DEPARTMENT OF THE NAVY
SUPPORTING DATA FOR FISCAL YEAR 1984
BUDGET ESTIMATES

SUBMITTED TO CONGRESS JANUARY 1983

RESEARCH, DEVELOPMENT, TEST AND EVALUATION,NAVY

BOOK 3 OF 3 BOOKS

TACTICAL PROGRAMS
INTELL,& COMMUNICATIONS
MANAGEMENT & SUPPORT

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A128 123
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) Department of the Navy Supporting Data for FY1984 Budget Estimates Descriptive Summaries Book 3 of 3 Tactical Programs, Intell & Comm, Mgmt Support	5. TYPE OF REPORT & PERIOD COVERED Final FY 1984
	6. PERFORMING ORG. REPORT NUMBER —
7. AUTHOR(s) —	8. CONTRACT OR GRANT NUMBER(s) —
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of the Navy Office of the Comptroller NCB-2 Pentagon Rm 4C640 Washington DC 20350	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS —
11. CONTROLLING OFFICE NAME AND ADDRESS Same as 9	12. REPORT DATE January 1983
	13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Same as 9	15. SECURITY CLASS. (of this report) Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE —

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

Approved for Public Release, Distribution Unlimited

18. SUPPLEMENTARY NOTES

—

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Descriptive Summaries
FEDS
Research, Development Test + Evaluation
RDT+E
Tactical Programs
Intell + Comm
Management + Support

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

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DEPARTMENT OF DEFENSE, MILITARY

RDT&E, NAVY

CONTENTS

SECTION I - DESCRIPTIVE SUMMARIES

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

CONTENTS

SECTION II

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64228N
DoD Mission Area: 232 - Amphibious, Strike, Antisurface Warfare
Title: SH-60 Carrier Variant
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	19,711	*	*	*
W1629	SH-60 Carrier Variant	0	0	19,711	*	*	*
	Quantities			(T&E)			(2)

*Funded in P.E. 64229N, ASW Improvements in FY 1985 and subsequent years.

The above funding profile includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1984.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: SH-60 Carrier Variant will provide carrier battle groups with inner zone Anti-Submarine Warfare protection [redacted] using manned helicopters equipped with dipping sonar. Secondary missions will include search and rescue, logistics support, medical evacuation and aircraft plane guard. The SH-60 Carrier Variant is a derivative of the Light Airborne Multi-Purpose System MK III aircraft (SH-60B) and is a replacement for existing carrier Anti-Submarine Warfare helicopters (SH-3H).

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 Congressional reduction of 9,868 (to zero) in FY 1983 delaying the start of the program one year; and Navy adjustment in program scope and rephasing for the delayed start reducing the FY 1984 funding request by 23,643. FY 1985 and outyear funding is now included in P.E. 64229N, ASW Improvements.

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	9,868	43,354	34,435	87,657
W1629	SH-60 Carrier Variant	0	0	9,868	43,354	34,435	87,657

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

F. (U) RELATED ACTIVITIES: Program Element 64206A, UH-60A Black Hawk (Utility Tactical Aircraft System), a derivative of which has been selected for the Light Airborne Multi-Purpose System MK III airframe. Program Element 64753F, HH-60D Night Hawk (combat rescue/special operations helicopter), a derivative of the Army Black Hawk and the Navy Light Airborne Multi-Purpose System MK III airframe and engine development. Program Element 64212N, SH-60B Seahawk (Light Airborne Multi-Purpose System MK III), the parent aircraft of the SH-60 Carrier Variant.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA (Lead Laboratory); Naval Air Test Center, Patuxent River, MD; Naval Weapons Engineering Support Activity, Washington, DC; Naval Air Engineering Center, Lakehurst, NJ; Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Sikorsky Aircraft Division, Stratford, CT (Air Vehicle); General Electric, Lynn, MA (Engine); Bendix Oceanics, Sylmar, CA (Dipping Sonar); system integrator to be determined.

