E on the Catapult Launched Fuel Air Explosive Mine Countermeasures Systems, the FY 1983 decrease of 142 is due to a reduction in management support contracts, and the increase of 334 in FY 1984 is to fund prototype manufacture and Development Testing of a ground dispenser for the anti-tank and anti-personnel families of scatterable mines. Combat Logistics Support (Advanced): The increase of 17 in FY 1982 and decrease of 12 in FY 1984 are due to inflation and refinement of cost estimates respectively, and the FY 1983 decrease of 17 is due to a reduction in management support contracts. Aviation Support Material and Equipment: The increase of 41 in FY 1982 and the decrease of 17 in FY 1984 are due to refinement of cost estimates, the FY 1983 decrease of 7 is due to a reduction in management support contracts.

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Program Element: 63729H

Title: Marine Corps Combat Services Support
(Advanced)

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,003	3,122	4,416	5,931	Continuing	Continuing
C0051	Electronics Maintenance Complex	-	844	427	361	Continuing	Continuing
C0063	Power Source Systems	60	375	352	375	Continuing	Continuing
C0075	Tactical Motor Transport Vehicles (Advanced)	273	962	1,030	1,004	Continuing	Continuing
C0077	Mine and Boobytrap Countermeasures (Advanced)	100	232	1,988	3,456	Continuing	Continuing
C0078	Combat Logistics Support (Advanced)	37	415	342	378	Continuing	Continuing
C0082	Aviation Support Material and Equipment	173	294	271	357	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	<u>Procurement, Marine Corps</u>						
C0075	5/4 Ton Truck	-	40,384	91,743	102,463	207,961	442,551
	(Quantity)	-	(1,013)	(2,976)	(3,123)	(5,811)	(12,923)
	Truck, Tractor, 5 Ton	4,854	1,321	-	-	8,236	14,411
	(Quantity)	(65)	(17)	-	-	(132)	(214)
	Truck, 5 Ton	45,958	62,117	-	-	84,044	192,119
	(Quantity)	(638)	(802)	-	-	(1,402)	(2,842)
	Lubrication and Service	286	79	840	2,968	5,629	9,802
	(Quantity)	(34)	(3)	(30)	(100)	(175)	(342)
	5 Ton Retrofit	2,400	3,787	13,393	17,518	Continuing	Continuing
	(Quantity)	(104)	(167)	(504)	(658)	TBD	TBD

F. (U) RELATED ACTIVITIES: U.S. Army PE 63104A, on Fuels/Lubricant Development; U.S. Army PE 63210A on Aircraft Power/Propulsion; U.S. Army PE 64204A on Air Mobility Support Equipment; U.S. Army PE 63602A and 63606A on Land Mine Warfare; U.S. Army PE 63621A on Vehicle Componentry.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA; U.S. Army Tank and Automotive Command, Warren, MI; Marine Corps Logistics Base, Albany, GA; Naval Sea System Command, Washington, DC; Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Coastal Systems Center, Panama City, FL. Contractors: Brunswick Corporation, Marion, VA; Oshkosh Truck Corporation, Oshkosh, WI.

H. (U) PROJECTS LESS THAN \$10 M. IN FY 1984:

(U) Project C0051, Electronics Maintenance Complex: This program provides a maintenance facility housed in standard Marine Corps shelters which is compatible with merchant container shipping.

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Program Element: 6329M

Title: Marine Corps Combat Services Support
(Advanced)

(U) In FY 1982, prototype design and assembly was completed.

(U) The FY 1983 program consists of:

- o Commencing and completing Developmental Testing.
- o Beginning Full Scale Development.
- o Conducting a requirements analysis to determine the types of shelters and quantity of internal appointments needed.

(U) For FY 1984, it is planned to:

- o Complete Initial Operational Test and Evaluation.
- o Receive Approval for Service Use.

(U) Project C0063, Power Source Systems: This program supports development of high capacity, all temperature primary and secondary batteries, and thermal electric, thermionic and solar power sources.

(U) The FY 1982 program consisted of:

- o Continued development of prototype sources for non-dangerous nickel cadmium batteries and thermal electric generators.
- o Design of prototype of a manpacked solar power unit.

(U) The FY 1983 program consists of:

- o Continuing development (expanded to include in-service as well as radio sets under development) of the nickel cadmium battery.
- o Testing the manpacked solar power unit.
- o Monitoring Army power source system development.

(U) For FY 1984, it is planned to:

- o Continue to monitor Army power source programs.
- o Continue efforts to identify improved/alternate power source systems.
- o Develop battery charging capabilities.
- o Conduct Development/Operational Test of vehicular mounted solar power units.

(U) Project C0075, Tactical Motor Transport Vehicles: This program is to provide the optimum mix of tactical motor transport vehicles and support equipment for Marine Corps employment; provide for transportation of dimensionally standard loads in view of containership realities of the midrange period; reduce types of vehicles requiring maintenance support and concomitant personnel.

Program Element: 63729H

Title: Marine Corps Combat Services Support
(Advanced)

(U) The FY 1982 program consisted of:

- o Delivery of prototype High Mobility Multipurpose Wheeled Vehicles.
- o Conducting Development Test/Operational Test and Evaluation of the High Mobility Multipurpose Wheeled Vehicles.
- o Logistics Vehicle System Approval for Service Use.

(U) In FY 1983, it is planned to:

- o Enter production on the Logistics Vehicle System Trucks and High Mobility Multipurpose Wheeled Vehicle.
- o Continue to monitor/support Army tactical vehicle development programs.
- o Continue Developmental/Operational Testing of variants of the Logistics Vehicle System.

(U) For FY 1984, it is planned to:

- o Field the Logistics Vehicle System.
- o Continue to ensure interservice tactical vehicle fleet coordination.
- o Evaluate commercial items for suitability as military vehicles.

(U) Project G0077, Mine Warfare: This program provides the Marine Corps with an amphibious capability to breach minefields. The system must be compatible with existing equipment normally used in an amphibious assault.

(U) In FY 1982, this program:

- o Began development efforts to evaluate the Catapult Launched Fuel Air Explosive mine countermeasures system to breach minefields.
- o Evaluated design studies of the Fuel Air Explosive warhead/launcher mechanism for the Catapult Launched Fuel Air Explosive system.

(U) The FY 1983 program consists of:

- o Manufacturing prototype warhead, launched and fire control mechanisms.
- o Continuing to monitor other Service efforts in minefield breaching.
- o Beginning development of a conventional mine laying module for deploying the scatterable mine (Anti-Tank/Anti-Personnel) family.

(U) For FY 1984, it is planned to:

- o Production and delivery of warhead, launchers and fire control mechanisms is the primary cause of the FY 1984 increase.
- o Commence Development Test I.

Program Element: 63729H

Title: Marine Corps Combat Services Support
(Advanced)

- o Begin efforts to determine suitability of other minefield breaching techniques.
- o Transition mine laying module to Full Scale Development.

(U) Project C0078, Combat Logistics Support: This program is to provide the Fleet Marine Forces with service support heavy engineering (earthmoving) equipment and material handling equipment; provide food service, water purification, electric power distribution, and bulk fuel systems; provide standardized portable maintenance shops, and overhead protective construction material. This program will research and develop those and like items in the Advanced Development stage.

(U) In FY 1982, this program:

- o Evaluated commercial off-the-shelf heavy engineering equipment to replace aging items.
- o Investigated new combat engineering vehicles, commercial rubber tire tractors and bulk fuel equipment.

(U) The FY 1983 program:

- o Continued to evaluate commercial heavy equipment.
- o Continued to investigate new combat engineer vehicles, commercial rubber tire tractors and bulk fuel equipment.
- o Investigate heavy class material handling equipment.

(U) For FY 1984, it is planned to:

- o Continue evaluating commercial heavy equipment.
- o Continue investigating combat engineer vehicles, commercial rubber tire tractors, bulk fuel and material handling equipment.
- o Transition appropriate efforts to Full Scale Development.

(U) Project C0082, Aviation Support Material and Equipment: This project supports Marine Corps efforts to improve aviation operational capabilities through participation in other service development, service developed equipments, or development and evaluation of aviation associated equipment not available elsewhere.

(U) In FY 1982, this program:

- o Monitored United States Air Force and Navy aviation projects and aviation support material equipment efforts.
- o Continued monitoring Air Force development efforts in Naval Gunfire application to Forward Air Controller Beacon.
- o Evaluated Marine Air Traffic Control and Landing System and Marine Air Traffic Control Squadron Equipment.
- o Evaluated AV-8A aircraft load using a "ski-jump" platform.

(U) In FY 1983, it is planned to participate in the following other Service development efforts:

- o KCX/JVX/ANX Weapons System Concept Formulation (Army/Air Force/Navy).
- o Development of a Laser Guided Zuni Rocket (Navy/Air Force).

Program Element: 63729M

Title: Marine Corps Combat Services Support
(Advanced)

- o Initial Operational Test and Evaluation of Marine Air Traffic Control Landing System Command and Communication Subsystems (Army).
- o Continue development of the Multifunction Radar Transponder Beacon with the Army.
- o Operational Test and Evaluation of Marine Air Traffic Control Squadron Equipment (Army).

(U) In FY 1984, it is planned to:

- o Continue Initial Operational Test and Evaluation of Marine Air Traffic Control and Landing System and Marine Air Traffic Control Squadron Equipment.
- o Continue participation in other Service developments of aviation systems/equipment.

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 6373M
DoD Mission Area: 373-Tactical Surveillance,
Rece and Target Acquisition

Title: Marine Corps Intelligence/Electronic
Warfare System (Advanced)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	890	6,885	6,057	10,491	Continuing	Continuing
C0066	Communications and Non-Communications Electronic Countermeasures Systems ****	5	1,582	1,719	3,460	Continuing	Continuing
C0067	Communication Electronic Countermeasures Systems	3	-	-	-	-	6
C0936	Marine Corps Electronic Warfare Simulation Suite (MCEWSS)	40	1,340	413	0	Continuing	Continuing
C0937	Mobile Electronic Warfare Support System (MEWSS)	3	**	**	**	**	**
C1296	All-Source Imagery Processor (ASIP)	717	1,625	**	**	**	**
C1297	Remotely Monitored Battlefield Sensor System (REMBASS)	122	1,081	1,192	***	Continuing	Continuing
C1421	Lightweight Battlefield Surveillance Radar (LBSR)	-	473	457	2,140	Continuing	Continuing
C1422	Lightweight Seismic Acoustic/Passive Device (LSAPD)	-	784	739	2,351	Continuing	Continuing
C1423	Mobile Intelligence Analysis System (MIAS)	-	-	977	1,367	Continuing	Continuing
C1698	Air Droppable Soil Penetrometer (ADSP)	-	-	560	977	Continuing	Continuing
C1746	Amphibious Preassault Survey System	-	-	-	196	Continuing	Continuing

** Funded in Program Element 64718M, Marine Corps Intelligence/Electronic Warfare Systems (Engineering) in FY 1983 and subsequent years.

*** Funded under Program Element 64657M, Marine Corps Ground Combat/Supporting Arms System (Engineering) in FY 1985 and subsequent years.

****Project C0066 previously titled Non-Communications Electronic Countermeasures System (NOW COMM ECM).

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This Program Element provides RDT&E funds for the advanced development of Marine Corps intelligence and electronic warfare equipment and systems required for the support of operating forces.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Lightweight Battlefield Surveillance Radar: The FY 1983 decrease of 16 is due to a reduction in management support contracts and the FY 1984 decrease of 1707 is due to a restructuring of the program, including a reassessment of the requirement. Lightweight Seismic Acoustic/Passive Device (LSAPD): The FY 1984 decrease of 1715 is due to restructuring the program requirements in FY 1982. Communications and Non-Communications Electronic Countermeasures Systems: Titled Non-Communications Electronic Countermeasures System in the FY 1983 Descriptive Summary. This project will remain in Program Element 63730M rather than transition to Program Element 64718M. Decrease of 41 in FY 1982 due to difficulties in identifying candidate systems for development. Increase of 1,719 in FY 1984 is due to this project remaining in PE 63730M and to the initiation of a project to develop communication jammers. Marine Corps Electronic Warfare Simulation Suite: Decrease of 511 in FY 1982 is due to a reduction in planned program costs. The FY 1984

Program Element: 63730M

Title: Marine Corps Intelligence/Electronic Warfare System (Advanced)

decrease of 5 is due to cost refinements. Mobile Electronic Warfare Support System: Decrease of 831 in FY 1982 reflects a reduction in the planned scope of work due to a redefinition of the requirement. Remotely Monitored Battlefield Sensor System: Increase of 122 in FY 1982 reflects support of joint operational test conducted with the Army. This increase also reflects development of program documentation for FY 1983 start. The FY 1983 decrease of 90 is due to a reduction in management support contracts. FY 1984 decrease of 14 is due to refinement of cost estimates, including escalation. All Source Imagery Processor: Decrease of 61 in FY 1982 is due to reduction in actual contractor costs, and the FY 1983 decrease of 24 is due to a reduction in management support contracts.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	<u>TOTAL FOR PROGRAM ELEMENT</u>	8	2,209	7,024	6,242	TBD	TBD
C0066	Non-Communication Electronic Countermeasures System (NONCOMM ECM)	-	46	1,582	*	*	*
C0067	Communication Electronic Countermeasures System	3	-	-	-	-	3
C0936	Marine Corps Electronic Warfare Simulation Suite (MCEWSS)	5	551	1,340	418	TBD	TBD
C0937	Mobile Electronic Warfare Support System	-	834	*	*	*	*
C1296	All-Source Imagery Processor (ASIP)	-	778	1,649	*	TBD	TBD
C1297	Remotely Monitored Battlefield Sensor System (REMBASS)	-	-	1,180	1,206	TBD	TBD
C1421	Lightweight Battlefield Surveillance Radar (LBSR)	-	-	489	2,164	TBD	TBD
C1422	Lightweight Seismic Acoustic/Passive Device (LSAPD)	-	-	784	2,454	TBD	TBD

* Funded under Program Element 64718M, Marine Corps Intelligence/Electronic Warfare Systems (Engineering) in FY 1984 and subsequent years.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: TBD

F. (U) RELATED ACTIVITIES: Other Services electronic warfare and intelligence systems development.

G. (U) WORK PERFORMED BY: Communications and Non-Communications Electronic Countermeasures Systems: To be determined. Marine Corps Electronic Warfare Simulation Suite: In-House: Naval Training Equipment Center, Orlando, Florida. Remotely Monitored Battlefield Sensor System: Naval Air Development Center, Warminster, PA. Lightweight Seismic Acoustic/Passive Device and Lightweight Battlefield Surveillance Radar: To be determined. Air Droppable Soil Penetrometer: To be determined. Mobile Intelligence Analysis System: To be determined.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project C0066, Communications and Non-Communications Electronic Countermeasures Systems: The goal of this program is to satisfy the continuing requirement for Communications and Non-Communications Electronic Countermeasures Systems which will provide the Radio Battalions the ability to jam/deceive enemy receivers and radars. A standoff communications jammer is required which will jam VHF and UHF tactical receivers. This jammer will be the replacement for the currently fielded AN/TLQ-17A. A similar requirement exists to field a system capable of jamming HF receivers. The Radio Battalion also must be capable of jamming or deceiving counter-mortar/counter-battery, combat surveillance, target acquisition and certain other ground bases' radars.

(U) In FY 1982, other Service developments were monitored and requirements defined.

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Program Element: 63730M

Title: Marine Corps Intelligence/Electronic Warfare System (Advanced)

(b) The FY 1983 program consists of:

- o Establishing a joint advanced development program with another Service for development of a non-communications jammer.
- o Preparing program initiation documentation for communications electronic countermeasures system.
- o Developing concepts of employment for non-communications countermeasures systems.

(U) For FY 1984, it is planned to:

- o Initiate development of a communications jammer which will replace the AN/TLQ-17A currently in service.
- o Continue joint advanced development of a non-communications jammer with another Service
- o Initiate development of an HF jammer.

(U) Project C0936, Marine Corps Electronic Warfare Simulation Suite: This suite of equipment will simulate the hostile electromagnetic environment for Fleet Marine Force Electronic Warfare training.

(U) The FY 1982 program consisted of:

- o Defining the system requirement to include threat capabilities and tactics.
- o Preparing system description and specifications.
- o Designating manpower/training requirements.

(U) For FY 1983, it is planned to:

- o Integrate identified electronics into currently fielded electronic warfare training systems.
- o Continue to define the electronic warfare threat and identify candidate threat simulators.

(U) For FY 1984, it is planned to:

- o Complete system integration.
- o Conduct Operational Test-II.
- o Continue to evaluate threat capabilities.
- o Plan for improvements to ensure accurate simulation of current threat tactics, techniques and equipment.

(U) Project C1297, Remotely Monitored Battlefield Sensor System: This program is an Army developed hand emplaced, unattended ground sensor system that will detect and target classify intruding personnel, wheeled and tracked vehicles. The Marine Corps has an additional requirement for an air delivered sensor that is not satisfied by the Army battlefield sensor program. These sensors will replace the current inventory of hand and air delivered sensors, which is no longer in production, and which will reach the end of its service life by FY 1987-1989.

(U) In FY 1982, the Army's hand emplaced sensor fabrication was completed; the Marine Corps also participated in the Army's

Program Element: 63730H

Title: Marine Corps Intelligence/Electronic Warfare System (Advanced)

Remotely Monitored Battlefield Sensor System Development Test/Operational Test II.

(U) The FY 1983 program consists of:

- o Beginning a joint development effort for an air delivered sensor.
- o Evaluating current air delivered sensors for possible system upgrade.

(U) For FY 1984, it is planned to:

- o Complete joint Advanced Development on the air delivered sensor.
- o Commence Engineering Development.

(U) Project CI421, Lightweight Battlefield Surveillance Radar: This program will develop a ground surveillance radar which will detect and locate moving personnel and vehicles for targeting. This radar represents a significant improvement over current ground surveillance radars, and will be the late 1980's replacement for the AN/PPS-15 ground surveillance radar. The mean-time-between-failures of the Lightweight Battlefield Surveillance Radar is expected to improve 300 percent over the AN/PPS-15 ground surveillance radar.

(U) In FY 1982, this project was not active.

(U) The FY 1983 program consists of:

- o Completing requirement documentation/definition.
- o Preparing preliminary design analysis and performance specification.
- o Completing cost-work breakdown schedule.
- o Conducting vulnerability assessment.
- o Commencing advanced development.

(U) For FY 1984, it is planned to:

- o Continue advanced development.
- o Construct E-Scan antenna, signal processor and transmitter/receiver.
- o Develop software.
- o Evaluate interfaces for hardware, software and terminal/display requirements.

(U) Project CI422, Lightweight Seismic Acoustic/Passive Device: This program is a seismic acoustic sensor that will detect and locate tank movements, artillery firing and low flying aircraft out to a range of 20 kilometers. It is a passive sensor which does not provide an emitter signature and does not depend on line of sight. It is a new capability which will not replace any current system.

(U) In FY 1982, this project was not active.

Program Element: 6 WJ00H

Title: Marine Corps Intelligence/Electronic Warfare System (Advanced)

(U) The FY 1983 program will conduct feasibility tests, prepare documentation, and initiate the Advanced Development effort.

(U) The planned FY 1984 program is to:

- o Continue Advanced Development.
- o Develop system specification.
- o Prepare logistics support plan.

(U) Project CI423, Mobile Intelligence Analysis System: This system will replace the Intelligence Analysis Center which reaches the end of its projected service life in the early-to-mid 1990's. To the maximum extent possible, it will utilize software programs already developed for the Intelligence Analysis Center and incorporate technology and techniques from other 1980's developmental systems. The major R&D thrust will be in the areas of increased mobility, enhanced processing capability, size reduction, and dissemination of intelligence to the Battalion/Squadron levels.

(U) In FY 1982, this project was not active.

(U) The plan for FY 1983 is to prepare program initiation documentation and monitor other Service developments.

(U) For FY 1984, it is planned to:

- o Further define the requirements.
- o Examine applicable technology.
- o Write system specifications.
- o Develop concept of operations.
- o Initiate advanced development.

(U) Project CI698, Air Droppable Soil Penetrometer: Determining soil trafficability is a critical parameter during planning for amphibious operations. Although some trafficability data can be obtained from remote sensing systems, this data is insufficient, and occasionally unobtainable. Currently, reconnaissance teams must be employed to obtain the needed information. This program will allow collection of soil trafficability data without employing reconnaissance teams for that purpose in the objective area.

(U) This project was not active in FY 1982 or FY 1983.

(U) The planned FY 1984 program is to:

- o Develop required program documentation.
- o Design/fabricate an advanced development model.
- o Obtain trafficability data in areas where active/passive sensors cannot be used reliably.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63731M
DoD Mission Area: 351 - Land Warfare

Title: Marine Corps Command/Control/Communications
Systems (Advanced)
Budget Activity: 4 - Tactical Programs

1. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	354	2,244	0	0	Continuing	Continuing
C0064	Marine Integrated Personnel System (MIPS)	0	2,108	0*	0	0	2,108
C0935	Real-Time Financial and Manpower Management Information System (REAL-FAMMIS)	354	136	0*	0	0	1,610

*Begins Operations and Maintenance, Marine Corps funding

The above funding profile includes escalation and encompasses all work and development phases now planned or anticipated through FY 1983.

2. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program provides funds for the advanced development of all Marine Corps Command, Control and Communications (C3) equipment and systems required for the conduct and support of combat operations.

3. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: The Marine Corps intended to utilize the program to conduct necessary development and testing of Automatic Data Processing Equipment in the Fleet Marine Force, to broaden and enhance its applicability in the field and to examine concepts for provisioning of a tactical follow on replacement. Specifically, the program was to design an interface between the Automatic Data Processing Equipment and the Management Information System on board the Amphibious Assault Ship. This effort has not proven successful and, due to fiscal constraints, further utilization of resources on this endeavour have been deferred.