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

UE

Program Element: 64228N Title: SH-60 Carrier Variant

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

(U) Project W1629, SH-60 Carrier Variant

1. (U) DESCRIPTION (Requirement and Project): The SH-60 Carrier Variant, a derivative of the Light Airborne Multi-Purpose System MK III aircraft (SH-60B) is a replacement for existing Anti-Submarine Warfare helicopters (SH-3H). Its avionics suite will consist of developed equipment from the Light Airborne Multi-Purpose System MK III program and improved existing equipment from the SH-3H program. This program will be accomplished by taking advantage of the SH-60B development; two prototype SH-60B aircraft assets will be available for reconfiguration, test and evaluation. Contracts will be signed with the major contractors (system integrator, airframe, and engine) to develop the configuration and test the weapon system. Acceptance by similarity with previously tested identical systems will be formulated to reduce the development costs. Acquisition risk will be minimal because of experience obtained from the SH-60B program. The total planned production program is [redacted] aircraft.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Alternative Design Trade Study of the SH-60B was initiated to investigate the configuration feasibility, mission effectiveness, and scheduling alternatives to develop life cycle costs and determine the cost effectiveness of various avionics configurations for the SH-60 Carrier Variant.

b. (U) FY 1983 Program: The trade study will be completed leading to specification definition and program documentation.

c. (U) FY 1984 Planned Program: Commence SH-60F full scale development. Complete specification definition. Initiate detailed design and mockup the structural and avionics configuration. Design modifications to SH-60B to include core and mission avionics packages with associated software for integration of the AQS-13F dipping sonar. Commence planning and training for Navy test and evaluation, Integrated Logistics Support for development and production, and long lead production. Initiate fabrication of prototype modifications.

d. (U) Program to Completion: Complete design and fabrication of two prototypes. Fabricate the bench facility to support the avionics system integration demonstration. Flight test the modified aircraft, conduct navy preliminary evaluation and operational evaluation aboard a fleet carrier, award production contracts and commence deliveries of production aircraft. This development effort will be continued in FY 1985 in Program Element 64229N, ASW Improvements.

e. (U) Milestones

	MILESTONE	DATE	
1.	(U) Award Design Contract	(October 1982)	February 1984
2.	(U) First Flight of SH-60 Carrier Variant-Modified SH-60B	(November 1984)*	July 1985
3.	(U) Award Advanced Acquisition Contract for Limited Production		April 1986
4.	(U) Complete Initial Operational Test and Evaluation		September 1986
5.	(U) Award Limited Production Contracts	(October 1985)*	January 1987
6.	(U) Complete Navy Preliminary Evaluation	(August 1985)*	July 1987
7.	(U) Complete Navy Operational Evaluation	(June 1986)*	September 1987
8.	(U) Avionics System Integration Demonstration	(March 1984)*	November 1987
9.	(U) Award Production Contract	(August 1986)*	April 1988
10.	(U) First Production Aircraft System Delivery	(January 1988)*	October 1988
11.	(C) Initial Operating Capability		

* Indicates Milestones displayed in FY 1983 Descriptive Summary. Slip results from delayed program start and restructure.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64252N
DoD Mission Area: 235 - Naval Warfare Support
Title: Aircraft Propulsion (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	T E C
	TOTAL FOR PROGRAM ELEMENT	0	0	9,758	19,522	20,000	
W1731	T56/M71 Engine Improvement Program	0	0	9,758	19,522	20,000	

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

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The main purpose of this program is to increase the power and pot reduce the fuel consumption of the T56 series engine. These improvements will increase the performance and margin of sa takeoff for the E-2/C-2. The P-3 and C-130 aircraft could also benefit from the program.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: Not applicable. This is a new start.

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

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: To be determined.

F. (U) RELATED ACTIVITIES: Aircraft Engine Component Improvement Program, Program Element 64269N; the T56/M71D Improvement Program carries out work which is beyond the scope of the Component Improvement Program. Naval Sea Systems Energy Conservation Program, Program Element 63724N and Naval Sea Systems Command DDG-51 Propulsion, Program Element development work for these two programs have results applicable to the T56/M71D combustor and turbine design. United St Force T56-A-100 Engine Model Derivative Program, Program Element 64218F; funding for this program ended in FY 1982. Re the United States Air Force program have direct application to the design of the T56/M71D.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Propulsion Center, Trenton, NJ. OTHERS: Na Development Center, Warminster, PA; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: Detroit Diesel Allison, India IN.