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FY 1984 RDT&F DESCRIPTIVE SUMMARY

Program Element: 63734N
DoD Mission Area: 238 - Other Naval Warfare

Title: Chalk Coral
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	2,900	4,976	4,198	Continuing	Continuing
R1804	Chalk Coral	0	2,900	4,976	4,198	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63736N

Title: Strike Warfare Technology

DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,700	3,000	0	0	0	6,050
R1572	Strike Warfare	1,700	3,000	0	0	C	6,050

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Details of this program are of a higher classification and of limited access nature.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63737N
DoD Mission Area: 238 - Other Naval Warfare

Title: Link Hazel
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	16,000	34,130	41,972	0	92,102
R1679	Link Hazel	0	16,000	34,130	41,972	0	92,102

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63763N Title: Integrated Tactical Surveillance System
DoD Mission Area: 323 - TIARA for Naval Warfare Budget Activity: 4-Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,235	11,334	30,181	113,242	TBD	TBD
X1319	Integrated Tactical Surveillance System	12,235	11,334	30,181	113,242	TBD	TBD

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops a system of systems, including modified sensors, processing and dissemination elements, and user modules in order to provide all weather, day/night surveillance of high interest aircraft and ships in ocean areas and related littoral zones worldwide where United States naval forces may be employed in the pursuit of national objectives. The Integrated Tactical Surveillance System addresses the critical need for extended range surveillance data on high interest targets to support the Anti-Air and Anti-Surface elements of Naval Warfare.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: An increase of 270 in FY 1982 to provide funds necessary to complete Concept Exploration studies; a decrease of 6,500 in FY 1983 due to a 5,000 Congressional reduction and revision of cost estimates (-1,500); and a decrease of 77,112 in FY 1984 due to application of program funds to other programs directly supporting Integrated Tactical Surveillance System requirements to meet critical near term improvement objectives.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14,000	11,965	17,834	107,293	TBD	TBD
X1319	Integrated Tactical Surveillance System	14,000	11,965	17,834	107,293	TBD	TBD

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: To be determined

F. (U) RELATED ACTIVITIES: Program Element 63717N, Project X0798, Over-the-Horizon Targeting and Project X0709, Navy Command/Control System Afloat; Program Element 64711N, Command and Control Systems; Program Element 31011N, Tactical Intelligence Systems; Program Element 62712N, Surface/Aerospace Target Surveillance; Program Element 33109N, Satellite Communications; Program Element 64777N, NAVSTAR Global Positioning System; Program Element 63858N, Project X0728, Command and Control Architecture and Management Support; Program Element 64725N, Project X1779, Over-the-Horizon Radar; Program Element 64577N, Extremely High Frequency Satellite Communications.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, D.C.; Naval Ocean Systems Center, San Diego, California. SUPPORT CONTRACTORS: John Hopkins University, Applied Physics Laboratory, Laurel, Maryland. INDUSTRIAL CONTRACTORS: TBD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

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Program Element: 63763N

Title: Integrated Tactical Surveillance System

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984.

(U) Project X1319 Integrated Tactical Surveillance System

1. (U) DESCRIPTION (Requirement and Project): The Integrated Tactical Surveillance System responds to a need for an integrated system of sensors, sources, processing, and dissemination elements to provide essential data to tactical commanders to position and employ Naval Forces worldwide. This capability requires accurate and timely tactical intelligence independent of weather, time of day or changing political climate. The system concept requires a warfighting capability and operation under conditions of emission control and countermeasures. Concept formulation studies, completed in FY 1982, identified specific system elements and an architectural framework to implement capability necessary to meet the defined need. The content and recommendations of these studies were presented to the Chief of Naval Operations Executive Board in May, 1982. Decisions and direction from this review and subsequent meetings include improvements in Command and Control capability both ashore and afloat, direct readout terminals, connectivity between allied air defense radar systems and Fleet Ocean Surveillance Information Centers and Facilities, and improvements in national system processing and connectivity to tactical centers.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed concept exploration efforts. The Chief of Naval Operations Executive Board and OSD staffs were briefed on study efforts. Approval was given to proceed with engineering development of recommended command and control enhancements.

b. (U) FY 1983 Program: Conduct systems engineering and complete development specifications for near-term enhancements including: an afloat correlation capability; direct downlink terminals; and shore-based correlation and connectivity improvements. Commence development efforts for the near-term enhancements.

c. (U) FY 1984 Planned Program: Continue to refine and define system elements and begin Advanced Development of selected near-term enhancements. An increase of \$18,847 between FY 1983 and FY 1984 supports increased Advanced Development efforts for selected near term enhancements.

d. (U) Program to Completion: Complete development and test of approved system elements leading to procurement of hardware to allow Initial Operational Capability in _____ and Full Operational Capability in _____

e. (U) Milestones

MILESTONE

1. Concept Exploration Complete
2. Chief of Naval Operations Executive Board
3. Commence advanced development of near-term enhancements
4. Initial Operational Capability
5. Full Operational Capability

DATE

September, 1982
May, 1982
January, 1983

FY 1984 RUT&E DESCRIPTIVE SUMMARY

Program Element: 63784N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Anti-Submarine Warfare Surveillance
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,235	1,000	11,093	22,950	Continuing	Continuing
X0756	Lightweight Undersea Sensor Components	1,235*	1,000*	0	0	0	41,002
X1312	Fixed Distributed System	0	0	11,093	22,950	Continuing	Continuing

* Lightweight Undersea Sensor Components development and improvement efforts will be completed in FY 1983. These components will be utilized in and funded under Fixed Distributed Systems in FY 1984 and beyond.

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the design and development of advanced undersea surveillance systems, Lightweight Undersea Sensor Components, and advanced fiber optic technology in order to provide tactical information to Anti-Submarine Warfare forces and assist in carrying out the Navy's ASW mission. The Fixed Distributed System is a concept employing large numbers of sensors in fields or barriers. These distributed sensors are for use in detecting the

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: X0756, Lightweight Undersea Sensor Components: FY 1983 is decreased 284 as a result of a Congressional reduction. The FY 1984 program is decreased 1,514 due to restructuring of the program to terminate the development of Lightweight Undersea Sensor Components and initiate the development of the Fixed Distributed System. X1312, Fixed Distributed Systems: The increase of 8,427 in FY 1984 reflects accelerated development of applications of fiber optic technology.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,149	1,235	1,284	4,280	TBD	Continuing
X0756	Lightweight Undersea Sensor Components	3,149*	1,235	1,284	1,414	TBD	Continuing
X1312	Fixed Distributed System	0	0	0	2,866	TBD	TBD

* Previously listed under Program Element 63794N, Anti-Submarine Warfare, in FY 1981 and prior.

Program Element: 63784N

Title: Anti-Submarine Warfare Surveillance

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	<u>FY 1982 Actual</u>	<u>FY 1983 Estimate</u>	<u>FY 1984 Estimate</u>	<u>FY 1985 Estimate</u>	<u>Additional to Completion</u>	<u>Total Estimated Cost</u>
OPN Funds Quantity*	20,500	21,790	18,880	18,550	Continuing	Continuing

* Various mixes and quantities of Lightweight Undersea Sensor Components (hydrophones, multiplexers and repeaters) to be procured.

F. (U) RELATED ACTIVITIES: Undersea Surveillance Systems, Program Element 24311N.

G. (U) WORK PERFORMED BY: IN-HOUSE: None. CONTRACTORS: Western Electric Company, Greensboro, NC; TRW Systems, McLean, VA; Bell Laboratories, Whippany, NJ.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project X1312, Fixed Distributed System:

1. (U) DESCRIPTION (Requirement and Project): (NEW START) The Fixed Distributed System provides for initiation of the design, development and integration of fiber optic technology to be used in the Fixed Distributed System for the Sound Surveillance System network.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Not applicable.

b. (U) FY 1983 Program: Not applicable.

c. (U) FY 1984 Planned Program: Complete an accelerated program of fiber optic cable validation and preliminary cable handling/deployment design. Continue trunk cable and repeater design; fabricate models for demonstration. Select sensor/multiplexer design configuration and initiate design of hardware. Initiate preliminary storage/handling and ship interface specifications.

d. (U) Program to Completion: Continue fiber optic trunk, sensor, and installation development culminating in prototype hardware development and installation.

e. (U) Milestones: Not applicable.

FY 1984 RDTE DESCRIPTIVE SUMMARY

Program Element: 63785N

Title: Long Range Acoustic Propagation

DoD Mission Area: 233 - Anti-Submarine Warfare

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11,644	12,578	8,399	20,722	Continuing	Continuing
R0119	Surveillance Environmental Acoustic Support	8,313	8,991	*	*	*	*
R0120	Tactical Anti-Submarine Warfare Environmental Acoustic Support	3,331	3,587	*	*	*	*
R0120	Anti-Submarine Warfare Environmental Acoustic Support			8,399	20,722	Continuing	Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

*In FY 1984, Projects R0119 and R0120 have been combined in a single project, R0120, now titled ASW Environmental Acoustic Support.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Provide environmental acoustic systems predictive capability and data essential to optimize the design, development and performance of undersea acoustic surveillance and tactical anti-submarine warfare systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: Increase of 828 in R0119 for FY 1982 resulted from a reprogramming action to provide funding for a Mediterranean Sea measurement exercise. Effective in FY 1984, R0119, Surveillance Environmental Acoustic Support and R0120, Tactical Anti-Submarine Warfare Environmental Acoustic Support are combined in R0120, Anti-Submarine Warfare Environmental Acoustic Support. The decrease in funds for 1984 of 8,499 is due to budgetary constraints.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,340	10,814	12,578	16,898	Continuing	Continuing
R0119	Surveillance Environmental Acoustic Support	7,842	7,445	8,991	12,220	Continuing	Continuing
R0120	Tactical Anti-Submarine Warfare Environmental Acoustic Support	2,498	3,329	3,587	4,678	Continuing	Continuing

*Shown in Program Element 63795N, Long Range Acoustic Propagation in FY 1981 and prior years. Program Element number administratively changed to 63785N.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

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Program Element: 63785N

Title: Long Range Acoustic Propagation

F. (U) RELATED ACTIVITIES: This project provides direct ocean environmental acoustic measurement and modeling support for research and development pursued under the following Program Elements: 24311N, Undersea Surveillance System; 63768N, Rapidly Deployable Surveillance Systems; 64789N, Surveillance Towed Array Sensor; 63784N, Anti-Submarine Warfare Surveillance; 63259N, Acoustic Search Sensors (Advanced); 63553N, Surface Anti-Submarine Warfare; 63708N, Anti-Submarine Warfare Signal Processing; 64713N, Tactical Towed Array Sonars; 63601N, Mine Development; 64503N, Submarine Sonar Development; 63502N, Surface Mine Countermeasures; and 63610N, Advanced Lightweight Torpedo.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Research and Development Activity, Bay St. Louis, MS; Naval Air Development Center, Warminster, PA; Naval Research Laboratory, Washington, DC; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, New London, CT. CONTRACTORS: Analysis & Technology, Inc., North Stonington, CT; B-K Dynamics, Inc., Rockville, MD; Ocean Data Systems, Inc., Rockville, MD; Planning Systems, Inc., McLean, VA; Science Applications, Inc., McLean, VA; Tracor, Inc., Rockville, MD; University of Texas (Applied Research Laboratory), Austin, TX; University of Washington (Applied Physics Laboratory), Seattle, WA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project R0120, Anti-Submarine Warfare Environmental Acoustic Support: This project provides environmental acoustic support for the development and design of ASW systems, including weapons and mines, in the form of acoustic models, prediction systems, instrumentation and ocean data. Program scope also includes at-sea experiments and measurements. Prior to FY 1984 project R0119 provided this support exclusively to the Sound Surveillance System; R0120 provided support for all other acoustic ASW and mine warfare programs.

(U) FY 1982 Program:

(U) Project R0119, Surveillance Environmental Acoustic Support:

- o Joint program plan between the Naval Ocean Research and Development Activity and the Undersea Surveillance Project Office (PNE-124) was approved and program initiated for surveillance system assessment.
- o Measurement program was initiated to provide data for Surveillance Towed Array Sensor System optimization in high ambient noise areas.
- o On-site prediction system installation at Commander, Ocean Systems Pacific was completed.
- o Measurements for fixed surveillance system deployment were conducted.

(U) Project R0120

- o The acoustic prediction model to support operational deployment of the Vertical Line Array sonobuoy became operational.
- o The Quanaul Range test for the Advanced Lightweight Torpedo was completed.
- o Interim Bottom Loss charts for the Atlantic were delivered to operational VP squadrons.
- o Ambient noise atlas was delivered to Fleet Numerical Oceanographic Center.

(U) FY 1983 program consists of:

Program Element: 63785N

Title: Long Range Acoustic Propagation

(U) Project R0119

- o Completion of [] exercise and data analysis.
- o Expansion of on-site prediction system to Commander, Ocean System Atlantic and continued test and evaluation of Pacific system.
- o Continuation of fixed surveillance system array characterization program.
- o Vertical array field exercise []
- o Continuation of mobile surveillance system deployment guide.

(U) Project R0120

- o Installing new Acoustic System Range Prediction System at Fleet Numerical Oceanographic Center for all passive sonar sensors.
- o Installing updated Ship-Helicopter Acoustic Range Prediction System at Fleet Numerical Oceanographic Center for all active sonar sensors.
- o Development of shore based acoustic prediction model to support the operational deployment of the Expendable Reliable Acoustic Path sonobuoy.
- o Continuation of the development of an environmental acoustic prediction system to support [] sonobuoy and towed-array systems such as Wide Aperture Array and other tactical towed arrays.
- o Shallow water experiments to ascertain the performance of mines and effectiveness of mine countermeasures.

(U) FY 1984 it is planned to:

- o Conduct test and evaluation of on-site prediction system in both Atlantic and Pacific.
- o Develop ASW system performance models []
- o Plan for system performance assessments during FY 1985 field program []
- o Deliver shallow water ASW performance prediction capability to Fleet Numerical Oceanographic Center.
- o Complete Bottom Loss Upgrade model at Fleet Numerical Oceanographic Center.
- o Conduct Advanced Lightweight Torpedo [] performance assessment experiment.
- o Continue collection and analysis of acoustic data for tactical towed arrays and sonobuoy performance.
- o Commence initial support of the [] ASW program.
- o Continue mine and mine countermeasure shallow water data analysis.

Program Element: 63785N

Title: Long Range Acoustic Propagation

(U) Program to completion: This is a continuing program. The scope of efforts will expand in the areas of acoustic modelling, measurement programs and instrumentation development spectrum. Prediction models to support new submarine sonars and LAMPS MK III will be expanded. Increased emphasis will be placed on shallow water measurements and modelling.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63787M
DoD Mission Area: 235 - Naval Warfare Support

Title: Special Processes
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	50,337	72,523	67,219	70,771	Continuing	Continuing
T0116	Linear Tank	50,337	72,523	67,219	70,771	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Details of this program are of a higher classification and of limited access nature.

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FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63788N
 R&D Mission Area: 233 - Anti-Submarine Warfare

Title: Deployable Surveillance Systems
 Budget Activity: 4 - Tactical Programs

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

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	6,715	19,312	21,076	20,007	54,004	150,573
X0955	Rapidly Deployable Surveillance System	6,715	19,312	21,076	20,007	54,004	150,573
	RDT&E Quantities		DP	DP	IOT&E		(200)

DP - Development Prototype
 IOT&E - Initial Operational Test and Evaluation

The above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the development of an air deployable, long-life, moored surveillance system of passive sensors to detect, [] As a flexible element of the integrated Undersea Surveillance System, the Rapidly Deployable Surveillance System provides [] submarine surveillance [] because of political, economic or other operational considerations. Mod 0 provides real-time [] data via an aircraft interface. Mod 1 (growth option; decision in FY 1985) provides [] relay to selected shore facilities.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a decrease of 48 in FY 1982 due to inflation adjustments and a decrease of 570 in FY 1984 due to de-escalation adjustments. The overall net increase of 13,512 results from cost adjustments for the Mod I Rapidly Deployable Surveillance System buoy development and the impact of the FY 1982 Congressional reduction.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	13,348	6,763	19,312	21,646	60,499	137,679
X0955	Rapidly Deployable Surveillance System	13,348	6,763	19,312	21,646	60,499	137,679

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
OPN Quantity	0	0	0	0	125,944 (4,000)	125,944 (4,000)

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Program Element: 63785K

Title: Deployable Surveillance Systems

F. (U) RELATED ACTIVITIES: Program Element 63785K, Long Range Acoustic Propagation, will conduct environmental measurements, perform data analyses, and provide effectiveness studies with respect to sensor employment options; Program Element 24311N, Undersea Surveillance System, will provide

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA (lead laboratory). CONTRACTORS: Sanders Associates, Inc., Nashua, NH (prime contractor); TRW Systems, McLean, VA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project X0955, Rapidly Deployable Surveillance System:

1. (U) DESCRIPTION (Requirement and Project): The Rapidly Deployable Surveillance System will provide a quick reaction air deployable acoustic surveillance system allowing the tactical commander the option to extend undersea surveillance. The Rapidly Deployable Surveillance System is a passive, long life buoy that automatically floats in water depths of 100 to 1000 feet. For the basic Mod 0, acoustic data is transmitted in real time to aircraft in a low-directional acoustic data link.

An additional Mod I development effort increases the ability to remotely read-out acoustic data at a central shore facility for further processing, display, and analysis, thereby reducing the requirement for an "on station" aircraft.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: Continued Mod 0 design development and initiated lifetime and initial mechanical life launch testing and component level testing on selected components and subassemblies.

b. (U) FY 1983 Program: Perform evaluation and analysis of the lifetime demonstration testing results. Parachute testing will be initiated with instrumented mass models of the Rapidly Deployable Surveillance System shape. Engineering laboratory testing of selected components and assemblies will be initiated. Component and subassembly testing will continue. Shock and vibration testing will be performed to provide data for flight clearance certification. Instrumented water entry shock testing will be conducted. Fabrication of critical items for engineering evaluation will commence.

c. (U) FY 1984 Planned Program: Continue Mod 0 subsystem and system testing; and acoustic and electrical subsystem design testing. Conduct fabrication and testing of engineering development model buoys for acoustic performance certification. Conduct studies on the Mod I option.

d. (U) Program to Completion: Full scale Mod 0 development will continue. Mod 0 technical and operational evaluation will be completed. Production approval will be sought. Decision on development of Mod I will be made.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64203N
 MOD Mission Area: 238 - Other Naval Warfare

Title: Avionics Development
 Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,901	3,941	9,659	11,455	Continuing	Continuing
W0572	Avionics Components and Subsystems	4,605	1,520	2,698	3,523	Continuing	Continuing
W0845	AN/AYK-14(V)	11,296	2,421	5,803	2,742	Continuing	Continuing
W1630	Carrier Aircraft Inertial Navigation System II	-	-	1,158	5,190	Continuing	Continuing

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases not planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Currently included in this element are three projects as follows:

(U) W0572 Avionics Components and Subsystems: Provides for the design, evaluation and qualification of a family of less than major standard avionics equipment that meets multi-mission needs and can be utilized by a wide range of aircraft platforms. Avionics Components and Subsystems also provides for interservice coordination on joint avionic standardization. The Avionics Components and Subsystems project is in consonance with the Naval Aviation Plan goals, providing the means to (1) ensure the logical and efficient transfer of exploratory and advanced development technology into engineering development, (2) reduce the fleet maintenance and logistic burden through maximum use of commonality, better hardware design, and usable technical information; and (3) take advantage of the full set of technical opportunities available in the existent and projected technology base to develop affordable systems which serve to maximize the capabilities of aviation at sea.

(U) W0845 AN/AYK-14(V): Provides for the development and production of a Navy Standard Airborne Computer capable of satisfying the airborne digital computer requirements in the 1977-1990 timeframe. In the decade prior to the introduction of the AN/AYK-14(V), each weapon system developed its own computer as contractor furnished equipment. As a result, the proliferation of functionally similar but logistically unique hardware, software and documentation had begun to reach epidemic proportions. The AN/AYK-14(V) project is an outgrowth of the requirement to reduce the proliferation of unique computer systems by developing a standard design flexible enough to permit its use in a wide variety of applications for which total hardware and support software can be standard Government Furnished Equipment resulting in greatly reduced life cycle costs.

(U) W1630 Carrier Aircraft Inertial Navigation System II: Is a planned New Start for FY 1984. This program represents the transition of laser gyro technology developed under Program Element 63202N, Project W0525, Advanced Technology Demonstration Laser Gyro. The program provides for the design, development, test, evaluation, and qualification of the Navy's next generation Standard Carrier Aircraft Inertial Navigation System. The program represents significant opportunities for both reducing individual system life cycle costs and improving fleet readiness through improved system reliability/availability and reduced alignment/reaction time.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are: W0572, Avionics Components and Subsystems: +400 in FY 1982 due to reprogramming and -11 in FY 1983 due to Navy application of a general Congressional reduction and +1,331 in FY 1984 in order to start new programs within Avionics Components and Subsystems. W0845, AN/AYK-14(V): A total reduction in FY 1983 of 5,008 consisting of a 4,960 Congressional reduction and 48 for Navy application of a general Congressional reduction; and +4,148 in FY 1984 due to acceleration and expansion of development of preplanned product improvements to meet newly defined/urgent user requirements. W1630 Carrier Aircraft Inertial Navigation System II is a new start at 1,158 in FY 1984.

Program Element: 64203N

Title: Avionics Development

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	8,881	12,501	8,960	3,022	Continuing	Continuing
W0572	Avionics Components and Subsystems	1,218	1,205	1,531	1,367	Continuing	Continuing
W0845	AN/AYK-14(V)	6,353	11,296	7,429	1,655	Continuing	Continuing
W1276	Electromagnetic Compatibility Aerospace Research and Development	1,310	-	-	-		1,310

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not Applicable.