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

(U) Project W1731, T56/M71 Engine Improvement Program (NEW START): The E-2C aircraft is now operating under a sig operational limitation. At temperatures greater than 70°F some reduction in gross weight is required in order to sustai engine rates of climb of 100 feet per minute. For the near term, the approved water injection MOD T56-A-425A will allev ongoing safety problem; however, it does not solve the problem of future growth. Presently planned airframe and improvements will culminate in an aircraft that weighs approximately 54,000 pounds by 1990 (present weight 52,500 pounds) will occur in spite of strict configuration management and incorporation of only the most essential improvements such as e radar range. This aircraft will be unable to sustain single engine flight powered by the present engine or the -42 addition to the safe operation of the E-2C at increased gross weights, the requirement exists to maintain current endura altitude profiles. A decrease in specific fuel consumption, and, to sustain altitude, more power throughout the E-2C's profile is needed. The improved T56/M71 satisfies present and future E-2C requirements for performance, fuel econo altitude capability.

Program Element: 64252N Title: Aircraft Propulsion (Engineering)

FY 1984 will be the first year of funding for this element. The major objective will be the start of full scale engineering and developmental testing to meet a high production rate release date of October 1987. This will be preceeded by the initial fabrication of the T56/M71 engine configuration. Testing goals for FY 1984 include 175 hours of component testing and initiation of 300 hours of durability testing. Initiate procurement of long lead time components to support developmental testing and future production.

For Program to Completion the following will occur: Testing, including flight testing, will be performed throughout the life of the project. High production rate release is scheduled in October 1987. This development project is scheduled for completion in FY 1987. Continued support for the T56/M71 after FY 1987 will be funded under the Engine Component Improvement Program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64255N Title: Air Electronic Warfare
DoD Mission Area: 374 - Multimission, Technology, and 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	11,360	11,679	17,214	11,761	Continuing	Continuing
W0539	Foreign Material Exploitation, Tactical Air	1,966	1,954	1,487	993	Continuing	Continuing
W0602	Electronic Warfare Environmental Simulation	9,394	9,725	9,873	10,768	Continuing	Continuing
W1778	Closed Loop Test Capability	-	-	5,854	TBD	Continuing	Continuing

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: This program provides for the analysis of foreign technology and trends from all intelligence sources, including foreign material exploitation. It provides for the design, fabrication and integration of threat radar simulators at the Electronic Warfare Threat Environment Simulation (EWTES) complex at Naval Weapons Center, China Lake, CA. It also provides for a closed loop radar simulation capability to be used to determine effectiveness of Electronic Countermeasures Equipment installed in host 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 the result of downward economic and budgetary adjustments. Foreign Material Exploitation, Tactical Air decreased 10 in FY 1982, 315 in FY 1983, and 913 in FY 1984. Electronic Warfare Environmental Simulation decreased 320 in FY 1982, 1,400 in FY 1983 and 4,658 in FY 1984 as a result of budget constrants A resultant reduction in scope of effort also occurred. FY 1984 is first year of funding for the Closed Loop Test Capability Project (+5,854).

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

Project No.	Title	FY 1931 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	10,206	11,690	13,394	16,931	Continuing	Continuing
W0539	Foreign Material Exploitation, Tactical Air	1,577	1,976	2,269	2,400	Continuing	Continuing
W0602	Electronic Warfare Environmental Simulation	8,629	9,714	11,125	14,531	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Virtually all tactical aircraft from all the services that are equipped with Electronic Countermeasures equipment or with Electronic Support Measures (ESM) equipment will use the facilities supported by this program. Related efforts with United States Air Force and United States Army are coordinated through the OSD sponsored, Tri-Service CROSSBOW-S Committee, the Joint Coordinating Committee on Electronic Defense Systems and through the mutual use of facilities.