F. (U) RELATED ACTIVITIES: W0572 Avionics Components and Subsystems: A tri-service Memorandum of Agreement to promote joint development of standard avionics components and subsystems has been signed. Each service will identify and emphasize program elements that promote interservice standardization activities, of which this project is one. Currently, a joint USAF/USN Standard Central Air Data Computer has been formulated and in FY 1984 a joint USA/USN Standard Attitude Heading Reference System will commence. The USN/USAF Standard Intercommunication System and Standard Flight Data Recorder are being coordinated. The Navy's Advanced Engineering Project, Modular Avionics Packaging, Program Element 63217N, Project W0885, is investigating new technology packaging concepts for future applications in the Avionics Components and Subsystems Project. W0845 AN/AYK-14(V): This effort is coordinated with the AN/UYK-20(V) Project Office to assure software compatibility between the AN/AYK-14(V) and the AN/UYK-20(V) computer systems. W1630 Carrier Aircraft Inertial Navigation System II: This effort represents the transition of technology development under Program Element 63202N, Project W0525 to Engineering Development.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN (lead laboratory); Naval Air Development Center, Warminster, PA; Naval Ocean Systems Center, San Diego, CA; Naval Research Laboratory, Washington, DC; Naval Ship Engineering Center, Norfolk, VA; Naval Air Test Center, Patuxent River, MD; Naval Sea Systems Command, Washington, DC; Naval Surface Weapons Center, Silver Spring, MD. CONTRACTORS: Aircsearch Co., Torrance, CA; Marconi Avionics Ltd., Rochester, Kent, England; United Technologies, Amherst, MA; ARINC, Annapolis, MD; MITRE, McLean, VA; Control Data Corporation, Minneapolis, MN.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) W0572 Avionics Components and Subsystems: A growing concern among the military avionics community is the proliferation of unique avionic equipments that increases with each new or modified aircraft project. This proliferation of unique Contractor Furnished Equipment due to nonavailability of off-the-shelf Government Furnished Equipment is resulting in a growing cost burden in the areas of development, procurement, logistics, maintenance and other factors related to system life cycle cost. To meet this threat, the Avionics Components and Subsystems program has been formulated to provide for the orderly development of a family of Government Furnished Equipment, supportive of, but separate from, major aircraft weapon system acquisitions and common to multiple aircraft types. This objective is in consonance with Government Accounting Office letter report B-163058 of 12 May 1978. The approach taken to meet the objectives will be to develop and use flexible and adaptable design concepts to ensure multiple aircraft commonality, as well as tri-service interoperability. This program will be of a continuing nature with new development efforts continually being identified and undertaken. An Avionics Components and Subsystems Joint Services Review Board has been formulated to review commencement of joint engineering developments whenever practical and feasible.

(U) In FY 1982, the Critical Design Review was completed and the qualification testing commenced on the Standard Central Air Data Computer; the demonstration phase of the Carrier Aircraft Inertial Navigation System Covert Data Link was commenced; the Naval Air Systems Command Avionics Master Plan was completed; and the specifications (draft) completed for the Joint Attitude Heading Reference System, Flight Data Recorder, and Intercommunication System.

Program Element: 64203N

Title: Avionics Development

(U) The FY 1983 program consists of:

- o Joint Central Air Data Computer Project will commence technical evaluation and operational testing.
- o The specification and program requirements for a Standard Intercommunications System, Standard Flight Data Recorder, and Standard Attitude Heading Reference System will be coordinated with the Army and Air Force.

(U) For FY 1984, it is planned to continue:

- o The Joint Standard Attitude Heading Reference System development.
- o Coordination with the Air Force and Army on standard avionic projects.
- o The Carrier Aircraft Inertial Navigation System Covert Data Link demonstration will be completed and engineering development commenced.
- o Program coordination with the Army and Air Force on cooperative standard avionics projects.
- o Complete laboratory reliability and qualification tests, technical evaluation and operational evaluation testing of the Navy Standard Carrier Aircraft Inertial Navigation System Covert Data Link.
- o Award the Engineering Development Contract for Joint USA/USN Standard Attitude Heading Reference System.
- o Complete Laboratory Reliability and Qualification Tests of the Standard Attitude Heading Reference System.
- o Initiate New Start Standard Avionics projects (i.e.; the Standard Intercommunication Set or the Standard Flight Data Receiver). This accounts for the increase in funding from FY 1983 to FY 1984.

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

(U) W0845 AN/AYK-14(V): The AN/AYK-14(V) is a general purpose, standard airborne computer designed to satisfy the majority of airborne digital processing requirements in the 1977 - 1990 timeframe. As such, the AN/AYK-14(V) provides an alternative to the proliferation of functionally similar but logistically unique computer systems developed for each new weapon system or system update. Other major objectives of the project are to reduce operations and support costs through standardization of hardware and software while providing flexibility and growth potential, high reliability, easy maintainability, low initial acquisition cost, and state-of-the-art performance with a low research, development, test and evaluation investment. While the AN/AYK-14(V) is designed specifically for operation in airborne environments, the computer design is also compatible with shipboard and land based applications. The AN/AYK-14(V) utilizes a modular design functionally partitioned into connectable Shop Replaceable Assemblies divided into the following subsystems: (1) Processor Subsystem, (2) Input/Output Subsystem, (3) Memory Subsystem, (4) Power Supply Subsystem, and (5) Chassis Subsystem. All functions such as logic, register memory and internal communications have been implemented using off-the-shelf large scale integrated semi-conductor technology. The computer system is designed for flexibility to enable construction of different system configurations without redesign or modifications to the hardware or firmware. The AN/AYK-14(V) uses the Machine Transferrable AN/UYK-20. The AN/UYK-20 is the standard mini-computer for Navy shipboard use. The following AN/AYK-14(V) applications have been identified: F/A-18, LAMPS MK III, EP-3B/E, AV-8B, EA-6B, E-2C, P-3C, Advanced Lightweight Torpedo, Automatic Carrier Landing System, Advanced Aircraft Electrical System and Advanced Aircraft Armament System. The project plans to promote technology infusion in AN/AYK-14(V) hardware which will extend the life of the AN/AYK-14(V) by meeting evolving user digital computer requirements.

Program Element: 64203N

Title: Avionics Development

(U) In FY 1982 the maintainability demonstration was successfully completed. Preproduction Testing which included baseline of the 64K core memory module, Naval Tactical Data Center and PROTEUS Input/Output modules was completed. Retrofit of preproduction computers to baseline configuration was initiated. Development and testing of preplanned product improvements to meet new user requirements continued. Interim logistics support continued as integrated operational logistics support planning and development matured. Second Source leader-follower approach changed to validated technical data package, build-to-print program.

(U) The FY 1983 program consists of:

- o Induction of preproduction computers to the Retrofit-to-Baseline program will be completed.
- o Accelerate and expand preplanned product improvement.
 - NAVCOMPT policy decision allowed funding for technical data package validation through APN accounts vice RDT&E appropriation. RDT&E funds previously identified for technical data package validation are to be redirected into this preplanned product improvement program.
 - Previous preplanned product improvement based on one module enhancement.
 - Urgent and newly defined user operational requirements necessitate a three module approach to achieve:
 - (a) Throughput increase from 500 thousand operations per second to 1.2 million instructions per second.
 - (b) Single card processor with Ada compatibility.
 - (c) Direct memory access to solve current saturated input/output loading.
- o Continue development of intermediate level maintenance technical publications and begin development of depot level maintenance technical publications.
- o Continue provisioning to meet material support date in third quarter FY 1984.
- o First delivery of intermediate level test set (Memory Loader/Verifier) and Category IIID automatic test equipment.

(U) For FY 1984, it is planned to continue:

- o Intermediate and depot level maintenance technical publications.
- o Complete deliveries of retrofitted computers.
- o Continue validation of the Technical Data Package with APN funding to enable second sourcing when plan approved.
- o Continue accelerated development, testing and qualification of preplanned product improvements to deliver brassboards in fourth quarter FY 1984. This effort accounts for funding increase from FY 1983 to FY 1984.
- o Continue delivery of production computers to meet user requirements.

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

Program Element: 64203N

Title: Avionics Development

(U) W1630 Carrier Aircraft Inertial Navigation System II: (NEW START) Current operational Carrier Aircraft Inertial Navigation Systems, such as the Carrier Aircraft Inertial Navigation System I (AN/ASN-92), have deficiencies which impact both Fleet readiness and the cost of ownership. The Carrier Aircraft Inertial Navigation System II system provides the Navy with the opportunity of improving both Fleet readiness and reducing inertial system Life Cycle Costs through the application strapdown sensor technology (e.g. Ring LASER gyro). Improvements in reliability, alignment times and cost are associated with the inherent characteristics of the proposed technology. The Carrier Aircraft Inertial Navigation System II system will be a completely digital system utilizing low cost, high speed micro-processors for computing aircraft attitude, heading, velocity, and position information. The Ring LASER gyro technology exhibits significant advantages over the conventional "spinning wheel" gyros in characteristics such as reaction time, calibration stability, environmental insensitivity, reliability, and dormancy (shelf life). These advantages make it possible to predict enhanced reliability by an order of magnitude, reduce carrier alignment times by several minutes, and achieve an 80% reduction in logistic support costs; all as compared to the Carrier Aircraft Inertial Navigation System I (AN/ASN-92) system, as part of planned avionic improvement programs for such aircraft as the S-3A, E-2C, F-14A, etc. Application will be extended to other aircraft as opportunities evolve.

(U) The FY 1984 program plans to:

o Award Engineering Development Contract for the Carrier Aircraft Inertial Navigation System II System.

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

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

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FY 1984 RDI4E DESCRIPTIVE SUMMARY

Program Element: 64211N

Title: Aircraft Identification Monitoring System/

DoD Mission Area: 344 - Tactical Command and Control

Air Traffic Control Radar Beacon/MARK XII
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,363	6,228	8,608	8,813	Continuing	Continuing
W0454	Identification Friend or Foe/MARK XII	2,034	1,764	1,770	1,976	Continuing	Continuing
X0676	Shipborne Identification Friend or Foe/MARK XII	2,329	4,464	6,838	6,837	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element covers the Navy portion of a tri-service military program to provide positive identification of friendly combat units including NATF forces. The existing systems appear vulnerable to certain sophisticated forms of electronic countermeasures and must be modified (or improved) to reduce or eliminate the effects of such tactics. The operational needs of the military forces to use MK XII Identification Friend or Foe systems will continue through the 1990's. It is essential to develop methods to decrease the existing vulnerability and increase the system reliability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: For Project W0454, a decrease of 26 in FY 1984 because of routine budget adjustments. For Project X0676, a decrease of 16 in FY 1984 due to budget adjustments.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	3,152	4,363	6,228	8,650	Continuing	Continuing
W0454	Identification Friend or Foe/MARK XII	1,628	2,034	1,764	1,796	Continuing	Continuing
X0676	Shipborne Identification Friend or Foe/MARK XII	1,524	2,329	4,464	6,854	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None

F. (U) RELATED ACTIVITIES: Program Element 63267N, Combat Identification System; Program Element 63515N, Advanced Identification Techniques.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, D. C.; Naval Ocean Systems Center, San Diego, CA; Naval Avionics Center, Indianapolis, IN; Naval Electronics Systems Engineering Activity, St. Inigoes, MD; CONTRACTORS: MITRE Corporation, McLean, VA; Bendix Corporation, Towson, MD; Hazeltine Corporation, Greenlawn, NY; Vitro Laboratory, Wheaton, MD.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0454, Identification Friend or Foe/MARK XII: This project provides for the design and development of modifications necessary for reduction of electronic countermeasures vulnerability of MARK XII Identification Friend or Foe Systems and for integration into airborne weapons and communications systems.

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Program Element: 64211b

Title: Aircraft Identification Monitoring System/
Air Traffic Control Radar Beacon/MARK XII

(U) In FY 1982, vulnerability of the airborne MK XII System was evaluated. Several candidate improvements were identified and test models were fabricated.

(U) The FY 1983 program consists of:

- o Fabricating 3 - pulse Decoder and Mode 4 Anti-Jam engineering test models.
- o Performing evaluation of Mode 4 evaluator for the E2C aircraft.
- o Continuing to investigate new techniques to reduce electronic warfare vulnerability and improve system performance and reliability.

(U) For FY 1984, it is planned to:

- o Continue evaluation of electronic warfare vulnerability improvements.
- o Study design requirements to integrate MK XII sensor data with other airborne identification sensors.

(U) This is a continuing program

(U) Project X0676, Shipborne Identification Friend or Foe/MARK XII : This project provides for the design and development of the modifications necessary for reduction in electronic countermeasures vulnerability of the MK XII Identification Friend or Foe System and for integration into shipborne weapons and communications systems.

(U) In FY 1982,

- o Vulnerability of the shipboard MK XII was evaluated.
- o Several candidate improvements were identified and engineering tests models were fabricated.

(U) The FY 1983 program consists of:

- o Perform shipboard test and evaluation of Mode 4 Evaluator and Anti-Jam Receiver.
- o Development of Central Identification Friend or Foe System for shipboard integration and continue improvements in the new MK XII Identification Friend or Foe test set.
- o Continuing to investigate new techniques to reduce electronic warfare vulnerability and improve system performance and reliability.

(U) For FY 1984, it is planned to:

- o Evaluate electronic warfare vulnerability improvements.
- o Develop the Central Identification Friend or Foe System, the new MK XII Identification Friend or Foe Test Set and other promising improvements.

Program Element: 64211H

Title: Aircraft Identification Monitoring System/
Air Traffic Control Radar Beacon/MARK XII

(U) This is a continuing program.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64212N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Light Airborne Multi-Purpose System MK III
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	70,368*	8,969	4,392	7,671	24,323	**801,513
W0474	Light Airborne Multi-Purpose System MK III Quantity (Test and Evaluation)	70,068*	8,969	4,392	0	0	757,505 (5)
W0973	Recovery Assist, Securing, and Traversing System	300*	0	0	0	0	11,664
W1707	Light Airborne Multi-Purpose System MK III Improvement	0	0	0	7,671	24,323	31,994

* Includes a below threshold reprogramming of -500 (-200 in W0973 and -300 in W0474) not reflected in FY 1984 President's Budget.
** Includes 2,729 for Project S1087 funded in FY 1981 and prior years.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Light airborne Multi-Purpose System MK III is a computer integrated ship/helicopter system that dramatically increases the effectiveness of surface combatants. It is optimized for anti-submarine warfare and has secondary missions of anti-ship surveillance and targeting, search and rescue, medical evacuation, vertical replenishment and communications relay. For ASW, the helicopter provides a remote platform for deployment of sonobuoys and torpedoes and processing of acoustic and non-acoustic sensor information. For anti-ship surveillance and targeting, the helicopter serves as an elevated platform for radar and electronic support measures. The ship provides sensor processing, command and control, and integrates all Light Airborne Multi-Purpose System information gained from system sensors. The ship also provides the Recovery Assist, Securing and Traversing System as well as visual landing aids, and maintenance/support facilities for the aircraft. Beginning in FY 1985, funding is provided for a planned product improvement program for the Light Airborne Multi-Purpose System MK III. The improvements will take advantage of current state of the art technology in the areas of acoustic processing software, sonobuoy reception and ASW target localization/attack.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net reduction in total FY 1982 obligations of 2,220, which was excess to the FY 1982 effort, reprogrammed to other high priority programs. In addition, 300 was reprogrammed within program element in FY 1982 to correct operational test deficiencies in Recovery Assist, Securing, and Traversing System. A reduction of 8 in FY 1983 is due to Navy application of a general Congressional reduction. In FY 1984, 4,392 is provided to the Light Airborne Multi-Purpose System MK III project for continued correction of discrepancies from Operational Test IIB and verification of correction testing. Increases in the out years reflect the addition of Project W1707 in FY 1985.

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Program Element: 64212N

Title: Light Airborne Multi-Purpose System MK III

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional To Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	100,842	72,588	8,977	0	0	769,584
W0474	Light Airborne Multi-Purpose System MK III	99,564	72,588	8,977	0	0	755,341
	Quantity (Test and Evaluation)						(8)
W0973	Recovery Assist, Securing, and Traversing System	630	0	0	0	0	11,514
S1087	Light Airborne Multi-Purpose System MK I	648	0	0	0	0	2,729
	Shipboard Subsystem						

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional To Completion	Total Estimated Cost
Aircraft Procurement, Navy* (B.A.1)	675,200	606,700	505,700	477,100	3,183,400	5,553,100
Quantity	(18)	(27)	(21)	(18)	(120)	(204)
APN, B.A.6	31,461	181,647	90,268	97,442	120,549	521,367
Other Procurement, Navy*	39,690	80,088	76,759	116,592	162,900	476,029
Quantity	(4)	(9)	(7)	(14)	(18)	(52)
Operations and Maintenance, Navy (Fleet Modernization Program)			13,955	116,922	693,522	824,399
Military Construction (64714N)	0	12,500	9,000	0	0	21,500
Shipbuilding and Conversion, Navy		**	**	**	**	**
Quantity	(6)	(5)	(5)	(7)	(21)	(44)

* Amount includes spares

** Costs for (44) systems currently programmed at approximately \$781.0 million. Cost breakdown by year is reflected in Shipbuilding and Conversion, Navy appropriations under ship acquisition program elements.

F. (U) RELATED ACTIVITIES: Program Element 64206A, UH-60A BLACKHAWK (Utility Tactical Transport Aircraft System), a derivative of which has been selected for the Light Airborne Multi-Purpose System MK III airframe. Program Element 64753F, HH-60D, NIGHTHAWK (Combat Rescue/Special Operations helicopter), is an Air Force derivative of the UH-60A airframe and the SH-60B engine. Program Element 64750A, EH-60A QUICKFIX and Program Element 64748A, EH-60B Stand-Off Target Acquisition System, are derivatives of the BLACKHAWK airframe. Program Elements 64203N, AN/AYK-14 Standard Airborne Computer; 64266N, AN/UYS-1 Advanced Signal Processor; 64518N, AN/UYS-21 Tactical Data System; will be used in Light Airborne Multi-Purpose System MK III. Program Element 64713N, AN/SQR-19 Tactical Towed Array Sonar, will be used in conjunction with the Light Airborne Multi-Purpose System MK III. Program Elements 24224N, FFG-7 Class Guided Missile Frigate; 24223N, DD-963 Class Spruance Destroyer; 24222N, DDG-993 Class Kidd Destroyer; and 24221N, CG-47 Class Aegis Cruiser will receive the Light Airborne Multi-Purpose System MK III.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA, (Lead Laboratory); Naval Air Engineering Center, Lakehurst, NJ; Fleet Combat Direction Systems Support Activity, Dam Neck, VA; Naval Underwater Systems Center, New London, CT; Naval Air Test Center, Patuxent River, MD; Naval Avionics Center, Indianapolis, IN. CONTRACTORS: International Business Machines, Owego, NY (Light Airborne Multi-Purpose System MK III System Prime); Sikorsky, Stratford, CT (Air Vehicle); Central Electric, Lynn, MA (Engine); Canadian Commercial Corporation (DAF Indal), Ottawa, Canada (Recovery Assist, Securing and Traversing System).

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Title: Light Airborne Multi-Purpose System MK III

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984

(U) Project W0474, Light Airborne Multi-Purpose System MK III: This project provides for the full scale development and test and evaluation of the Light Airborne Multi-Purpose System MK III including Technical Evaluation, Operational Evaluation, Board of Inspection and Survey trials, and deficiency corrections and verifications.

(U) In FY 1982, full scale development was essentially completed. This effort included final operational evaluation and Board of Inspection and Survey trials.

(U) The FY 1983 program consists of:

- o Correction of Operational Test IIB deficiencies
- o Demonstration of deficiency corrections

(U) For FY 1984, it is planned to:

- o Complete correction of Operational Test IIB deficiencies including main gear box durability modifications
- o Complete demonstration of deficiency corrections in an operational environment.

(U) MILESTONES

DATE

1. (U) Complete Navy Preliminary Evaluation		October 1981
2. (U) Award/definitize aircraft pilot production contract	(April 1981/June 1982)*	February 1981/April 1982
3. (U) Complete Board of Inspection and Survey trials	(January 1982)*	September 1982
4. (U) Complete Initial Operational Test and Evaluation	(January 1982)*	February 1982
5. (U) Award/definitize aircraft full production contracts	(December 1981/May 1983)*	March 1982/December 1982
6. (U) First production ship system delivery		July 1983
7. (U) First production aircraft system delivery		October 1983
8. (U) Initial Operating Capability		[]

* Date shown in FY 1983 Descriptive Summary. Slip in Board of Inspection and Survey trials resulted from Test and Evaluation asset availability.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation Highlights: Light Airborne Multi-Purpose System MK III full scale development testing has progressed from laboratory and bench tests, through individual systems tests, through total systems testing using the

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Land Base Test Site and Mobile Ship Ground Station, to, in CYs 1981 and 1982, at-sea tests including participation in a major fleet exercise. The five preproduction prototype SH-60B aircraft have accumulated over 3,000 accident free flight hours. The vast majority of this time was flown by Navy crews in the four mission equipped preproduction aircraft. Over 170 days were spent deployed aboard the USS MCINERNEY (FFG-8). Over 600 at-sea flight hours and over 1,000 shipboard landings were accumulated. The Light Airborne Multi-Purpose System MK III Weapons System was tested in a wide range of primary and secondary mission scenarios, including ASW against a variety of fleet submarines. Development and operational test results are presented in the following paragraphs.

2. (U) Development Test and Evaluation

a. (U) The Light Airborne Multi-Purpose System MK III full scale development test and evaluation program used five SH-60B SEAHAWKS, three Helicopter Landing Systems, three Light Airborne Multi-Purpose System MK III ship electronic sets and the Light Airborne Multi-Purpose System MK III configured test ship, the USS MCINERNEY (FFG-8).

b. (U) A firm basis to continue Light Airborne Multi-Purpose System MK III development was provided by Operational Test IB*(H-2/Short Range) and Operational Test-IC (H-3/Extended Mission) testing under CNO Project-189 (formerly S/C-5). H-2/Short Range test results and H-3/Extended Mission testing were highly successful and the results were provided at Defense Systems Acquisition Review Council Milestone IIB and IIC, respectively.

* In accordance with the 1980 revision of NOD Instruction 5000.3 and OPNAV Instruction 3960.10A all test phases have been renumbered.

c. (U) Development Test IIA was dedicated to testing the integration of the hardware and software of the newly developed/improved Light Airborne Multi-Purpose System MK III equipments into their respective airborne and shipboard systems and insuring that the effectiveness of the operator-equipment interface in its operating environment was not a limiting factor in system performance. The Light Airborne Multi-Purpose System MK III Land Based Test Site then combined the airborne avionics laboratory and the ship electronics laboratory and was used for system integration and Proof of Compliance testing.

d. (U) Development Test II was dedicated to extensive laboratory, flight and shipboard testing of various Light Airborne Multi-Purpose System MK III subsystems as well as integrated testing of the entire Light Airborne Multi-Purpose System MK III weapon system. Five preproduction prototype SH-60B helicopters and one Light Airborne Multi-Purpose System MK III equipped FFG-7 class ship, as well as various land-based test sites and facilities, were used during this phase of testing. Each of the major Navy and contractor demonstrations conducted is described in some detail below.

e. (U) The first weapon system demonstration was conducted at the Light Airborne Multi-Purpose System MK III Land-based Test Site. This demonstrated that the avionics and ship electronics were ready for installation in the aircraft and the ship, respectively, and that the software was mature enough to permit the weapon system to advance to flight testing.

f. (U) Navy Preliminary Evaluation IA was conducted at Sikorsky's West Palm Beach Test Facility, using an instrumented SH-60B. The primary purposes of this Navy Preliminary Evaluation were to evaluate the flying qualities and performance of the SH-60B and a proposed flight envelope. The Navy Preliminary evaluation showed that the SH-60B was ready for testing at sea.

g. (U) The Hard Landing demonstration was conducted at Naval Air Test Center using an instrumented SH-60B. The objective of this demonstration was to verify the capability of the landing gear system and the airframe to withstand stresses imposed during landings. Results included: a vertical landing speed of 10.2 feet per second, with roll angles up to 6 degrees; aircraft stability in multi-azimuthal landings at 9 degrees slope; and excellent response in the hard landing. This demonstrated that the aircraft was structurally ready for at-sea operations.

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h. (U) Navy Preliminary Evaluation was to evaluate the aircraft under night and instrument meteorological conditions. This evaluation showed that the aircraft was ready for all weather operations.

i. (U) Navy Preliminary Evaluation-IB was conducted at Naval Air Engineering Center using an instrumented SH-60B. The objectives of this evaluation were to determine the maturity of the Helicopter Landing System and to evaluate the compatibility of the SH-60B SEAHAWK and the Helicopter Landing System in preparation for the Helicopter Landing System Technical Evaluation at sea. This Navy Preliminary Evaluation showed that dynamic response and centering of the aircraft during recovery assist landing, and the visual landing aids configuration were excellent. This Navy Preliminary Evaluation demonstrated that the Helicopter Landing System was ready for at-sea Technical Evaluation.

j. (U) The System Prime Contractor's Weapon System Demonstration was conducted at Naval Air Test Center using three mission configured SH-60B aircraft and the Mobile Ship Ground Station, which contained the Light Airborne Multi-Purpose System MK III ship electronics. The objectives of this demonstration were to verify that the Light Airborne Multi-Purpose System MK III weapon system was ready for testing at sea, to demonstrate compliance of the weapon system with IBM contract specifications, and to provide an early look at the system's operational suitability. This demonstration verified that the Light Airborne Multi-Purpose System MK III weapon system was ready for testing at sea.

k. (U) Navy Preliminary Evaluation-IC (Flying Qualities Phase) was conducted at Sikorsky's West Palm Beach facility using an instrumented SH-60B. The primary objective of the Navy Preliminary Evaluation was to evaluate the SH-60B's flying qualities with the proposed final Programmable Read Only Memory installed in the Automatic Flight Control System. This evaluation concluded that the flying qualities of the SH-60B helicopter would enable the weapon system to perform the ASW and Anti-Ship Surveillance and Targeting missions.

l. (U) Navy Preliminary Evaluation-IC (Performance Phase) was conducted at the Sikorsky West Palm Beach Flight Test Facility using an instrumented SH-60B. The primary objective of this Navy Preliminary Evaluation was to evaluate the SH-60B aircraft performance in level flight, in a hover, and during climbs and autorotations. The performance of the SH-60B helicopter demonstrated excellent potential to perform the Light Airborne Multi-Purpose System MK III mission.

m. (U) Dynamic FFG-8/SH-60B Interface Tests were conducted at sea on board the USS MCINERNEY using an instrumented SH-60 and Helicopter Landing System installed in the ship. The primary objectives of this test period were to develop a SH-60B/FFG-8 flight envelope, and to evaluate the Helicopter Landing System during recovery assist, maneuvering and straightening, and traversing operations. Additional objectives were to evaluate technical characteristics of the Helicopter Landing System during ship motion of 60 pitch and 260 roll. This test demonstrated that the SH-60B could perform its assigned missions within the flight envelope developed for the FFG-8, under wind and sea conditions as described above. The Horizon Reference Set on the FFG-8 was also evaluated as a significant aid to the pilots in position keeping during Recovery Assist, Securing and Traversing recovery assist landings aboard ship.

n. (U) A maintenance engineering inspection was conducted at Naval Air Test Center using a mission equipped SH-60B and a simulated FFG-7 class hangar. The primary objective of this test was to determine if Navy personnel could perform the necessary maintenance functions to support the SH-60B at sea, on board a FFG-7 class ship, by following maintenance procedures described in Navy maintenance publications. This test demonstrated the ability of Navy maintenance personnel to perform these functions.

o. (U) Navy Preliminary Evaluation II (Shore) was conducted at Naval Air Test Center using two mission configured SH-60B Helicopters and the Mobile Ship Ground Station. The objectives of this test period were to evaluate acoustic, radar, navigation, and ordnance systems as well as data link performance. From this evaluation it was concluded that the SH-60B aircraft had the potential to perform the Light Airborne Multi-Purpose System MK III mission.

p. (U) Navy Preliminary Evaluation II (Sea) was conducted at the Atlantic Undersea Test and Evaluation Center using two mission configured SH-60B aircraft embarked aboard USS MCINERNEY. The primary objective of this test was to determine the ability

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of the Light Airborne Multi-Purpose System MK III weapon system subsystems to perform their necessary functions. This test evaluated the ability of all Light Airborne Multi-Purpose System MK III Subsystems to function individually and collectively. The Light Airborne Multi-Purpose System MK III weapon system demonstrated this capability by successfully prosecuting a variety of submarine target threats.

q. (U) The next portion of the Light Airborne Multi-Purpose System MK III weapon system at-sea Technical Evaluation was conducted in an open ocean environment using two SH-60B helicopters embarked aboard the USS MCINERNEY. The objective of this test was to demonstrate the ability of the Light Airborne Multi-Purpose System MK III weapon system to perform its ASW mission in accordance with the thresholds listed in Decision Coordinating Paper 85. The Light Airborne Multi-Purpose System MK III weapon system demonstrated its ability

from the Light Airborne Multi-Purpose System ship with areas of uncertainty of up to

r. (U) Mission Profile Qualification Tests were conducted at Naval Air Test Center. These tests included over 200 flight hours at typical mission profiles in order to obtain Navy reliability and maintainability data.

s. (U) Structural demonstrations and final hard landing demonstrations were conducted to demonstrate that the SH-60B aircraft could meet all contract performance and flying qualities specifications.

t. (U) System Prime Contractor Environmental Demonstrations were conducted on a mission configured aircraft to measure the effects of temperatures, noise and vibrations on the aircraft avionics.

u. (U) Navy Preliminary Evaluation III was conducted both ashore (at Naval Air Test Center) and at sea (aboard MCINERNEY) to review the performance of all aircraft, engine, avionics and shipboard subsystems as well as performance of the entire Light Airborne Multi-Purpose System MK III integrated system. Additionally, Navy Preliminary Evaluation III evaluated the effectiveness of necessary system changes/updates identified during Operational Test IIA. Over 100 flight hours were flown during the course of Navy Preliminary Evaluation III. At-sea evaluations included a number of ASW and anti-ship surveillance and targeting scenarios. Successful torpedo drops were made during ASW events. Navy Preliminary Evaluation-III constituted a successful full dress rehearsal prior to Operational Evaluation.

v. (U) Future Development Test and Evaluation, development Test-III (May 1982 - Fleet Introduction). Development Test-III is ongoing, using two mission equipped preproduction prototype aircraft. Modifications are being incorporated as a result of previous testing. Deficiency corrections have been successfully demonstrated with regard to Automatic Flight Control System vibration absorbers and operator workload problem. Ongoing Hazards of Electromagnetic Radiation to Ordnance/Electromagnetic Vulnerability tests to measure the effectiveness of filterline wiring are being undertaken at Naval Air Test Center, Patuxent River, MD. Tests are also planned at Naval Air Test Center and Naval Air Engineering Center, Lakehurst, NJ, to determine satisfactory ship/aircraft/Recovery Assist, Securing and Traversing compatibility under representative fleet Electromagnetic Environment conditions with completion expected in February 1983. Revisions to electronic warfare support measures software have been incorporated to overcome previous Development Test and Evaluation and Operational Evaluation deficiencies and are currently undergoing bench testing. Reworked electronic warfare support measures antennae are to be tested in March 1983. Initial Magnetic Anomaly Detection testing of possible improvements is planned for 1983.

3. (U) Operational Test and Evaluation

a. (U) Operational Test and Evaluation (Operational Test-IIA and Operational Test-IIIB) objectives were to determine the Light Airborne Multi-Purpose System MK III weapon system's operational performance (operational effectiveness and operational suitability) in a realistic operational environment against targets representative of the threat. Recovery Assist, Securing and

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Traversing Operations: Evaluation -IIB was conducted concurrently with the at-sea portion Light Airborne Multi-Purpose System MK III Operational Test-IIA.

b. (U) Operational Test-IIA was conducted ashore and at sea from 1 May to 30 June 1982 using two preproduction prototype mission equipped SH-60B aircraft. Two at-sea periods, 23 May - 3 June 1981 were conducted aboard USS MCINERNEY (FFG-8) in the Bermuda operating area. USS PINBACK (SSN-670) provided seven days of dedicated, ^{services and} USS GARCIA (FF-1040) equipped with towed array sonar provided five days of simulated Tactical Towed Array Sonar services. A total of 200.9 hours was flown.

c. (U) Operational Test-IIB was conducted ashore and at sea from 1 October 81 - 5 February 1982. During the period 21 - 28 October 1981, Naval Air Test Center and Air Test Evaluation Squadron One (VX-1) conducted Joint Development Test/Operational Test-III of the Recovery Assist, Securing and Traversing system aboard MCINERNEY prior to commencement of Light Airborne Multi-Purpose System MK III Operational Evaluation on 3 November 1981 in order to verify corrections to Operational Test-IIB deficiencies. During 2 - 23 November 1981 a two-helicopter detachment aboard USS MCINERNEY participated in Readiness Exercise 1-81, conducted AN/ALQ-142 Electronic Support Measures range tests at the Atlantic Fleet Weapons Training Facility and ASW operations with USS RICHARD RUSSELL (SSN-687). During 4 - 7 December 1981 a two-helicopter detachment conducted sea state five cold weather operations aboard USS MCINERNEY. During the period from 18 - 31 January 1982 a two-helicopter detachment aboard USS MCINERNEY conducted Electronic Support Measures range tests, ASW operations with USS JACKSONVILLE (SSN-699), and Anti-Ship Surveillance and Targeting operations with USS SAMUEL E. MORISON (FFG-13). A total of 391.5 flight hours was flown in Operational Test-IIB.

d. (U) Operational Evaluation Conclusions:

(1) (U) The Light Airborne Multi-Purpose System MK III weapon system has the potential to be operationally effective based on demonstrated ASW capability.

(2) (U) The Light Airborne Multi-Purpose System MK III weapon system has the potential to be operationally suitable, based on demonstrated probability of mission success, maintainability, and operational availability.

(3) (U) The following items enhanced mission performance and represented significant improvement in helicopter/ship ASW:

(a) Capability of Light Airborne Multi-Purpose System MK III to redetect and localize threat representative targets;

(b) Light Airborne Multi-Purpose System MK III capability to conduct flight operation from the FFG-7 class ship in sea states through 5, and to conduct ASW operating in sea states through 4;

(c) SH-60B range and endurance;

(d) Shipboard electronic performance and reliability;

(e) SH-60B automatic approach, hover and depart capabilities;

(f) Light Airborne Multi-Purpose System MK III communications relay capability;

(g) SH-60B AN/APS-124 radar performance;

(h) T700-GE-401 jet engine performance and reliability.

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e. (U) Operational Evaluation Recommendations:

- (1) (U) Continue approval for limited production
- (2) (U) Proceed with planned production of the SH-60B aircraft and shipboard equipment subject to:
 - (a) Continuing aggressive shore-based Development/Operational Test-IIIA to verify correction of identified deficiencies.
 - (b) Conducting Operational Test-IIIB with the earliest representative LOT I SH-60B, and a fully integrated Light Airborne Multi-Purpose System MK III ship, to support production approval.
- (3) (U) Adopt the modified sparing list.
- (4) (U) Develop and procure Light Airborne Multi-Purpose System MK III Weapons System Trainers in sufficient time to support fleet introduction.
- (5) (U) Correct specific deficiencies delineated in the Operational Evaluation report prior to the Initial Operating Capability date.

4. (U) Follow-on Test and Evaluation

a. (U) Operational Test-IIIA is currently being conducted utilizing preproduction prototype aircraft modified as necessary to incorporate corrections of deficiencies from Operational Test II. Objectives of Operational Test IIIA are to: (1) test changes to be incorporated in the production system, (2) complete any deferred or incomplete Initial Operational Test and Evaluation, (3) verify correction of Operational Test-II deficiencies, and (d) continue tactics development.

b. (U) Operational Test-IIIB will be conducted using the earliest available representative LOT 1 production aircraft and a Light Airborne Multi-Purpose System MK III equipped ship. The objectives of Operational Test-IIIB are to: (1) verify operational effectiveness and suitability as the basis for full-rate production, (2) verify correction of Operational Test II and Operational Test IIIA deficiencies, (3) test changes that have been incorporated in LOT 1 production systems, (4) evaluate the Light Airborne Multi-Purpose System MK III system using a fully integrated Light Airborne Multi-Purpose System MK III ship's system, and (5) continue tactics development in new environments and against new threats.

5. (U) System Characteristics. The thrust of the Light Airborne Multi-Purpose System MK III is the development of airborne and shipboard systems, i.e., sensors, data links, data processors and tactical displays to meet mission requirements for ASW and limited anti-ship surveillance and targeting. The Light Airborne Multi-Purpose System MK III helicopter (SH-60B) is a derivative of the Army BLACK HAWK (UH-SH-60B) helicopters are planned to operate from existing MK III fleet ships and ships currently being built or planned for construction). The following characteristics, updated to reflect Secretary of Defense Decision Memorandum of 24 November 1981, apply to the MK III systems and represent the latest information available:

Program Element: 64212N

Title: Light Airborne Multi-Purpose System MK III

System Characteristics	Milestone III Threshold	Demonstrated*
a. (U) Light Airborne Multi-Purpose System MK III		(Notes 1, 2)
(1) Missions		
<u>Primary - Anti-Submarine Warfare</u>		
Pr (Probability of redetection and classification given valid trigger)	[]	[]
Pl (Probability of localization to within 3 nautical miles given correct classification)	[]	[]
Pa (Probability of attack criteria to within 800 yards given localization)	[]	[]
<u>Secondary - Anti-Ship Surveillance and Targeting (Note 3)</u>		
Pd (Probability of detection)	[]	[]
Pc (Probability of correct classification)	[]	[]
Pt (Probability of over-the-horizon targeting)	[]	[]
DRA (Detection Range Advantage)	[]	[]
<u>Other Secondary</u>		
Search and Rescue		1981 (o)
Vertical Replenishment		1981 (o)
Medical Evacuation		1981 (o)
Communications Relay		1981 (o)
(2) Operating Capability (Sea State)	4	5 (o) 5 (d)
(3) Aircraft Performance - Endurance		
ASW, nautical miles (Hours)	[]	[] (d)
Anti-Ship Surveillance and Targeting, nautical miles (hours)	[]	[] (d)
(4) Helicopter Dash Speed (knots)	125	150 (o) 130 (d)
(5) Radar Detection Range (nautical miles)/Surface Threat Cross Section (square meters)	[]	[]
(6) Navigation Accuracy (Distance from ship)		
35 nautical miles	[]	[]
70 nautical miles	[]	[]
100 nautical miles	[]	[]
b. (U) Availability, Reliability, and Maintainability		
(1) Operational Availability Total System (%)	[]	[]

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Program Element: 64212N

Title: Light Airborne Multi-Purpose System MK III

<u>System Characteristics</u>	<u>Milestone III Threshold</u>	<u>Demonstrated*</u>
(2) Reliability		
ASW Probability of Success Total System (X)	88	82 (o) 92 (d)
Anti-Ship Surveillance and Targeting Probability of Success Total System (X)	85	79 (o) 87 (d)
Mean Flight Hours Between Failures		
SH-60B SEAHAWK (Air-Vehicle and Avionics)	1.5	1.54 (o) 1.8 (d)
(3) Maintainability		
Mean Time to Repair (Hours) (Elapsed Maintenance Time/ Maintenance Action)		
Air Vehicle	2.0	1.02 (o) 1.3 (d)
Avionics	1.0	0.65 (o) 1.0 (d)
Ship Electronics	2.5	0 (o) 0.69 (d) (Note 5)
Direct Maintenance Man-hours/Flight Hour		
Avionics (Unscheduled)	0.8	0.75 (o) 1.6 (d)
Helicopter (Unscheduled)	4.0	3.36 (o) 3.7 (d)
Support Actions	8.0	6.06 (o) 4.1 (d)
Helicopter (Scheduled)	3.1	1.80 (o) 1.6 (d)
SH-60B (O-Level Total)	15.9	11.97 (o) 13.0 (d)
Probability of Fault Detection		
Avionics (X)	85	38 (o) 85 (d)
Ship Electronics (X)	80	Note 4 99 (d)
Probability of Fault Isolation		
Avionics (X)	85	19 (o) 86 (d)
Ship Electronics (X)	80	Note 5 82 (d)

* Demonstrated Legend

(o) Operational Evaluation Final Report

(d) Navy Development Test Results (Navy Preliminary Evaluations, special tests, and Navy supervised contractor tests)

NOTES

1. (U) The first column under demonstrated performance represents results obtained during operational testing (operational testing comprised approximately 600 flight hours). The second column under demonstrated performance represents results obtained during developmental testing (developmental testing comprised approximately 2,400 flight hours). This latter information is presented to provide data on criteria that were not evaluated during Operational Evaluation or to provide more complete data in cases where the Operational Evaluation results were derived from a relative small sample size.

2. (U) N/E indicates not evaluated during operational evaluation.

3. (U) These figures represent a limited sample size of [] opportunities and include detections and classification

Program Element: 64212M

Title: Light Airborne Multi-Purpose System MK III

utilizing all possible sensors; i.e. Electronic Support Measures, Radar, Identification Friendly or Foe and visual.

4. (U) First number [] represents Operational Availability using Full Scale Development packup kit. Second number [] represents Operational Availability using optimized sparring list modified to include Air Test and Evaluation Squadron One experience during Operational Evaluation.

5. (U) Represents data from only one failure in 2,967 operative hours and thus is not necessarily a representative measure of system maintainability.