G. (U) WORK PERFORMED BY: IN-HOUSE: The lead laboratory for Foreign Material Exploitation, Tactical Air and Electronic Warfare Environmental Simulation is the Naval Weapons Center, China Lake, CA. The lead laboratory for the Closed Loop Test Capability is the Naval Air Test Center, Patuxent River, MD. OTHERS: Pacific Missile Test Center, Point Mugu, CA. CONTRACTORS: SRI International, Menlo Park, CA; RCA, Moorestown, NJ; Electronic Warfare Associates, Ridgecrest, CA; General Dynamics, Pomona, CA;

Program Element: 64255N Title: Air Electronic Warfare

EG&G, Ridgecrest, CA; REL, Inc., Boynton Beach, FL; Scientific Atlanta, Atlanta, GA; Hughes, Fullerton, CA; Georgia Institute of Technology, Atlanta, GA; General Dynamics, Fort Worth, TX.

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

(U) Project WO539, Foreign Material Exploitation, Tactical Air: The project provides for the analysis of foreign technology and trends from all intelligence sources, including foreign material exploitation, and to establish a technology application data base for the purpose of forecasting future hardware designs. The basis for this is a discernable time-application relationship between foreign technology and military hardware development. Use of this information significantly reduces the effort required to define the threat designs and concentrates the limited available analysis effort to the areas of highest uncertainty. This reduces the time-delay between foreign threat initial operational capability and United States electronic warfare equipment/simulator development.

(U) In FY 1982, completed [ ]radar assessment document which was approved by Navy Intelligence Support Center and approved and distributed by Defense Intelligence Agency. Completed first draft of [ ] radar model parameters and performance characteristics. Document is currently under review by Naval Intelligence Support Center and final approval by Defense Intelligence Agency is expected by March 1983. Exploitation plans and preparations for [ ] have been completed.

(U) The FY 1983 program consists of:

- o Completion of [ ]assessment.
- o Completion of [ ]
- o Update of [ ]assessment.
- o Completion of exploitation plans for other exploitation projects.
- o Participation in other exploitation efforts.

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

- o Continue refining and updating radar assessments.
- o Participate in exploitation efforts whenever available.

(U) Project W1778, Closed Loop Test Capability: (NEW START) This project provides for installation of functional emulators of hostile weapons systems in the Electronic Warfare Integrated Systems Test Laboratory at Patuxent River, MD. This is an anechoic chamber large enough for tactical aircraft and will allow the determination of total weapons systems performance in a tightly controlled scenario. Mutual interference between the electronic countermeasures and electronic support measures system in the aircraft and other aircraft weapon systems can be readily determined; any degradations, as the result of integration, will be known. The existing signal generation and data collection/analyses capabilities in the laboratory will be used to supplement the new functions by providing a multiple environment and analysis capability for determining electronic countermeasures/electronic support measures performance and analyses of multiplex data bus interfaces between subsystems. Closed loop emulators will permit reductions in flight hours and permit greater security for developing and testing sensitive jamming techniques/equipment.

Program Element: 64255N Title: Air Electronic Warfare

(U) FY 1984 is the first year of funding these emulators. It is planned to investigate/establish a plan to identify critical closed loop simulators and develop a vertical test concept to ensure continuity of results between lab tests (on the countermeasures equipment alone), installed in aircraft (in the anechoic chamber), and actual flight test.

(U) Project W0602, Electronic Warfare Environmental Simulation : Enemy radar/missile surface-to-air defense systems have exacted a high cost to the United States in aircraft and pilots. This program's purpose is the development of Electronic Warfare Environment Simulators to replicate enemy threat characteristics and operational parameters and thereby enhance mission success by enabling aircrews to visualize and experience the threat prior to combat exposure. The simulations will provide a realistic enemy surface-to-air (sea and land) environment of electronic weapons and weapon guidance systems to test, evaluate and develop tactics for US airborne electronic countermeasures systems and devices. Prototype equipment and proposed system changes will also be evaluated for effectiveness.

In FY 1982, [ ] radar replica completed development and range integration. [ ] emitter-simulator completed development and started range integration. Initial development planning for semi-active test system [ ] radar was initiated. Major update to [ ] radar replica was initiated. Continued support for electronic warfare tactics development. Continued [ ] support.

The FY 1983 program consists of: [ ] emitter-simulator to complete range integration and become operational. [ ] radar replica to become operational. Continue with major update to [ ] radar replica. Complete initial development planning for semi-active test system [ ] radar. Initiate hardware development for semi-active test system. Continue support for electronic warfare tactics development. Continue [ ] support.