6. (U) Program Test and Evaluation Documentation

Phase I Navy Preliminary Evaluation-IA of the SH-60B Helicopter Preliminary Report	RW-25R-8-	13 AUG 80
First Interim Report - Phase I Navy Preliminary Evaluation-A1	RW-6R-81	29 MAY 81
Light Airborne Multi-Purpose System MK III Test & Evaluation, Phase I, Navy Preliminary Evaluation-IN of SH-60B Helicopter	RW-36R-80	14 OCT 80
Second Interim Report - Navy Preliminary Evaluation-IN-(Final)	RW-23R-81	16 JUN 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, SH-60B/FFG-8 Shipboard Envelope Development/Recovery Assist, Securing and Traversing Technical Evaluation	RW-11R-81	9 MAR 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Navy Preliminary Evaluation-IBB of SH-60B Helicopter	RW-37R-80	2 OCT 80
Final Report, Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Navy Preliminary Evaluation-IB and SH-60B/FFG-8 Shipboard Envelope Development/Recovery Assist, Securing and Traversing Technical Evaluation	RW-30R-81	14 SEP 81
Final Report - Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase II, Navy Preliminary Evaluation-II for Light Airborne Multi-Purpose System MK III	RW-C4R-81	30 JUN 81
Naval Air Test Center Test and Evaluation, Phase I, Light Airborne Multi-Purpose System MK III Full Scale Development, Program Summary Report	RW-8R-81	19 JUN 81
Phase III (Navy Preliminary Evaluation-II) of the Light Airborne Multi-Purpose MK III Ship/Air Weapon System (At-Sea Tests)	RW-C3R-81	4 MAY 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase II, Navy Preliminary Evaluation-II for Light Airborne Multi-Purpose MK III, Final Report	RW-C4RE-81	30 OCT 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase II Naval Preliminary Evaluation-II (Shore)	RW-13R-81	30 MAR 81

Program Element: 64212N

Title: Light Airborne Multi-Purpose System MK III

Final Report, Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase II, Navy Preliminary Evaluation-II for Light Airborne Multi-Purpose System MK III	RW-C4R-81	30 JUN 81
Naval Air Test Center Test and Evaluation, Phase II, Summary Report for Light Airborne Multi-Purpose System MK III	RW-48R-81	2 NOV 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase III Navy Preliminary Evaluation-III for Light Airborne Multi-Purpose System MK III 2nd Interim (Preliminary)	RW-53R-81	26 OCT 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase III, Navy Preliminary Evaluation-III for Light Airborne Multi-Purpose System MK III	RW-C5R-81	18 SEP 81
Third Interim Report - Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase III, Navy Preliminary Evaluation-III for Light Airborne Multi-Purpose System MK III	RW-C6R-81	9 FEB 81
Commander, Operational Test and Evaluation Force, Quicklook Report of Initial Operational Test and Evaluation of Light Airborne Multi-Purpose System MK III Weapon System	Message 31 JUL 81	10 JUL 81
Final Report, Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Navy Preliminary Evaluation-IB & SH-60B/FFG-8 Shipboard Envelope Development/Recovery Assist, Securing and Traversing Technical Evaluation	RW-30RE-81	16 NOV 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, (Navy Preliminary Evaluation-IC, Flying Quantities) of the SH-60B Helicopter	RW-1R-81	19 JAN 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, (Naval Preliminary Evaluation-IC - Performance) of the SH-60B Helicopter.	RW-12-81	11 MAR 81
Final Report, Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Navy Preliminary Evaluation-IC of the SH-60B Helicopter	RW-31R-81	27 OCT 81
At-Sea Technical Evaluation Report #6186881000	International Business Machines CDC RW-41R-80	15 JUL 81 28 OCT 80
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Special Purpose Test Preliminary for Light Airborne Multi-Purpose System MK III - 1st Interim (Preliminary)		
Second Interim Report - Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I, Special Purpose Tests for the Light Airborne Multi-Purpose System MK III	RW-C4R-80	23 JAN 81
Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I,	RW-5R-81	30 JAN 81

Program Element: 64212N

Title: Light Airborne Multi-Purpose System MK III

Spec. Purpose Test for Light Airborne Multi-Purpose System MK III

- 3rd Interim (Preliminary)

Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I,
SH-60B Initial Hard-Landing Demonstration

RW-20R-81

4 JUN 81

Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I,
SH-60B/T700-GE401 Propulsion System Demonstration

RW-10R-81

18 JUN 81

Req. for Performance Verification of Radio Frequency
Preamplifier/Signal Distribution Provision in
AN/ARR-75 Sonobuoy Receivers

RW-25R-81

7 JUL 81

Light Airborne Multi-Purpose System MK III Test and Evaluation, Phase I,
Witness of Air Vehicle Environmental Control System Demonstration

RW-40R-81

26 JAN 81

Commander, Operational Test and Evaluation Force, Quicklook Report, Operational
Evaluation of Light Airborne Multi-Purpose System MK III Weapon System

Message

24 FEB 82

Operational Evaluation of Recovery Assist, Securing and Traversing
System

(OPNAV Report
Symbol 3960-12)

14 JUN 82

Commander, Operational Test and Evaluation Force, Evaluation Report,
Light Airborne Multi-Purpose System MK III Weapons System

(OPNAV Report
Symbol 3960-12)

29 JUN 82

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64213N

DoD Mission Area: 232 - Amphibious, Strike, Antisurface Warfare

Title: Helicopter Development

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	11,759	13,194	24,559	10,184	22,557	98,502***
W0901	Helicopter Night Vision System	8,079	2,963	14,421 (T&E)	3,878	22,557	67,944 (5)
	Quantity: Infrared Detecting Sets						
	Forward Looking Infrared				(T&E)		(2)
	Augmented Cobra TOW Sight						
W1378	AH-1 Hellfire (Retrofit)	*	9,939	6,556	3,363	0	19,858
W1502	H-46 Ground Proximity Warning System	1,785	292	0	0	0	2,280 (2)
	Quantity: Trial Kits						
W1577	Crown Helicopter	**	**	2,999	1,771	0	4,770
W1792	Helicopter Engine Enhancement	1,895	0	583	1,172	T&D	T&D

* FY 1982 H-1 Hellfire funding was provided under PE 63313N, Project W1415, HELLFIRE.

** FY 1982/83 Crown Helicopter funding was provided under PE 64213N, Airborne ASW Developments, Project W1577.

*** Total includes FY 1982-1985 funding for Project W1792.

This is continuing program consisting of changing projects. The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 for project W1792 and through completion for each other project.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Helicopter Night Vision System, W0901, provides night vision goggle capability for the AH-1 attack, UH-1 support and CH-46/CH-53 transport helicopters engaged in amphibious assault and combat-support missions. It also provides two infrared systems developed by the U.S. Army, the Forward Looking Infrared Augmented Cobra TOW Sight for the Marine AH-1F and the Pilot Night Vision System for the Navy/Marine Corps CH-53E transport and the Navy MH-53E minesweeping helicopters. Present Marine and Navy helicopters capability to perform amphibious warfare and minesweeping tactical operations in a high or low visibility threat environment is severely restricted by the lack of night/low visibility capability. This project will allow attack, transport and minesweeping helicopters to operate at low altitude and near daylight speeds at night and during periods of reduced visibility. The AH-1 Hellfire (Retrofit), W1378, will provide the capability to defeat all current and postulated armor threats at increased standoff ranges with less risk to the launch platform using both autonomous and remote laser designators. Installation of a Ground Proximity Warning System, W1502, in the H-46 helicopter will provide an advanced warning to the pilot to detect hazardous flight conditions relative to the terrain/water. This project will also produce an emergency flotation system to enable the CH-46 to remain upright upon water entry for three hours in conditions up to sea state five. The Crown Helicopter project, W1577, will provide an avionics update of the Presidential helicopters. Helicopter Engine Enhancement, W1792, will provide increased engine power for the AH-1T attack helicopter to meet the requirements for high/hot operations. AH-1T aircraft weight increases have resulted in marginal hover in and out of ground effect and virtually no single engine performance under high altitude and temperature conditions.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: The net increase for FY 1982 of 1,702 is the result of the initiation of Project W1792 (+1,895) and cost refinements in Project W0901 (-193). In FY 1983 there is a net decrease of 13,366 caused by a specific Congressional reduction to Project W0901 (-13,240) and the Navy application of a general Congressional reduction (-75 in Project W0901 and -31 in Project W1378). The net increase of 12,991 in FY 1984 is the result of

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Program Element: 64213M

Title: Helicopter Development

the addition of projects W1577 (+2,999) and W1792 (+583), and an OSD Budget Decision addition to W0901 of \$10,000 offset partially by inflation adjustments in projects W0901 (-71) and W1378 (-193). FY 1985 and the outyears increased by 8,196 due to increase in Project W0901 (5,335) for program restructuring, decrease of -82 in Project W1378 for deflation and the addition of two new projects to this P.E., W1577 (+1,771) and W1792 (+1,172).

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	4,932	10,057	26,560	11,568	24,545	89,118
W0901	Helicopter Night Vision System	4,729	8,272	16,298	4,819	21,100	66,535
	Quantity: Night Vision Goggles (Aviation)	(T&E)					(1)
	Infrared Detecting Sets			(T&E)			(4)
	Forward Looking Infrared Augmented			(T&E)			(2)
	Cobra TOW Sight						
W1502	H-46 Ground Proximity Warning System	203	1,785	292	0	0	2,280
	Quantity: Trial Kits						(2)
W1378	AH-1 Hellfire (Retrofit)	0	0	9,970	6,749	3,445	20,164

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN-5 H-1 Helicopter Night Vision (Quick Fix)	707	3,486				4,193
Quantity	(16)	(212)				(228)
APN-5 H-1 Helicopter Night Vision Cockpit			9,704	43,786	83,397	136,887
Quantity			(3)	(76)	(161)	(240)
APN-5 H-46 Night Vision Goggles	1,805	5,846	8,263	3,132		19,046
Quantity	(26)	(239)	(463)	(120)		(848)
APN-5 H-53 Night Vision Goggles	719	2,760	4,137	9,179	11,815	28,610
Quantity	(10)	(255)	(50)	(49)		(364)
APN-5 H-1 Hellfire			8,942	45,982	29,853	84,777
Quantity			(1)	(54)	(43)	(98)
APN-5 H-46 Ground Proximity Warning System/			1,071	3,260	5,422	9,753
Emergency Flotation Fita						
Quantity			(4)	(132)	(216)	(352)
APN-5 VH-3D Cockpit/Avionics Update			6,697	14,980	23,178	44,855
Quantity			(1)	(3)	(7)	(11)

F. (U) RELATED ACTIVITIES: The Army had developed Aviation Night Vision Goggles (AVS-6) under Program Element 64710A; DOD Common Module Forward-Looking-Infrared, Program Element 63710A, developed the leading technology employed in night vision systems; Army Advanced Attack Helicopter Program, Army Program Element 64207A, provided the Pilot Night Vision System. Army Forward-Looking-Infrared Augmented Cobra TOW Sight and United States Coast Guard Short Range Recovery Helicopter Forward-Looking-Infrared are also related.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Test Center, Patuxent River, MD; Naval Air Engineering Center, Lakehurst, NJ; Naval Air Propulsion Center, Trenton, NJ. CONTRACTORS: Sikorsky Aircraft Company,

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Program Element: 64213N

Title: Helicopter Development

Stratford, CT; Bell Helicopter Textron, Fort Worth, TX; Martin Marietta Aerospace, Orlando, FL; Boeing Aircraft Company, Seattle, WA; Sanders Associates, Nashua, NH; Collins Radio Division, Rockwell International, Cedar Rapids, IA; Hughes Aircraft Company, Culver City, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1378, AH-1 Hellfire (Retrofit): This project provides for design and development of the integration of the Hellfire Missile System into the AH-1J and AH-1T helicopters.

(U) In FY 1982, design effort was begun for the AH-1J Hellfire Missile System integration and Cockpit Missile Control System.

(U) The FY 1983 Program consists of:

- o Delivery of the AH-1J Cockpit Missile Control System and Hellfire Missile System Prototype; contractor and Navy test on AH-1J; and, beginning design of integration for the more complex AH-1T.

(U) For FY 1984 it is planned to:

- o Complete Operational Evaluation of the AH-1J Cockpit Missile Control System and Hellfire Missile System; award contract to retrofit the AH-1J helicopter; and, complete contractor testing of AH-1T integration.

(U) Project W1502, H-46 Ground Proximity Warning System: This project will provide hazardous conditions warning to the H-46 pilots relative to terrain/water. It will also provide an emergency flotation system.

(U) In FY 1982, the interface requirements for the Ground Proximity Warning System were defined and the design of prototype floats were completed.

(U) The FY 1983 Program consists of:

- o Integration of the Ground Proximity Warning System prototype into the H-46; fabrication of emergency flotation devices; and, contractor testing of flotation devices.

(U) Project W1577, Crown Helicopter: [

Efforts were previously funded under Program Element

64219N.

(U) In FY 1982, [

(U) The FY 1983 Program consists of:

- o [

Program Element: 64213N

Title: Helicopter Development

(U) For FY 1984 it is planned to:

(U) Testing will be completed in []

(U) Project W1792, Helicopter Engine Enhancement: This program provides for the development of an engine with increased engine power for the AH-1T Attack Helicopter. This effort was begun with an internal Navy reprogramming in FY 1982.

(U) In FY 1982, study and initial design effort was begun.

(U) The FY 1983 Program consists of:

o Complete design effort.

(U) For FY 1984 it is planned to:

o Finalize Navy testing.

1. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W0901, Helicopter Night Vision System

1. (U) DESCRIPTION (Requirement and Project): This project provides integration of night vision systems for tactical Navy and Marine helicopters to enable low level operations during periods of darkness and reduced visibility. Systems vary in complexity from night vision goggles and lighting modifications in H-46, H-53, and H-1 helicopters to integration of the Army's Forward Looking Infrared Augmented Cobra TOW Sights in the AH-1T and the Army's Pilot Night Vision System in the Navy and Marine H-53E. This project follows Congressional direction to utilize to the maximum off-the-shelf, already developed equipment. Costs involved are primarily for integration.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Technical Evaluation and Operational Evaluation for AVS-6 night vision were completed. Evaluations were completed leading to the decision to procure the Army's Pilot Night Vision System.

b. (U) FY 1983 Program: Procure Pilot Night Vision System prototypes and other mission equipment; select system integrator; and, draft specifications for integration into the H-53E.

c. (U) FY 1984 Planned Program: Complete technical evaluation of the cockpit management control system for H-1 helicopter; complete system development; and, commence integration of the Pilot Night Vision System into the H-53E aircraft.

d. (U) Program to Completion: Complete integration of Pilot Night Vision System into H-53 aircraft. Complete Integrated Logistic Support, contractor test, technical evaluation, and operational evaluation.

e. (U) Milestones: Not applicable

FY 1984 RET&E DESCRIPTIVE SUMMARY

Program Element: 64214N
DoD Mission Area: 232 - Amphibious, Strike, Antisurface Warfare

Title: AV-8B (Engineering)
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	226,413	113,806	118,218	12,180	5,794	1,015,837
W0652	AV-8B	226,413	113,806	118,218	12,180	5,794	1,015,837
	Quantity (Operational Test and Evaluation)						(4)

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The AV-8B will meet the Marine Corps requirements for a light attack aircraft to provide responsive offensive air power that can operate from austere forward sites in direct support of ground forces. The AV-8B is an improved vectored thrust aircraft based on the AV-8A concept and the PEGASUS II engine that has twice the range or payload of the current HARRIER. It combines aerodynamic improvements with the Angle Rate Bombing System for increased weapon delivery accuracy and a new stability augmentation system to reduce pilot workload providing a more capable and reliable light attack aircraft. A two seat training version designated the TAV-8B will be developed.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: FY 1983 decreased by 265 due to Navy application of a general Congressional reduction. FY 1984 increased 44,268 as a result of a Department of Defense Program Budget Decision for development of a two seat training version of the AV-8B and 6,817 for correction of development deficiencies. FY 1985 increased 256 to cover cost of correction of development deficiencies.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	236,371	226,413	114,071	67,133	17,718	964,761
W0652	AV-8B	236,371	226,413	114,071	67,133	17,718	964,761

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN-1 (26110M) (Program Cost)	610,800	753,500	908,500	1,142,600	4,396,200	7,900,300
Quantity	12	21	32	48	215	328
APN, B.A.6	56,500	164,031	129,355	179,123	508,093	1,046,802
Milcon (26496M)	0	2,500	0	0	0	2,500

F. (U) RELATED ACTIVITIES: Not applicable.

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Program Element: 64214N

Title: AV-8B (Engineering)

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent River, MD; Naval Weapons Center, China Lake, CA; Naval Air Development Center, Warminster, PA. CONTRACTORS: McDonnell Douglas Corporation, Saint Louis, MO, with subcontract to British Aerospace, Ltd., Kingston, England; Rolls Royce, Bristol, England.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984: Not applicable.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984:

(U) Project W0652, AV-8B

1. (U) DESCRIPTION (Requirement and Project): The success of the AV-8B aircraft in providing the Vertical/Short Take-Off and Landing requirements of the United States Marine Corps led to the requirement for an improved aircraft capable of increased payload and range over the AV-8A. In cooperation with the manufacturers of the AV-8A, Hawker Siddeley Aviation Ltd., and the United Kingdom Government, the United States Navy conducted studies of such an improved aircraft, designated the AV-16. This new aircraft design incorporated a new engine, substantially redesigned wings and fuselage, and advanced avionics. Because of the cost of the AV-16 program, however, no effort was initiated beyond the study phase, which was completed in FY 1974. The United States Licensee of Hawker Siddeley Aviation Ltd., McDonnell Douglas Aircraft Corporation, then examined potential improvements in the existing AV-8A in laboratory and flight tests. By utilizing the existing AV-8A engine, incorporating a new wing, and redesigning certain aerodynamic characteristics of the aircraft, it was discovered that the AV-8A could be greatly improved and could possibly meet or exceed the projected performance of the proposed AV-16 at a much lower cost. These aerodynamic changes and modified wing have since been tested in the full scale wind tunnel confirming theoretical estimates. The new aircraft, designated the AV-8B, is required by the United States Marine Corps to fulfill their responsibility in providing Close Air Support for amphibious operations or for operations ashore. The use of Vertical/Short Take-off and Landing aircraft with their basing flexibility is seen as the most effective method of meeting this responsibility. The AV-8B will be substantially manufactured by McDonnell Douglas Corporation in St. Louis, MO, with manufacture of certain portions of the fuselage being done by Hawker Siddeley Aviation Ltd., renamed British Aerospace Ltd., in Great Britain. The engine will be manufactured by Rolls Royce Ltd., the current engine manufacturer, with certain parts manufactured by Pratt and Whitney Corporation. The flight demonstration effort was performed by two AV-8A modified to YAV-8B.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program:

- o Four Full Scale Development aircraft were completed for test and evaluation.
- o The first flight took place on 5 November 1981 at the McDonnell Douglas, St. Louis facility.
- o The four aircraft began flight testing at the Naval Air Test Center, Patuxent River, and Edwards Air Force Base, California. Began pilot production.

b. (U) FY 1983 Program:

- o Continue airframe static, fatigue and flight development testing. Incorporate fixes to deficiencies resulting from preliminary evaluations.
- o Begin limited production and award full production advance procurement contract.
- o Initiate Board of Inspection and Survey trials.
- o Initiate YAV-8B development.

Program Element: 64214N

Title: AV-8B (Engineering)

c. (U) FY 1984 Planned Program:

- o Conduct High Angle-of-Attack performance evaluation at Edwards Air Force Base.
- o Complete the airframe fatigue test program.
- o Continue TAV-8B development. Complete forward fuselage structural assembly. Complete engineering design work. Complete crew station configuration mock-up.
- o Continue to analyze and correct deficiencies resulting from development testing. Complete Board of Inspection and Survey trials. Initiate and complete Operational Test and Evaluation and obtain Approval for Service Use. Modify aircraft for Digital Electronic Engine Fuel Control flight test. Definitize Full Production Contract.

d. (U) Program to Completion:

- o Analyze all test results and correct any deficiencies resulting from Board of Inspection and Survey trials and from Operational Test and Evaluation.
- o Begin flight test of Digital Electronic Engine Fuel Control.
- o Continue High Angle-of-Attack performance evaluation.
- o Perform validation of Operational Flight Program Software.

e. (U) Milestones:

MILESTONE

1. Defense System Acquisition Review Council I
2. YAV-8B first flight
3. Defense Systems Acquisition Review Council II
4. Detail Design Review
5. Award of Full Scale Development Contract
6. First Flight of AV-8B (Full Scale Development)
7. Award of Production Contract
8. Board of Inspection and Survey
9. Operational Test and Evaluation
10. Initial Operational Capability

DATE

March 1976
November 1978
July 1979
July 1980
August 1980
November 1981
April 1982
October 1983
January 1984
September 1985

*(June 1985)

* Date listed in FY 1983 Program Element Descriptive Summary.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation:

a. (U) The AV-8B Test Program will evaluate and assess the technical and operational characteristics through an integrated and extensive development (contractor and Navy) and operational test and evaluation effort. The test program supports the acquisition strategy of the AV-8B by providing test results related to the established thresholds of characteristics in support of major milestones.

Program Element: 64214N

Title: AV-8B (Engineering)

b. (U) The basic aerodynamic improvements of the AV-8B (supercritical high-lift composite wing, leading edge root extension, engine inlet modification and lift improvement devices) over the current operational AV-8A have been demonstrated in a contractor/Navy flight test program at the Naval Air Test Center, Patuxent River, MD, with the two AV-8A aircraft converted to prototype YAV-8Bs. Performance characteristics for maximum vertical takeoff weight, short takeoff weight at 27,950 pounds, sustained "g" and cruise performance (clean, loaded) have been demonstrated in support of the Milestone II full-scale development decision. The Test and Evaluation Master Plan addressing the detail tests of the AV-8B full scale development phase was approved 9 June 1982.

c. (U) The full-scale development test program will utilize the results of the demonstration validation phase to the maximum extent possible to minimize unnecessary duplication. The full scale development test program will focus on the new features added over those in the AV-8A and YAV-8B. The laboratory and ground tests will include over 13,000 hours of wind tunnel testing, complete static, drop and fatigue structural qualification, manned flight simulation and overall avionics functional and integration tests including a crew station cockpit mock-up. The full scale development flight test will use five aircraft (one YAV-8 and four AV-8B) for the development and initial operational test and evaluation and consist of over 90 aircraft test months.

(1) (U) As of 5 November 1982 the five full-scale development aircraft have flown a total of 483 sorties and 529 flight hours. Four distinct periods of Navy Preliminary Evaluations (NPE) and Initial Operational Test and Evaluation (IOT&E) are interspaced during the full-scale development test program. NPE-I, NPE-II, NPE-III, and IOT&E have been completed with no non-resolvable problems. Shipboard sea trial tests will be conducted during Board of Inspection and Survey trials. Reliability and maintainability thresholds as defined in Test and Evaluation Master Plan Number 195 will be monitored through full-scale development.

(2) (U) Reliability and Maintainability data collected and analyzed up to and including the Initial Operational Test and Evaluation period indicate performance considerably better than predicted in D, MMH/FH (Direct, Maintenance Manhour/Flight Hour) and MTBF (Mean Time Between Failure). Completed technical testing supporting the Limited Production Decision in November 1982 includes the following: wing and fuselage static loads, ground vibration testing, maintenance engineering inspection, electromagnetic compatibility, wind tunnel, canopy/ejection, system integration (hardware/software), fatigue loads (2 lifetimes), and approximately 39 aircraft flight test months including 3 aircraft months of Navy NPE/Initial Operational Test and Evaluation. Complete development, test and evaluation in support of the Milestone III full production decision will include all the contractor major ground and flight demonstration tests and all Navy Technical Evaluation/Board of Inspection and Survey trials to include 25mm gun system integration tests. Naval Air Test Center will be the principal test site for contractor and Navy DT&E.

2. (U) Operational Test and Evaluation:

a. (U) Operational Testing is being conducted under the auspices of Commander, Operational Test and Evaluation Force. AV-8B has completed demonstration and validation phase and proceeded into full-scale development with the production of four full-scale development AV-8B aircraft.

b. (U) Defense System Acquisition Review Council I (DSARC I) (March 1976) directed the accomplishment of a Flight Demonstration Program to validate the proposed technical aspects of the AV-8B. Two AV-8A aircraft were modified to prototype YAV-8B's and the flight development program was conducted as combined Development Test/Operational Test I at Naval Air Test Center, Patuxent River, MD. The prototype YAV-8B is aerodynamically representative of the AV-8B but does not contain all planned avionics or system modifications. The flight performance handling qualities in the attack mission profile and Vertical/Short Take-off and Landing environments were assessed by Commander, Operational Test and Evaluation Force, compared to the AV-8A, the YAV-8B was found to be potentially operationally effective. Assessment of contractor maintenance plus reliability and maintainability data indicated the YAV-8B was potentially operationally suitable. Reliability and maintainability thresholds were not set. Analysis of contractor collected data showed a Mean Flight Hour Between Failure rate of 3.0 and 3.2 hours in Navy Preliminary Evaluation 1 and 2, respectively, as compared to the AV-8A rate of 1.5 hours.

Program Element: 64214N

Title: AV-8B (Engineering)

c. (U) Operational Test I, completed in July 1979, consisted of Air Test and Evaluation Squadron FIVE (VX-5), Commander. Operational Test and Evaluation's test agent, monitoring contractor and Navy testing plus active participation via three flights during Navy Preliminary Evaluation.

d. (U) Initial Operational Test and Evaluation in the Engineering Development Phase utilizing Full Scale Development aircraft was conducted during September 1982, and accumulated 32 sorties/46.7 flight hours to assess AV-8B capabilities in Close Air Support: O/I level maintenance and logistic support was contractor furnished during Operational Test IIB (Initial Operational Test and Evaluation) and will be conducted by fleet representative personnel during OT-IIC (Operational Test and Evaluation).

e. (U) Operational Test and Evaluation will culminate in the Operational Evaluation by Air Test and Evaluation Squadron FIVE (VX-5) during Operational Test IIC (October 1983 - January 1984) at China Lake, CA, to support the Milestone III production decision. Six aircraft months (2 production representative full scale development aircraft for 3 months) of testing in full operational scenarios, including operations from ships will involve dedicated Marine Corps Operational level support. Peculiar Ground Support Equipment and Automatic Test Equipment will be evaluated, if available. Equipment not available will be tested during Operational Test III.

f. (U) Follow-on Operational Test and Evaluation will be conducted by VX-5 at Naval Weapons Center, China Lake and by the first stand-up AV-8B squadron. Follow-on Test and Evaluation will be monitored by Commander, Operational Test and Evaluation Force, and Marine Corps Operational Test and Evaluation Agency and will verify corrective action recommended during Initial Operational Test and Evaluation, develop tactics, test equipment and/or systems not available during Initial Operational Test and Evaluation, and evaluate the AV-8B Operational Flight Program software operational effectiveness. Reliability, availability and maintainability thresholds and goals are as follows:

	Thresholds		Goal 1/ Mature System
	Operational Test IIB	Operational Test IIC	
1. Direct Maintenance Manhour/Flight hour	22	18.0	14.5 hours
2. Mission Capable Rate 1/	50%	70%	85%
3. Elapsed Manhours/Maintenance Action 2/	4.0	2.5	1.9 hours
4. Mission Reliability	70%	80%	93%

1/ Mission Capable rate - once declared ready for flight, probability that aircraft will launch and successfully complete assigned mission with no failure of the mission essential equipment. MC rate will be computed with the Navy 3M system (SCIR data) for the AV-8B's primary mission.

2/ Mean Time to Repair - Mean Time to Repair is defined in OPNAVINST 4970.2B.

3. (U) System Characteristics:

Objectives

- Maximum Vertical Takeoff Weight - 19,185 lbs.
- Short Take-off distance with 28,350 lbs - 1000 ft.
- Close Air Support Mission Radius - 209 nautical miles (7MK82SE, Internal Fuel, Guns and Ammo, 1,000 feet Short Take-off, 1.0 hour loiter at 5000 feet at maximum endurance speed).
- Reliability: Mean Flight Hour Between Failure at Milestone III - 1.8 hours
- Maintainability: Direct Maintenance Man-hours per Flight Hour at Milestone III - 18.0 hours

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64215N
DoD Mission Area: 235 - Naval Warfare Support

Title: Support Equipment
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		6,924	8,700	9,836	17,596	Continuing	Continuing
W0601	Aircraft Handling and Servicing Equipment	3,970	5,073	5,790	5,910	Continuing	Continuing
W0852	Aviation Automatic Test Equipment	2,364	2,814	2,935	8,551	Continuing	Continuing
W1108	Aircraft Salvage and Handling Equipment	390	853	1,111	3,135	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Aircraft Handling and Servicing Equipment, Aviation Automatic Test Equipment, and Aircraft Salvage and Handling Equipment projects provide for full-scale development of Naval Aviation support equipment systems. These systems are required for operational and maintenance support for all aircraft, propulsion, avionics, and armament systems at all maintenance levels (organizational, intermediate, and depot).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The only significant change is an increase of 656 in Project W1108 in FY 1984 to initiate development of a replacement LPH/LHA/LPD ship aircraft crash crane. Other minor changes in all years result from budgetary adjustments including inflation.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		6,903	6,947	8,700	8,837	Continuing	Continuing
W0601	Aircraft Handling and Servicing Equipment	3,639	4,193	5,033	5,375	Continuing	Continuing
W0852	Aviation Automatic Test Equipment	1,181	2,364	2,814	3,007	Continuing	Continuing
W1108	Aircraft Salvage and Handling Equipment	2,083	390	853	455	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN (Various equipments as developed)	114,310	171,535	163,845	333,280	Continuing	Continuing

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Field Activity is the Naval Air Engineering Center, Warminster, PA; Pacific Missile Test Center, Point Mugu, CA; Naval Air Test Center, Patuxent River, MD; Naval Avionics Facility, Indianapolis, IN; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Northern Research Corp., Woburn, MA; Page Airways Inc., Atchinson, KA; Consolidated Diesel Corp., Old Greenwich, CT; Dayton T. Brown, Inc., Bohemia, NY; Standard Manufacturing Company, Dallas, TX; Entwistle Company, Hudson, MA; Coastal Marine Research, Toms River, NJ; Stewart and Stevenson, Inc., Houston, TX; General Dynamics, San Diego, CA; Sperry Microwave, Clearwater, FL.

Program Element: 64215N

Title: Support Equipment

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0601, Aircraft Handling and Servicing Equipment: This project provides for the design and development of aircraft handling and servicing equipment (e.g., hydraulic test stands, mobile electronic power plants, ground start units, tow tractors, engine test stands, etc.) which are commonly used on multiple models of United States Navy/United States Marine Corps aircraft.

(U) In FY 1982, development was completed on an aircraft weapon hoist, a 100 gpm hydraulic component test stand, an armament handling equipment test stand, a United States Marine Corps hoist system and small missile adapter, a jet aircraft ground start unit, and a small aircraft handler.

(U) The FY 1983 effort consists of:

- o Completing development of a weapons skid, mobile turbofan/jet engine test system, and gaseous oxygen/nitrogen generator.
- o Continuing development of a new aircraft spotting vehicle, mobile electronic power plant, and aircraft tow tractor.
- o Initiating development of a dynamic engine simulator, vibration test set, and weapons loader.

(U) In FY 1984, it is planned to:

- o Complete development of the aircraft spotting dolly and aircraft tow tractor.
- o Continue development of the dynamic engine simulator, vibration test set, weapons loader, and mobile electric power plant.

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

(U) Project W0852, Aviation Automatic Test Equipment: This project provides for the design and development of a modularly constructed family of automatic test equipment, with standard hardware elements, designated the Consolidated Support System. The system will provide standardized intermediate and depot level maintenance test capability for existing and future avionic/electronic support requirements.

(U) In FY 1982, five competing contractors initiated the systems definition phase of the project. This effort includes conceptual design, specification development, and system synthesis model preparation.

(U) In FY 1983, the contractors will:

- o Complete system design; and,
- o Demonstrate system performance capability using the synthesis model.

(U) In FY 1984, a full-scale development contract will be awarded to one of the five competing contractors. Detailed design and fabrication of engineering development models will be initiated.

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

(U) Project W1108, Aircraft Salvage and Handling Equipment: This project provides for the design and development of equipment (including crash cranes and ancillary equipment) to expeditiously remove disabled/damaged aircraft from flight decks of CV and LPH/LHA/LPD class ships.

Program Element: 64215N

Title: Support Equipment

(U) In FY 1982, system design of the CV crash crane was completed and fabrication of a prototype unit was initiated. Design of several items of ancillary equipment was also initiated.

(U) In FY 1983, development of the CV crash crane and ancillary equipment will be continued.

(U) In FY 1984, CV crash crane and ancillary equipment development will be completed and LPH/LHA/LPD crash crane and ancillary equipment development will be initiated.

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

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64217N

DOD Mission Area: 233 - Anti-Submarine Warfare

Title: S-3 Weapon System Improvement Program

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	41,702	75,899	60,211	29,938	21,972	256,940
W0489	Acoustic Improvements	27,309	54,264	42,522	20,493	13,840	181,254
W1289	Non-Acoustic Improvements	14,393	20,170	16,305	9,445	8,132	72,637
	Quantity (Acoustic and Non-Acoustic Prototypes)*		(DT&E)	(OT&E)			(4)
W1639	Communication Control Group Integration	0	1,465	1,384	0	0	2,849
	Quantity			(T&E)			(6)

* A total of 56 subsystem prototypes are procured to support a System Integrated Laboratory at the contractor facility, a Navy software test facility and two test and evaluation aircraft.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The S-3 Weapon System Improvement Program addresses the requirement for an improved outer zone air ASW capability within the broad mission area of battle group anti-submarine warfare. These airborne outer zone tasks include independent screening and contact investigation in coordination with complementary surface, subsurface, and airborne units. The S-3 Weapon System Improvement Program is a modification program designed to improve the mission system effectiveness of the carrier based S-3A to meet current and projected threats. The program is administratively divided into Project W0489, Acoustic Improvements, Project W1289, Non-Acoustic Improvements and Project W1639, Communication Control Group Integration. Project W0489 includes Advanced Signal Processor and display formatting, increased sonobuoy receiver and reference capability, tape recorder, and submarine communications link incorporation. Project W1289 includes radar and Electronic Support Measure improvements, the addition of HARPOON, and chaff/flare dispensing electronic countermeasures capability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: RDT&E - Congress reduced the FY 1983 budget request by 15,344. Since the mark was non-prejudicial, the Navy allocated the reduction to both Acoustic Improvements and Non-Acoustic Improvements. Based on the House colloquy of 27 July 1982 (Congressional Record, Vol. 128, No. 99) and the Senate Appropriations Committee recommendation (Report No. 97-580) the Navy restored a total of 12,899 during the FY 1984 budget development leaving shortfalls of 1,868 in Acoustic Improvements and 577 in Non-Acoustic Improvements. A Reprogramming Action (DDI415) will be submitted to Congress in support of this adjustment. Full restoration is required to maintain the contractual program structure in terms of cost, schedule, technical performance, and supportability requirements. Without full restoration in FY 1983 a schedule slip will occur and increased funding in FY 1984 and subsequent years will be required. The total FY 1983 shortfall of 2,445 is included in both the "Additional to Completion" and "Total Estimated Cost" funding. The FY 1984 net program increase of 4,478 reflects increases of 2,883 in Acoustic Improvements and 1,595 in Non-Acoustic Improvements for schedule risks and a 3 reduction in Communication Control Group Integration for inflation adjustment. The increases in the outyears of 17,117 in W0489 and 7,599 in W1289 are for schedule risks.

APN - The FY 1985 APN funding estimate represents initial procurement (limited production) of S-3 Weapon System Improvement Program aircraft modification kits. The total estimated cost decrease represents alignment with budgetary constraints.

Program Element: 64217N

Title: S-3 Weapon System Improvement Program

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	14,738	41,702	78,344	55,733	27,194	230,191
WU489	Acoustic Improvements	10,346	27,309	56,132	39,634	17,216	163,117
W1289	Non-Acoustic Improvements	4,392	14,393	20,747	14,712	9,978	64,222
W1639	Communication Control Group Integration	0	0	1,465	1,387	0	2,852

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy, BA.5						
S-3 B	-	-	-	108,813	793,614	902,427
Quantity				(18)	(142)	(160)
Communication Control Group Integration	-	-	3,300	5,900	14,800	24,000
Quantity			(5)	(45)	(107)	(157)

F. (U) RELATED ACTIVITIES: Aircraft Carrier Anti-Submarine Warfare Module, Program Element 63228N (carrier data processing); Acoustic Search Sensors (Air Common Acoustic Processing), Program Element 64261N (advanced sensor processing software); Acoustic Communications (Integrated Acoustic Communications System project), Program Element 64566N; Advanced Signal Processor, Program Element 64266N (expanded acoustic processor capability); Surface and Aerospace Target Surveillance Technology (Project PROFILE), Program Element 62712N. Aircraft Equipment Reliability and Maintainability Program, Program Element 25633N (hardware developed for Communication Control Group); NAVSTAR Global Positioning System, Program Element 64777N (navigational system).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center (Lead Laboratory), Warminster, PA; Naval Air Test Center, Patuxent River, MD; Naval Research Laboratory, Washington, DC; Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Lockheed Aircraft Corp., Burbank, CA is the prime contractor. OTHERS: Texas Instruments, Dallas, TX; IBM, Manassas, VA; and Owego, NY; Sperry-UNIVAC, St. Paul, MN; and Valencia, CA; Hazeltine, Groenlawn, NY; Cubic, San Diego, CA; Sanders Associates, Nashua, NH; McDonnell Astronautics Corporation, St. Charles, MO; Goodyear Aerospace Corporation, Akron, OH; TRACOR Corporation, Austin, TX; Teledyne Systems Company, Los Angeles, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1639, Communication Control Group Integration: This project provides for the hardware and software integration into the S-3 of a current technology communication control group to replace the current 1960's technology system and improve reliability and maintainability.

(U) This integration effort is a new start in FY 1983. The FY 1983 program consists of:

- o Equipment and software development/integration.
- o Software specifications review.

Program Element: 64217N

Title: S-3 Weapon System Improvement Program

- o Equipment demonstrations and performance trade off studies.
- o Aircraft installation interface design.

(U) For FY 1984, it is planned to:

- o Complete engineering design.
- o Complete environmental, reliability and maintainability tests/demonstrations on the Service Test Models.
- o Verify aircraft installation provisions and hardware/software integration.
- o Conduct Technical and Operational Evaluation.
- o Development and testing will continue to completion in FY 1987.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984:

(U) Project W0489, Acoustic Improvements

1. (U) DESCRIPTION: (Requirement and Project): The existing S-3 acoustic data processor, designed in the 1960's, was optimized to [signature components of early Soviet submarines. Current submarine acoustic signatures consist primarily of] The projected threat will have reduced [signal strength requiring increased emphasis] An improved acoustic data processor with advanced sensor compatibility is required to counter the projected threat [The principal acoustic system improvement to meet the projected threat is to provide increased processing through the Advanced Signal Processor which will permit more flexibility] will provide improved [search performance against subsurface targets. Tactical aids will be incorporated to exploit the capabilities of the acoustic data processor (i.e., automatic target fixing techniques, and improved passive acoustic detection and classification aids). The central computer system memory capacity will be increased and the sonobuoy receiver system and sonobuoy reference system will be modified to encompass the [channel sonobuoys. Communications capability] will be added via the Integrated Acoustics Communication System.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The full-scale engineering development contract with Lockheed was definitized in March 1982. The contract is a cost plus incentive fee type with a specified ceiling. Software program performance specifications and hardware equipment specifications were finalized. Detailed design efforts continued through critical design reviews. Equipment fabrication and testing was initiated for hardware deliveries to the system integration laboratory in CY 1983. System integration and laboratory test plans were updated. Government Furnished Equipment (Advanced Signal Processor and Advanced Sonobuoy Communication Link) procurements were initiated to support the system integration laboratory, the Naval Air Development Center test facility, and two prototype aircraft. Automatic test equipment development was initiated. Maintenance plan and logistic support analyses preparation were initiated.

b. (U) FY 1983 Program: October through December 1982 - Complete system integration laboratory modification. January through September 1983 - Initial hardware deliveries and software build deliveries to the Lockheed system integration laboratory. Continue prototype unit and software laboratory integration and testing. Initiate reliability development testing and built-in-test effectiveness testing. October 1982 through September 1983 - Continue automatic test equipment development. Continue maintenance plan and logistic support analyses preparation.

Program Element: 6421/N

Title: S-3 Weapon System Improvement Program

c. (U) FY 1984 Planned Program: Continue prototype unit and software laboratory integration and testing. Complete equipment qualification testing. Complete delivery of equipments for the Lockheed system integration laboratory, the Naval Air Development Center system test facility and two prototype aircraft. Continue automatic test equipment development. Continue maintenance plan and logistic support analyses preparation. Complete first prototype aircraft, begin flight testing and complete Navy Preliminary Assessment.

d. (U) Program to Completion: In FY 1985, complete second prototype aircraft. Complete prototype unit and software laboratory testing. Complete initial Navy evaluation testing leading to limited production in FY 1985. Complete Technical and Operational Evaluations leading to full production start in FY 1987, with initial operational capability []
Modification of 160 aircraft is to be completed []

e. (U) Milestones: Not applicable.

(U) Project W1289, Non-Acoustic Improvements

1. (U) DESCRIPTION (Requirement and Project): The S-3A radar functions as a primary ASW sensor (submarine periscope detection) and provides an adjunct surface surveillance capability for the necessary correlation of surface targets. A deficiency exists in the ability of the operator to [] This has historically been a severe constraint of all airborne ASW radar systems. ASW radar contact investigation frequently results in the interruption of a primary acoustic monitoring responsibility and can potentially place the aircraft in a hostile threat environment. Recent technological advances offer the opportunity to obtain a [] with radar and provide [] to meet future threats.

HARPOON launch capability has been added for self defense and to permit urgent attacks against surfaced cruise missile launching submarines. A chaff/flare dispensing electronic countermeasures capability will also be added.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: The full-scale engineering development contract with Lockheed was definitized in March 1982. The contract is a cost plus incentive fee type with a specified ceiling. Software program performance specifications and hardware equipment specifications were finalized. Detailed design efforts continued through critical design reviews. Equipment fabrication and testing was initiated for hardware deliveries to the system integration laboratory in CY 1983. Radar shore testing was initiated. System integration and laboratory test plans were updated. Automatic test equipment development was initiated. Maintenance plan and logistic support analyses preparation was initiated.

b. (U) FY 1983 Program: October through December 1982 - Complete system integration laboratory modification. Complete radar shore testing. January through September 1983 - Initial hardware deliveries and software build deliveries to the Lockheed system integration laboratory. Continue prototype unit and software laboratory integration and testing. Initiate reliability development testing and built-in-testing effectiveness testing. October 1982 through September 1983 - Continue automatic test equipment development. Continue maintenance plan and logistic support analyses preparation.

c. (U) FY 1984 Planned Program: Continue prototype unit and software laboratory integration and testing. Complete reliability development testing and built-in-test effectiveness testing. Complete equipment qualification testing. Complete delivery of equipments for two prototype aircraft. Continue automatic test equipment development. Continue maintenance plan and logistic support analysis preparation. Complete first prototype aircraft, begin flight testing and complete Navy Preliminary Assessment.

d. (U) Program to Completion: In FY 1985, complete second prototype aircraft. Complete prototype unit and software laboratory testing. Complete initial Navy evaluation testing leading to limited production in FY 1985. Complete Technical and Operational Evaluation leading to full production start in FY 1987, with initial operational capability []
Modification of 160 aircraft is to be completed []

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64218N
DoD Mission Area: 235 - Naval Warfare Support

Title: Environmental Systems
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,081	1,246	2,679	1,403	Continuing	Continuing
W0532	Environmental Equipment Support	1,081	1,246	594	609	Continuing	Continuing
W1752	Tactical Environmental Support System (Engineering)	*	*	2,085	794	412	3,291

* Funded in advanced development Program Element 63207N, Environmental Applications, Project W0512 in FY 1983 and prior.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for project W0532 and through completion for project W1752.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Perform engineering development to improve Navy environmental support capabilities. Includes: (1) land-based and shipboard equipment for receiving and processing data from environmental satellites; (2) taking advantage of technical advances in environmental satellites; (3) adopting environmental subsystems developed by others for Navy operational use; (4) shipboard modular computer-based system for receiving, processing, and displaying environmental information on automated interactive graphic and alphanumeric terminals.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary, are as follows: The increase of 600 in 1982 results from reprogramming from Program Element 35160N/W0524 to expand the satellite receiver/recorder system to add the capability for reception of civil satellite data. Increase of 890 in FY 1983 results from a revision of cost estimates. The increase of 2084 in FY 1984 results from reprogramming from Program Elements 63207N and 6370AN, to begin engineering development of the Tactical Environmental Support System (project W1752).

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	533	481	356	595	Continuing	Continuing
W0532	Environmental Equipment Support	533	481	356	595	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not applicable.

F. (U) RELATED ACTIVITIES: Effort is related to Program Element 63207N, Environmental Applications (Project W0514, Meteorological Measuring System; Project W0512, Tactical Environmental Support System).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN; Office of Naval Research, Arlington, VA; Naval Oceanographic Office, Bay St. Louis, MS; Naval Air Development Center, Warminster, PA

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0532, Environmental Equipment Support: This project modifies or improves existing and developing systems or subsystems for receiving, processing, measuring, and developing environmental data and information to support naval operations.

Program Element: 64218N

Title: Environmental Systems

(U) In FY 1982:

- o The evaluation of the expanded environmental satellite receiving/recording system design was completed, to allow the reception of high resolution polar orbiting and geosynchronous, civil satellite data (in addition to the Defense Meteorological Satellite Program data) aboard selected Navy ships and shore stations.
- o Continued test and evaluation of a lightning position and tracking system at Naval Air Station, Cecil Field, Florida, for Navy utilization in locating and tracking lightning and severe storms in support of shore-based air operations, aircraft refueling operations, severe weather warnings and munition handling operations.
- o Continued engineering development evaluation and field test of the critical water-depth sensor of the Surface Condition Analyzer system at Naval Air Station, Pensacola, Florida, and at the manufacturer's plant in St. Louis, Missouri, to relate water-depth measurements to runway traction and hydroplaning conditions during Navy air operations.

(U) The FY 1983 program consists of:

- o Completing engineering development model II for the expanded satellite receiving/recording system.
- o Completing technical evaluation for a lightning position and tracking system for Navy-wide use.
- o Continuing technical evaluation for the Surface Condition Analyzer, critical water-depth system.

(U) For FY 1984, it is planned to:

- o Complete integrated logistic support and manuals, operational evaluation, and obtain approval for service use for the expanded environmental satellite receiving/recording system.
- o Complete technical evaluation of the Surface Condition Analyzer, critical water-depth system for measuring hydroplaning conditions on airfield runways for possible Navy-wide use.
- o Engineering development of promising technologies will continue.

(U) Project W1752, Tactical Environmental Support System (Engineering): This project will produce a shipboard, modular, interactive, standard, mini computer based system designed to predict/assess the performance of weapon/sensor systems as affected by the environment. This system will: (1) use environmental data from satellites, stored data bases, and existing sensors; (2) have a computer processing capability; (3) convert environmental factors directly into weapon/sensor performance parameters; and (4) provide data to aid in command and control decisions and weapons/sensor selection.

(U) For FY 1982: Not applicable.

(U) For FY 1983: Not applicable.

(U) The FY 1984 program will begin full scale engineering development of the Tactical Environmental Support System after completion of advanced development under PE 63207N, Environmental Applications.

(U) Program to Completion: Engineering development is scheduled to complete in FY 1986.

I. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64219N

DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Airborne Anti-Submarine Warfare Developments

Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	23,019	25,861	19,453	21,118	Continuing	Continuing
X0486	Anti-Submarine Warfare Operations Center	4,517	5,713	2,217	8,006	Continuing	Continuing
	Quantity					(OT&E)	(!)
W0485	Carrier ASW Helicopter Avionics Improvement Program*	4,223	3,099	6,927	2,343	TBU	180
	Quantity			(OT&E)2	(OT&E)2		(4)
W0490	Project BEARTRAP	5,658	4,647	3,936	5,963	Continuing	Continuing
W1442	SH-2 Reliability Readiness Improvement	7,621	9,005	6,373	4,806	8,543	36,348
W1577	Crown Helicopter	1,000	3,397	**	**	**	**

*Previously titled SH-3 Update

**Project W1577, Crown Helicopter transfers to Program Element 64213N in FY 1984.

As this is a continuing program, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for the transition through engineering development of acoustic and non-acoustic projects involving airborne anti-submarine warfare equipments, platforms and sensors. The program is responsive to fleet requirements for improved air ASW capability to counter the existing and projected submarine threat. In FY 1982 and FY 1983, it also provided an update of the avionics and electromagnetic pulse hardening of the Presidential helicopter fleet under Project W1577 (Crown Helicopter).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: RDT&E,N - The FY 1982 net program increase of 1,420 results from: revised cost estimates (-30); Navy reprogramming into Project BEARTRAP (+1,950) for procurement of sonobuoys and system validation tests of Direct Measurement Program; and a decrease (-500) in SH-2 Reliability Readiness Improvement resulting from Navy reprogramming into higher priority programs. The FY 1983 net program increase of 322 results from revised cost estimates (-878) and Navy reprogramming (+1,200) into Crown Helicopter to support an accelerated completion. The FY 1984 total program decrease of 12,695 results primarily from transfer of Crown Helicopter (10,368) to Program Element 64213N, Helicopter Development. In addition, the total program decreased from a net reduction (-2,375) for downward inflation adjustments and budgetary constraints. Restructuring of FY 1984 funds within program element resulted in a reduction (-6,400) of the effort in SH-2 Reliability Readiness Improvements to fund additional scope in the Carrier ASW Helicopter Avionics Improvement Program. The increased scope (+6,927) is for the definitized design (includes a helicopter automatic flight control system), two additional AQS-13F sonar development models for operational evaluation, as well as increased requirements for integrated logistics support planning and development testing. OP,N - Anti-Submarine Warfare Operations Center funding: increases in FY 1982 (510) and FY 1983 (838) supported procurement of a Fast Time Analyzer system. AP,N - SH-2 Reliability Readiness Improvement increases +41 in FY 1984 for inflation and repricing of the tail rotor pylon/drive train components.

Program Element: 64219N

Title: Airborne Anti-Submarine Warfare Developments

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	12,919	21,599	25,539	32,148	Continuing	Continuing
W0484	Anti-Submarine Warfare Avionics Improvement	600	0	0	0	0	46,933
W0485	SH-2 Update	660	4,223	3,099	TBD	TBD	TBD
X0486	Anti-Submarine Warfare Operations Center	4,192	4,547	5,713	2,654	Continuing	Continuing
W0490	Project HEARTRAP	5,367	3,708	4,647	4,823	Continuing	Continuing
W1542	SH-2 Reliability Readiness Improvement	0	8,121	10,090	13,803	10,040	42,054
W1577	Crown Helicopter	2,000	1,000	1,990	10,868	11,820	27,678

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy (B.A.5)						
SH-2 Reliability Readiness Improvement	0	0	2,741	27,699	Continuing	Continuing
Other Procurement, Navy (B.A.2)(332246)						
ASW Operations Center	3,057	12,507	7,997	29,777	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Program Element 64221N, P-3 Modernization Program (improvements will be supported by ASW Operations Center Upgrade); Program Element 64711N, Navy Command and Control System (will provide interface with the ASW Operations Center); Program Element 63228N, Carrier ASW Module (will utilize selected common hardware with ASW Operation Center); Program Element 64228N, SH-60 Carrier Variant (will incorporate AQS-13F sonar developed in Carrier ASW Helicopter Avionics Improvement Program); Program Element 63691N, MX 48 Advanced Capabilities and Program Element 63610N, Advanced Lightweight Torpedo (supported by Direct Measurement Program data).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command Detachment, Patuxent River, MD (Lead Laboratory for ASW Operation Center); Naval Air Development Center, Warminster, PA (Lead Laboratory for Carrier ASW Helicopter Improvement Program and Project Hearttrap); Naval Air Propulsion Center, Trenton, N.J. (Lead Laboratory for SH-2 Reliability Readiness Improvement); Naval Ocean System Center, San Diego, CA; Naval Air Test Center, Patuxent River, MD; Naval Air Warfare Facility, Pensacola, FL; and six additional facilities. CONTRACTORS: Bendix Oceanics, Sylmar, CA (Prime for the AQS-13F); Kaman Aerospace Corporation, Bloomfield, CT (Prime for SH-2 Reliability Readiness Improvement); TRACOR, Austin, TX; Mantech International Corp., Livingston, NJ; Sperry Univac Technical Services Div., Sperry Corp., St. Paul, MN; Sikorsky Aircraft Division/United Technologies, Stamford, CT; Precision/Echo, Santa Clara, CA; Honeywell, Inc., Denver, CO; Spartan Electronics, Jackson, MI; and 10 additional contractors.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project X0486, Anti-Submarine Warfare Operations Center: This project provides various hardware and software enhancements required to insure the continued effectiveness and reliability/maintainability of the existing nineteen operational ASW Operations Center Systems.

(U) In FY 1982, continued development of ongoing hardware and software enhancements of the baseline system. Initiated the ASW Operations Center Upgrade specification.

Program Element: 64219N

Title: Airborne Anti-Submarine Warfare Developments

(U) The FY 1983 program consists of:

- o Completing the Upgrade specification.
- o Acquiring hardware prototypes for a central computer preprocessor, high speed printer, X-Y plotter, data terminal and magnetic tape system.
- o Continuing baseline software development and software development to support hardware improvements to the baseline system.
- o Continuing requirement definition for follow-on baseline enhancements.

(U) For FY 1984, it is planned to continue:

- o Baseline software and software efforts to support baseline hardware enhancement.
- o Initiate design of the Upgrade system.
- o Upgrade system prototype development will continue through FY 1987.
- o This a continuing project.

(U) Project W0485, Carrier ASW Helicopter Avionics Improvement Program: This project provides for the design and development of a new helicopter dipping sonar (AQS-13F). The increase from FY 1983 to FY 1984 is for increased scope for the definitized design, two additional AQS-13F sonar development models for operational evaluation, as well as increased requirements for integrated logistics support planning and development testing.

(U) In FY 1982, data review was completed, logistic support analysis was initiated and fabrication of two engineering development models began.

(U) The FY 1983 program consists of:

- o Continuing fabrication of first two engineering development models of the sonar.
- o Continuing logistic support analysis.

(U) For FY 1984, it is planned to:

- o Complete logistic support analysis.
- o Complete development of the initial two engineering models.
- o Perform initial sea test.
- o Perform airframe integration tests.
- o Initiate second two engineering development models (to support operational evaluation) with long lead article development.
- o Initiate automatic flight control system changes to support flight operations in the dip mode.
- o Continue development and testing to completion in FY 1986.

(U) W0490, Project BEARTRAP: This project provides for the development of an aircraft system with advanced acoustic information collection capabilities to support ASW weapons and acoustic sensor development programs. The data collected is of scientific and technological exploitation quality.

Program Element: 64219N

Title: Airborne Anti-Submarine Warfare Developments

- (U) In FY 1982, operational software for Project BEARTRAP aircraft was updated; a new system design was initiated; procurement of Active Multiple Ping sonobuoys continued to support RUT&E, W requirements.

(U) The FY 1983 program consists of:

- o Completing redesign of [] for installation in [] BEARTRAP aircraft.
- o Initiating development of BEARTRAP capability for [] aircraft.
- o Continuing Active Multiple Ping collection effort.
- o Developing automated acoustic system calibration for BEARTRAP aircraft.
- o Developing BEARTRAP capability in a [] P-3C aircraft.

(U) For FY 1984, it is planned to:

- o Install automated acoustic system calibrators in all BEARTRAP aircraft.
- o Begin transition to AN/AQA-7(V) acoustic processor systems upgraded for [] aircraft.
- o Complete design for BEARTRAP capability in [] aircraft.
- o Continue Active Multiple Ping collection effort.
- o This is a continuing program.

(U) Project W1442, SH-2 Reliability Readiness Improvement: The SH-2F Light Airborne Multi-Purpose System MK I program is an integrated anti-submarine/anti-ship surveillance and targeting system that operates from destroyers cruisers and frigates to extend shipboard sensor and weapon capability. The Navy intends to employ the SH-2F aboard Light Airborne Multi-Purpose System MK I capable ships through the year 2000 - 2005 time frame. The SH-2F Readiness Improvement Program resulted from the recommendations of the CNO Executive Board in April 1980. Four improvements were identified as life-cycle cost effective and having the greatest impact on readiness. The determination was made to redesign 3 major dynamic components (main rotor hub, main rotor blades, and main gearbox internal components) as well as tail rotor pylon and drive train.

(U) In FY 1982, a contract was awarded to commence preliminary engineering design and development of the composite main rotor blade, main gearbox internal improvements, main rotor hub and tail pylon horizontal stabilizer mount improvements/tail rotor gearbox and support fittings.

(U) The FY 1983 program consists of:

- o Initiating detail design and analysis of main rotor blade spar, main gearbox improvements and tail rotor gearbox housing and support fitting.
- o Beginning flight test evaluation of improved tail rotor pitch and flapping bearings.
- o Initiating improved main rotor hub static tests and preliminary fatigue life analysis.
- o Continuing Reliability, Maintainability and Logistic support analysis studies.

(U) For FY 1984 it is planned to:

- o Flight test prototype tail rotor pitch and flapping bearings.
- o Continue improved main rotor hub fatigue tests and initiate flight test.
- o Continue main rotor blade fatigue tests and initiate flight tests.
- o Begin qualification and endurance of main gear box improvements.
- o Continue Integrated Logistic Support efforts.
- o Contractor and Navy tests of each task will continue through approval for full production (varies by task).

1. (U) PROJECT OVER \$10 MILLION IN FY 1984. Not applicable.

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FY 1984 RDT&K DESCRIPTIVE SUMMARY

Program Element: 642201 Title: Aircraft Infrared Signature Suppression
DoD Mission Area: 232 - Amphibious, Strike, Antisurface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,339	95	1,367	1,595	Continuing	Continuing
W0632	Aircraft Infrared Signature Suppression	1,339	95	1,367	1,595	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for the development of airframe and engine modifications designed to reduce aircraft susceptibility to heat seeking missiles and enhances aircraft survivability in penetrating enemy defense zones.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY 1982, decrease of 61 resulted from change of scope due to delay in contract award. FY 1983, decrease of 1,400 resulted from Navy application of a general Congressional reduction. The decrease of 31 in FY 1984 results from revision of cost estimates including inflation.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	1,322	1,400	1,495	1,598	Continuing	Continuing
W0632	Aircraft Infrared Signature Suppression	1,322	1,400	1,495	1,598	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: None.

F. (U) RELATED ACTIVITIES: This project will be coordinated with Program Element 63213N, Airborne Infrared Countermeasures, as an integral part of the total Infrared Countermeasure suite development for Navy/Marine Corps aircraft. Tri-service coordination is provided through the Joint Technical Coordinating Group Aircraft Survivability Committee, and directly with cognizant Army and Air Force offices. This assures that tri-service needs are met, where applicable, and avoids the possibility of duplication of effort.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Air Propulsion Center, West Trenton, NJ; Naval Air Test Center, Patuxent River, MD; Pacific Missile Test Center, Point Mugu, CA. CONTRACTORS: SIKORSKY, Stamford, CT; Hughes Helicopter, Culver City, CA; IITRI, Chicago, IL; Elano, Zenia, ON; SCITECH Associates, Princeton, NJ.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0632, Aircraft Infrared Signature Suppression: This project develops: (1) air cooled infrared suppressors used with or in lieu of existing aircraft engine exhaust tailpipes to block engine hot parts and dilute exhaust plume of turbohaft, turboprop, and medium and high bypass turbofan engines, and (2) aerosol shroud/obscuration techniques to suppress hot metal and plume signatures of turbojet and mini-bypass turbofan engines in order to reduce aircraft vulnerability to infrared guided missiles.

Program Element: 64220N

Title: Aircraft Infrared Signature Suppression

(U) In FY 1982:

- o Ground tests were conducted on CH-53E suppressor, a design problem identified, and corrective action initiated.
- o Wind tunnel tests were initiated on potential plume obscurant materials.
- o Contract awarded to modify the existing CH-46E suppressor in order to eliminate drag, thus improving aircraft performance.

(U) The FY 1983 program consists of:

- o Ground and flight tests of CH-53E suppressor on one of its three engines.
- o Fabrication of modified CH-46E suppressor.

(U) The FY 1984 plans are to:

- o Complete ground and flight test of CH-53E suppressor on one of its three engines.
- o Prepare for development of CH-53E suppressor for all three of its engines.
- o Complete testing of modified CH-46E suppressor.
- o Commence development of a suppressor for the T56 engine in the C-130, E-2, and F-3.

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

1. (U) PROJECTS OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64221N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: P-3 Modernization Program
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	22,473	18,584	19,934	28,261	Continuing	Continuing
W1149	Electronic Support Measures Integration Quantities	9,419 (T&E)	8,204	6,950	0	0	37,529 (8)
W1150	Communications Integration Quantities (T&E)	5,474	1,721	2,443	0	0	24,407 (6)
W1151	Localization System Integration Quantities (T&E)	1,929	1,738	0	0	0	9,780 (7)
W1152	Advanced Signal Processor Modification Quantities (T&E)	3,701	6,921	7,117	14,894	27,973	78,960 (7)
W1501	Searchwater	1,950	(1,000)*	0	0	0	8,400
W165b	Radar System Improvements Quantities	0	0	3,424 (DT&E)	13,367 (OT&E)	58,508	75,299 (4)

* Funded in Program Element 65111D, Foreign Weapons Evaluation

This is a continuing program consisting of several finite projects. The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated for the projects shown.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the modernization of the P-3C avionics suite. Results of a Service Life Extension Program study indicate that the service life of the P-3 airframe is longer than originally expected. The present P-3C avionics suite does not have the sensor growth capacity to counter the emerging threat. This program upgrades aircraft subsystems and adds a needed dimension of flexibility for the weapon system.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: The FY 1982 program reflects a net increase of 3,837. Electronic Support Measures funding was increased by 1,962 (1,218 budget adjustment and 744 Navy reprogramming to support contract initiation), and 1,950 of Navy reprogramming was added for the Searchwater radar evaluation. In addition, within Program Element restructuring reduced Advanced Signal Processor Modification by 1,929 and increased Localization System Integration by the same amount to adjust the project for a prior year reduction. The FY 1983 total program decreases by 3,014. Electronic Support Measures and Communications Integration were adjusted downward by 1,007 and 2,007, respectively, during the FY 1984 budget development. In addition, within Program Element restructuring reduced Advanced Signal Processor Modification by 1,738 and increased Localization System Integration by the same amount to complete the program. The FY 1984 program reflects a net decrease of 4,423 which includes a 3,085 reduction in Radar System Improvements for a rephased start and a net reduction of 338 in the total program for consultant services, Navy Industrial Fund rate decrease, and inflation adjustment.

Program Element: 64221N

Title: P-3 Modernization Program

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	29,649	18,636	21,598	24,357	63,066	185,289
W1149	Electronic Support Measures Integration	4,706	7,457	3,211	7,087	0	36,711
W1150	Communications Integration	12,074	5,549	3,728	2,486	0	26,532
W1151	Localization System Integration	1,032	0	0	0	0	6,113
W1152	Advanced Signal Processor Modification	6,817	5,630	8,659	7,275	35,211	74,959
W1501	Searchwater	170*	1,150*	0	0	0	6,600*
W1656	Radar System Improvements	0	0	0	7,509	27,825	35,334

* Includes 150 in FY 1981 and 1,150 in FY 1982 funded in Program Element 65111D, Foreign Weapons Evaluation.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy *						
Electronic Support Measures Integration, APN, B.A.5	0	0	0	0	TBD	TBD (275)
Quantities						
Communications Integration, APN, B.A.5	0	0	0	0	TBD	TBD (275)
Quantities						
Advanced Signal Processor Modification, APN, B.A.5	0	0	23,200	73,507	TBD	TBD (198)
Quantities			(TBD)	(TBD)		
Radar System Improvements, APN, B.A.5	0	0	0	0	TBD	TBD (TBD)
Quantities						

* Represents nonrecurring start up costs and quantities for both forwardfit and backfit.

F. (U) RELATED ACTIVITIES: Program Element 64261N, Acoustic Search Sensors (Air Common Acoustic Processing), is developing processor software for advanced sonobuoys. Program Element 64217N, S-3 Weapons System Improvement Program, is implementing imaging capability into the AN/APS-116 Radar.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Development Center, Warminster, PA. OTHERS: Naval Air Test Center, Patuxent River, MD. CONTRACTORS: IBM, Manassas, VA; Lockheed California Company, Burbank, CA; Magnavox, Fort Wayne, IN; SCI Systems, Inc., Huntsville, AL; General Electric Company, Utica, NY; All Division of Eaton Corporation, Deer Park, NY; Computer Sciences Corporation, Warminster, PA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1994:

(U) Project W1149, Electronic Support Measures Integration: This project integrates a new Electronic Support Measures system into the P-3C weapon system with initial operating capability in [] The new system will [] increase signal classification; and provide a multiple signal processing capability [] with complex signal processing []

Program Element: 64221N

Title: P-3 Modernization Program

automatic emitter/platform/weapons system correlation and HARPOON targeting. This project also includes Modified Logic Unit Development, which is an interface update to allow integration of the Electronic Support Measures system into the central processor as well as eliminate logic unit component obsolescence.

(U) In FY 1982, the AIL Division of the Eaton Corporation was competitively selected as prime development contractor and engineering development began.

(U) In FY 1983, program consists of:

- o Continuing hardware/software development.
- o Initiating system integration.

(U) In FY 1984, it is planned to:

- o Complete hardware design and development.
- o Complete software development.
- o Conduct reliability testing.
- o Complete system integration and install prototype in a flying testbed aircraft.
- o Initiate Navy technical testing.
- o Testing will continue to completion in FY 1985 with Operational Evaluation.

(U) Project W1150, Communications Integration: This project integrates a new communications system into the P-3C weapon system with an initial operating capability of . The new system will improve P-3C secure Ultra High Frequency and High Frequency voice communications, incorporate a satellite communications capability and provisions for the Joint Tactical Information Distribution System. The fully integrated system will lower operator workload and off-load the aircraft central computer while increasing reliability and maintainability of the entire communications system. The system will also provide rapid communications for HARPOON targeting.

(U) In FY 1982, system hardware/software development commenced at the contractor's facility.

(U) In FY 1983, program consists of:

- o Continuing hardware/software development.
- o Initiating systems integration.

(U) In FY 1984, it is planned to:

- o Complete hardware design and development.
- o Complete software development.

Program Element: 64221N

Title: P-3 Modernization Program

- o Conduct reliability testing.
- o Complete system integration and install prototype in a flying testbed aircraft.
- o Initiate Navy technical testing.
- o Testing will continue to completion in FY 1985 with Operational Evaluation.

(U) Project W152, Advanced Signal Processor Modification: Prior to FY 1983 this project integrated an improved acoustic suite into P-3C Update series aircraft. The P-3C Update III (in production in FY 1983) incorporates a Single Advanced Signal Processor (dual display, single analyzer unit of the Advanced Signal Processor), ancillary receiver and antenna systems and provides aircraft design provisions for implementation of Air Common Acoustic Processing software capabilities. This system design is suitable for retrofit in earlier P-3 aircraft. Beginning in FY 1983, this project implements Air Common Acoustic Processing in the Single Advanced Signal Processor acoustic suite. Air Common Acoustic Processing software will provide an expanded acoustic capability to include increased sonobuoy monitor, Passive Tracking Algorithm, channel sonobuoy radio frequency selection and broadband analysis capabilities. The new software will be modular in design so that future software development required to incorporate advanced sensors, now under development, will be at minimal cost. This system will substantially increase probability of target detection by providing expanded analysis and target classification to each of two acoustic sensor operators.

(U) In FY 1983, a dual display, single analyzer unit Advanced Signal Processor completed technical and operational test and evaluation. Commenced production of the P-3C Update III configuration under Limited Production Approval.

(U) The FY 1983 program consists of:

- o Verifying corrections to Operational Evaluation deficiencies in the Update III configuration.
- o Initiating platform software development required to implement Air Common Acoustic Processing capabilities.

(U) For FY 1984, it is planned to:

- o Continue integration of new software capability with the Single Advanced Signal Processor system.
- o Development and testing will continue through operational evaluation in FY 1986.

(U) Project W1656, Radar System Improvements: This project replaces the current AN/APR-115 with the AN/APR-137 radar with imaging capability to improve detection, classification and weapon targeting at Over-the-Horizon ranges. The new radar will also improve man-machine interface, operability, display/control, reliability and maintainability. The project integrates the AN/APR-137 radar being developed by the S-3 Weapons System Improvement Program into the P-3C starting in FY 1984.

(U) For FY 1984, it is planned to:

- Award a contract for AN/APR-137 prototypes modified for the P-3C.
- Commence hardware/software integration.

(U) Development and testing will continue through Operational Evaluation in FY 1987.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64225N
DoD Mission Area: 371 - Self-Protection

Title: Advanced Radar Warning
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		2,458	0	7,714	3,716	Continuing	Continuing
W0618	Tactical Airborne Radar Warning System Quantity (DT&E/OT&E)	2,458	0	7,714	3,716	Continuing	Continuing (7)

As this is a continuing program, the above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Currently, deployed radar warning receiver systems in Navy tactical aircraft provide limited signal detection and direction finding capabilities and are not responsive to changes in a dynamic threat environment due to a hardwired signal analyzer. The Advanced Radar Warning Receiver (AN/ALR-67) system will correct this deficiency by incorporating a high speed reprogrammable digital processor with crystal video receiver and a superheterodyne receiver channel to detect and provide direction finding on all signals within its operating band. The F-14, F/A-18, A-6E, EA-6B and AV-8B are planned for ALR-67 installations. The digital processor subsystem will be retrofitable into the operational ALR-45 Radar Warning Receiver system in aircraft with limited service life such as A-7, A-4, F-4, and AV-8C. Extension of frequency coverage into the L band and development of a laser intercept capability are also planned for the ALR-67. Updates and operational improvements will utilize applicable technology from the USAF ALR-74 whenever practical. The reprogrammable digital processor developed for the ALR-67 is such that it may be used to upgrade the capabilities of the ALR-45 by direct retrofit into aircraft equipped with the ALR-45.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: In FY 1982, a net increase of 2,075 was required to continue test and evaluation of the ALR-67 and the ALR-45F. In FY 1983 the project was not funded. In FY 1984 funding was restored (+7,714) to continue development of the Advanced Special Receiver, Millimeter Wave Warning extension, and laser intercept capability.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT		2,647	383	0	0	TBD	13,602*
W0618	Tactical Airborne Radar Warning System	2,647	383	0	0	TBD	13,602*

* Cost through FY 1982

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Program Element: 64225N

Title: Advanced Radar Warning

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
Aircraft Procurement, Navy						
AN/ALR-67		24,900	64,800		389,700	474,400
Quantity		(1)	(95)		(535)	(631)
AN/ALR-45F	16,992	11,083	15,049		14,736	113,862
Quantity	(82)	(69)	(104)		(442)	(697)

F. (U) RELATED ACTIVITIES: The ALR-67 Advanced Radar Warning Receiver and the ALR-45F/APR-43 Radar Warning Receiver/Direction Finding combination provide signal hand-off to the High Speed Anti-Radiation Missile (AGM-88) during the missile's "self protect" mode. The ALR-67 is designed to integrate with the Airborne Self-Protection Jammer (ALQ-165) being developed in Program Element 64226N. The ALR-45F and APR-43 Radar Warning Receivers, the ALQ-126A/B and ALQ-162 Countermeasure Sets, and the ALE-39 Countermeasures dispenser, constitute the upgraded electronic warfare suite that will be retrofitted into aircraft not employing the ALR-67 Advanced Radar Warning Receiver and ALQ-165 Airborne Self-Protection Jammer. The ALQ-126A/B and AN/ALQ-162 Countermeasure Sets are being developed and modified in Program Element 64224N, Adaptive Electronic Countermeasures.

G. (U) WORK PERFORMED BY: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: Applied Technology Division, ITEK Corporation, Sunnyvale, CA.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W0618, Tactical Airborne Radar Warning System: This project funds development and evaluation of the AN/ALR-67 and ALR-45F (retrofit) radar warning receivers. It is intended to extend frequency band of ALR-67 into the [] and [] and to upgrade the signal density capability to the expected 1990 threat capabilities.

(U) In FY 1982, full scale development was continued. [] Advanced Design Model evaluation occurred.

(U) In FY 1983, the project was not funded.

(U) For FY 1984, it is planned to:

o Initiate ALR-67 improvement program to increase the signal handling capability in a dense pulse environment by incorporation of Instantaneous Fourier Transformation technology in the Airborne Special Receiver. Effort coordinated with USAF upgrades to AN/ALR-74.

o Initiate full scale development of [] warning receiver and [] receiver.

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

I. (U) PROJECT OVER \$10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64226N
DoD Mission Area: 371 - Self-Protection

Title: Advanced Self-Protection Systems
Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING) (Dollars in Thousands)

Project No	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	23,665	29,316	47,366	29,911	Continuing	Continuing
W0619	Airborne Self-Protection Jammer Common Development	7,724	7,215	12,774	5,058	Continuing	Continuing
W1481	Airborne Self-Protection Jammer Support Equipment and Technology	7,777	2,624	8,222	6,358	Continuing	Continuing
W1482	Airborne Self-Protection Jammer Aircraft Integration	8,164	19,477	21,336	17,508	Continuing	Continuing
W1728	Airborne Self-Protection Jammer Improvements	-	-	5,074	977	Continuing	Continuing
	Quantity (Development Test and Evaluation/Operational Test and Evaluation)						16 ASPJ/BCPMS*

* 16 Airborne Self-Protection Jammers and 8 Comprehensive Power Management Systems (funded by Navy and Air Force)

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Airborne Self-Protection Jammer, designated AN/ALQ-165, is a joint Navy and Air Force program to develop a defensive electromagnetic countermeasure system for self-protection of tactical aircraft (F-14, F/A-18, A-6E, EA-68, AV-8B, and United States Air Force F-16) to increase their probability of mission success and survivability when confronted by modern diversified radar-controlled weapons systems. The resulting system is to be flexible and compatible with integrated system concepts and capable of installation in existing aircraft. The program also includes development of support equipment, alternate technology, aircraft integration, and Airborne Self-Protection Jammer Improvements. An Air Force Comprehensive Power Management System for the ALQ-131 pod is included in this development.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: The FY 1982 program was restructured to reflect the manner in which funding was actually expended, i.e., 5,434 from Aircraft Integration, 1,600 to Common Development and 3,834 to Support Equipment. This was done to accommodate material lead times for spares and support equipment which will be used in test and evaluation. A net decrease of 15 in FY 1983 occurred as the result of minor adjustments: In FY 1984, total funding for the program increased by 32,298. Of this total, 7,210 was added to Common Development to fund the Navy's share of the cost of additional modules which permit the Airborne Self-Protection Jammer to respond to the latest threat assessment. For Support Equipment, 5,443 was added to cover the cost of deferred and rescheduled Operational Test and Evaluation requirements. Aircraft Integration reflects an increase of 14,571 which includes increases for additional Test and Evaluation aircraft (one F-18 and the newly added AV-8B), the replacement of in-house integration estimates with those contained in contractor proposals and a change in scope resulting from the need to add additional aircraft cooling capability in order to improve reliability. A new project, Airborne Self-Protection Jammer Improvements (W1728), was added to the program in FY 1984. FY 1984 funding of 5,074 is added in this project to keep the Airborne Self-Protection Jammer abreast of advances in Electronic Warfare technology.

Program Element: 64226N

Title: Advanced Self-Protection Systems

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY:

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
TOTAL FOR PROGRAM ELEMENT							
W0619	Airborne Self-Protection Jammer Common Development	28,137	23,665	29,331	15,068	Continuing	Continuing
W1481	Airborne Self-Protection Jammer Support Equipment and Technology	16,149	6,124	7,230	5,524	Continuing	Continuing
W1482	Airborne Self-Protection Jammer Aircraft Integration Quantity (Development Test and Evaluation/Operational Test and Evaluation)	9,050	3,943	2,524	2,779	Continuing	Continuing
		2,938	13,598	19,477	6,765	2,633	45,411 (16ASPJ/8CPMS)*

* 16 Airborne Self-Protection Jammers and 8 Comprehensive Power Management Systems

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: To be determined.

F. (U) RELATED ACTIVITIES: The advanced development model phase of this project was funded under Airborne Electronic Warfare Equipment, Program Element 63206N. Funding for the Air Force Comprehensive Power Management System and the AN/ALQ-131 Pod is included in Program Element 64737F which also provides support for system development and for component and subsystem risk reduction efforts related to the ALQ-165. The ALR-67 Radar Warning Receiver; funded under Advanced Radar Warning, Program Element 64225N, is being interfaced with the ALQ-165.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Air Test Center, Patuxent River, MD; Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, China Lake, CA; Aeronautical Systems Division, Wright-Patterson Air Force Base, Dayton, OH; Warner-Robins Air Logistics Center, Warner-Robins, GA. CONTRACTORS: Prime contractor is Joint Venture of ITT, Avionics Division, Nutley, NJ; and Westinghouse, Baltimore, MD; Joint Venture Headquarters is Nutley, NJ; Grumman Aerospace Corp., Bethpage, Long Island, NY; McDonnell Douglas Corp., Saint Louis, MO; General Dynamics Corp., Fort Worth, TX. Six other contractors in various geographical areas support this program.

H. (U) PROJECTS LESS THAN \$10 MILLION IN FY 1984:

(U) Project W1481, Airborne Self-Protection Jammer Support Equipment and Technology:
This project provides technology to support Airborne Self-Protection Jammer development, intermediate level support equipment called the Advanced Electronic Warfare Test Set, and the procurement and modification of government-furnished equipment for integration into the aircraft.

(U) In FY 1982, one engineering development model and three system test models of the Advanced Electronic Warfare Test Set were delivered. Work commenced on the integration of the Airborne Self-Protection Jammer with the Tactical Air Navigation used in the F/A-18 and with the ALR-67 Radar Warning Receiver.

(U) The FY 1983 program consists of:

- o Updating the Advanced Electronic Warfare Test Set to the latest configuration of the Airborne Self-Protection Jammer.
- o Continuous integration of Airborne Self-Protection Jammer with the Tactical Air Navigation used in F/A-18 and with the ALR-67 Radar Warning Receiver.
- o Test and insure compatibility of software and other interfaces.

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Title: Advanced Self-Protection Systems

(U) For FY 1984, it is planned to:

- o Commence development of the Test Program Sets used with the Advanced Electronic Warfare Test Set and the Airborne Self-Protection Jammer.
- o Complete integration of the Airborne Self-Protection Jammer with the F/A-18 Tactical Air Navigation and with the ALR-67 Radar Warning Receiver.
- o The increase from FY 1983 to FY 1984 is to cover the cost of deferred and rescheduled Operational Test and Evaluation requirements.

(U) This is a continuing program.

(U) Project W1728, Airborne Self-Protection Jammer Improvements: This project provides for the insertion of the latest technology into the Airborne Self-Protection Jammer in order to keep it abreast of the constantly changing electronic warfare threats. Proposed areas for technology insertion include: countermeasures, high speed processor, new countermeasure technique, high speed switches, antenna improvements and

(U) No funds were provided for this project in FY 1982 or FY 1983.

(U) For FY 1984, it is planned to:

- o Start work in providing an operational reprogrammable capability for the Airborne Self-Protection Jammer.
- o Work will commence on an electronic countermeasures technique now used by large aircraft against specific threat types.
- o Efforts will concentrate on the development of smaller antennas for use on tactical aircraft.
- o Work will begin on the development of high speed, reprogrammable digital memories to the military standard configuration.

(U) This is a continuing program.

I. (U) PROJECT OVER \$10 MILLION IN FY 1984.

(U) Project W1482, Airborne Self-Protection Jammer Aircraft Integration:

1. (U) DESCRIPTION (Requirement and Project): This project supports the integration of the Airborne Self-Protection Jammer (AN/ALQ-165) with the Navy tactical aircraft (F-14, F/A-18, A-6E, EA-6B, AV-8B).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Pre-prototype engineering efforts for installation of the Airborne Self-Protection Jammer in the F/A-18 and F-14 were commenced.

b. (U) FY 1983 Program: Complete prototype engineering efforts, installation and check out of the Airborne Self-Protection Jammer in the F/A-18. Continue engineering design and pre-prototype activities for the A-6E, EA-6B and AV-8B.

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Title: Advanced Self-Protection System

c. (U) FY 1984 Planned Program: Complete Development Test and Evaluation and commence Operational Test and Evaluation of the Airborne Self-Protection Jammer in the F/A-18. Complete prototype engineering and installation of the Airborne Self-Protection Jammer in the F-14. Commence prototype engineering in the A-6E and AV-8B.

d. (U) Program to Completion: Complete installation, check-out and Follow On Test and Evaluation of the Airborne Self-Protection Jammer in the F-14, A-6E, and AV-8B.

e. (U) Milestones

MILESTONE

1. Associate Contractor Agreement
2. Complete Design Specifications, F-14, F/A-18
3. Commence Prototype Installation, F-14, F/A-18
4. Complete Prototype Installations in F/A-18

DATE

June 1980
August 1981
(June 82)* April 1982
October 1983

* Date listed in FY 1983 Program Element Descriptive Summary. Applicable to F/A-18 only; the schedule for F-14 is currently under review.

(U) Project W0619, Airborne Self-Protection Jammer Common Development:

1. (U) DESCRIPTION (Requirement and Project): This project funds the Navy's share of the joint Navy/Air Force common development of the Airborne Self Protection Jammer. This development is required to increase Navy and Air Force tactical aircraft survivability and to provide or enhance probability of mission success. It will provide advanced capabilities for countering present and projected threats with new electronic countermeasure techniques and capabilities not available in today's Defensive Electronic Countermeasures.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Critical design reviews were held. Fabrication and assembly of engineering development models commenced. Integration and installation work continued. An OSD Review was held in January 1982 which approved the continuation of full scale development and encouraged expeditious fielding of the Airborne Self-Protection Jammer.

b. (U) FY 1983 Program: Continue fabrication, assembly, integration and deliveries of the development models. Test, analyze and fix program will begin.

c. (U) FY 1984 Planned Program: Development models will be delivered. Complete the test, analyze and fix program. Complete development, test and evaluation. The increase in funding from FY 1983 to 1984 is to fund the Navy's share of the cost of additional modules which permit the Airborne Self-Protection Jammer to respond to the latest threat assessment.

d. (U) Program to Completion: Complete developmental and operational testing. Obtain approval for service use of the ALQ-165 in the F-14, A-6E, EA-6B, and AV-8C aircraft. Acquire approval for full production.

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e. (U) Milestones

MILESTONE	DATE
1. Phase I Full Scale Development Decision for the Advanced Self Protection Jammer	August 1979
2. Advanced Self Protection Jammer Fabrication and Assembly Contract Award	August 1981
3. Complete installation design specifications for the F-14 and F-18	August 1981
4. Deliver development model of Advanced Electronic Warfare Test Set for Testing	November 1981
5. First Advanced Self Protection Jammer (ASPJ) Engineering Development Model Delivery (February 1983)*	August 1983
6. Advanced Self Protection Jammer Reliability/Qualification Tests Complete (September 1983)*	March 1984
7. Advanced Self Protection Jammer in F-18 Technical Evaluations Complete (July 1984)*	January 1985
8. Advanced Self Protection Approval for Service Use (August 1984)*	February 1985
9. Advanced Self Protection Jammer Serial Production Decision (October 1984)*	April 1985

*Dates in parens are milestone dates shown in FY 1983 Descriptive Summary. Six month delay in milestones is due to technical problems requiring redesign of developmental model components.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: The Airborne Self-Protection Jammer will provide advanced capabilities for countering current and projected threats with Electronic Countermeasures techniques not adequately addressed by existing Defensive Electronic Countermeasures systems:

The Airborne Self-Protection Jammer incorporates both a flexible, software reprogrammable system that is compatible with integrated system concepts and capable of installation in existing aircraft. Air Force participation in the program includes use of the Airborne Self-Protection Jammer in the F-16 (possibly other aircraft) and development of a Comprehensive Power Management System (essentially the Receiver Processor modules being developed for Airborne Self-Protection Jammer). The Comprehensive Power Management System will be used to update Air Force ALQ-131 electronic countermeasure pod systems. Following Defense Systems Acquisition Review Council approval in 1979, two contractor teams competed in Phase I (design and critical item demonstration) of Full Scale Development. On 27 August 1981, the team of ITT/Westinghouse was awarded the contract and commenced Phase II, Engineering Development Model fabrication and assembly. The Engineering Development Models will be procured; three will be reworked to Prototype Models. Six Prototype Models, representative of production units, will be procured. This is a Joint Navy/Air Force program; Navy is Executive Service. The Navy Program Manager has an Air Force Assistant. An Advanced Development Model assembled by the Naval Research Laboratory underwent integration and concept testing in 1975-76. These tests demonstrate the feasibility of the dual-mode power amplifiers, software reprogrammability and Radar Warning Receiver interface operations. Further testing at the Pacific Missile Test Center Tactical Environment Simulator, the Naval Weapons Center Electronic Warfare Test Site, and technique testing at the Air Force Electronic Warfare Evaluation Simulator demonstrated the system concept and techniques effectiveness against specific threat systems. Further testing will consist of contractor conducted testing starting FY 1983 to demonstrate environmental qualifications, reliability, maintainability and electromagnetic compatibility. These tests will be conducted in both the Engineering Development and Prototype Models. Laboratory testing by the Navy and Air Force, starting later in FY 1983 and using Navy and Air Force personnel, will stress system performance against particular threat simulations. Starting in FY 1984, ground flight testing, using prototype models, will include measurements of technical characteristics, installation and interface evaluations and operational effectiveness criteria in the F-18. Air Force testing in the F-16 and the ALQ-131 pod will parallel

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the Navy Technical Evaluation. Testing in the F-14, A-6E, EA-6B, and AV-8B will be conducted as Follow On Test and Evaluation. Test facilities include the Tactical Environmental Simulation at Point Mugu, CA; the Electronic Warfare Threat Environment Simulation at China Lake, CA; Air Force Electronic Warfare Evaluation Simulation at Fort Worth, TX; and the Acquisition Division Test Range at Eglin Air Force Base, FL; and Electronic Warfare Integrated Systems Test Laboratory at Naval Air Test Center, Patuxent River, MD. Development testing will be conducted under the auspices of the Project Manager, FMA-272, Naval Air Systems Command, assisted by Naval Air Test Center and Pacific Missile Test Center. Operational Test and Evaluation Force will monitor development testing in order to eliminate redundancies.

2. (U) Operational Test and Evaluation. Commander, Operational Test and Evaluation Force, and Air Force Test and Evaluation Center independently reviewed tests on the Advanced Development Model, March 1977 - August 1978, which paved the way for commencement of Full Scale Development. They will monitor contractor and government development testing. Initial Operational Test and Evaluation will consist of an independent evaluation by Operational Test and Evaluation Force of combined development/operational testing of the Phase II Engineering Development and Prototype Models. This evaluation, conducted by service personnel, will make preliminary assessments of the human factors, to ensure that service personnel can operate the system efficiently, and of operational suitability and effectiveness. After the completion of the Technical Evaluation, an Operational Evaluation will be conducted in FY 1984 by Navy test squadrons under the direction of Commander, Operational Test and Evaluation Force, using prototype models in the F-18 that are representative of production units. The objectives of the Operational Test and Evaluation are to demonstrate operational effectiveness and suitability, demonstrate interfaces with the warning receivers, continue tactics development, and to demonstrate achievement of the reliability/maintainability thresholds in paragraph 3 below. Completion of the Operational Evaluation will provide the basis for a recommendation by Commander, Operational Test and Evaluation Force, regarding Approval for Full Production in the F-18 at Milestone IIIA which is expected in early FY 1986. F-14, A-6E, EA-6B and AV-8B testing will be carried out as Follow on Test and Evaluation. Development of the Airborne Self-Protection Jammer is a Joint Navy/Air Force program. The Navy is Executive Service; the Navy Program Manager has an Air Force Assistant and an Air Force Deputy for Test and Evaluation. A Joint Test and Evaluation Master Plan has been approved by the Office of the Secretary of Defense. Test facilities include the Tactical Environment Simulation at Point Mugu, CA; the Electronic Warfare Threat Environment Simulation at Point Mugu, CA; the Electronic Warfare Threat Environment Simulation at China Lake, CA; the Air Force Electronic Warfare Evaluation Simulation at Fort Worth, TX; and the Acquisition Test Range at Eglin Air Force Base, FL.

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3. (U) System Characteristics

a. (U) The following items are to be demonstrated by the developing agency/contractor.

<u>Performance</u>	<u>Threshold (Variances)</u>
Frequency Coverage (GHz)	
Threat capacity, simultaneous emitters	
Pulse density (pps)	
Output Peak Power	
Output Continuous Wave Power	
Pulse Density Cycle	
Response Time (seconds)	
Operational Availability	92%
Mission Reliability	95%
Maintenance Demand/Mean Flight-Hours Between Maintenance Action (hours)	6.8
DI :t Maintenance Man-hours/Maintenance Action (hours)	2.18
ics Demand/Mean Flight Hours Between Repair (hours)	17.0

b. (U) The Engineering Development Models have not yet been fabricated and neither development nor Operational Testing has commenced.

4. (U) Program Documentation

a. (U) Testing has not yet commenced so no test reports are available.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64227M Title: HARPOON Modifications
 DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface Warfare Budget Activity: 4 - Tactical Programs

A. (U) FY 1984 RESOURCES (PROJECT LISTING): (Dollars in Thousands)

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	0	0	0	0	0	0
W1644	HARPOON Modifications	0	0	0	0	0	0

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program was to support necessary improvements to HARPOON which are not common with the TOMAHAWK.

C. (U) EXPLANATION OF CANCELLATION OR DEFEER: The Navy has terminated this program as a result of constraints in development of the FY 1984 program.

417-418B