For FY 1984, it is planned to continue: Complete major update to [ ] radar replica. Majority of project effort will be in developing the semi-active test system [ ] radar. A partial capability will be available in FY 1985, with full capability by FY 1987. Continue [ ] support.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64260N
Title: CH/MH-53E
DoD Mission Area: 234 - Mine 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	11,141	11,119	32,880	14,738	5,767	93,892
W1109	CH/MH-53	11,141	11,119	32,880	14,738	5,767	93,892
	(Quantity)	Development Prototype					(1)

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 MH-53E development was directed by the Navy to fill a major deficiency in our ability to counter the Soviet Block mine warfare capability. To combat a large Soviet mine inventory, we have three active ships and 23 Navy aircraft capable of minesweeping. Of these assets approximately half are capable of being deployed at a given time because of support limitations and other operational tasking. The total number of aircraft and ships is insufficient to clear the ports and ocean choke points necessary to keep allied shipping and naval forces at sea. The Chief of Naval Operations has determined that a minimum of 32 MH-53Es dedicated to the airborne mine countermeasures mission are required as soon as possible to correct this deficiency.

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 200 in FY 1982 due to revision of cost estimates and a decrease of 82 in 1983 due to Navy application of a general Congressional reduction.

A 24,976 increase in FY 1984 as a result of: restructuring and rescheduling of the project due to funds lost in FY 1979 through FY 1981 to Navy reprogramming (+10,176); rescoping of the program to initiate development of new aircraft tail rotor system required for airborne mine countermeasures operations (+3,000); rescoping the program to include initiation of development, qualification and test of minesweeping mission systems which includes a night operating system, an Omega Long Range Navigation system, and a tow boom and ramp required to deploy advanced minesweeping equipment (+11,800).

Increases in FY 1985 and outyears (total 20,013) are as a result of completion of the tail rotor development (+2,500); completion of the mission systems described above (+9,500); an increased scope of contractor and Navy flight test and evaluation (+4,291); and, restructuring/inflation resulting from program funds lost in FY 1979 through 1981 because of reprogramming (+3,722).

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	8,006	10,941	11,201	7,904	492	48,785
W1109	CH/MH-53	8,006	10,941	11,201	7,904	492	48,785

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: To be determined.

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent River, MD; Naval Coastal Systems Center, Panama City, FL; Operational Test and Evaluation Force, Norfolk, VA; CONTRACTORS: Sikorsky Aircraft Division of United Technologies Corporation, Stratford, CT; Hamilton Standard Division of United Technologies Corporation, Windsor Lock, CA; Goodyear Aerospace, Rockmart, GA; Ladish Corporation, Cudahy, WI; McWilliams Forge, Rockaway, NJ; ALCOA, Cleveland, OH; Zero Manufacturing, Manson, MA; Circle Field Contracts, Anaheim, CA; Aeroquip Corporation, Jacksonville, MS; Honeywell Incorporated, St. Louis Park, MN.

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

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

(U) PROJECT W1109 CH/MH-53E

1. (U) DESCRIPTION (Requirement and Project): Decision Coordinating Paper Number 94, approved in April 1978, listed airborne mine countermeasures as a mission for Navy H-53E aircraft. This project will develop, test and qualify the aircraft airborne mine countermeasures provisions required to produce an airborne mine countermeasures capable H-53E aircraft. These provisions will also enhance the aircraft's capability to perform utility and special missions by adding increased range, long range navigation and night capability. The MH-53E will have a significantly improved airborne mine countermeasures capability over the presently deployed RH-53D. It will increase tow tension capacity by 50 percent and time on station between 30 and 50 percent, depending on mission. Mission reliability will nearly double. The aircraft will be able to employ and operate all airborne mine countermeasures equipment now in fleet use and under development to the limits of their design. The existing RH-53D cannot fully employ mission systems scheduled for fleet introduction in 1987. These systems are required to counter Soviet mines now coming into their operational inventory.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS: The development program was started in September 1979 with preliminary engineering feasibility studies of the capability of the H-53E aircraft to perform in the airborne mine countermeasures environment. FY 1980 and FY 1981 completed these studies and incorporated their results into detailed specifications for the modification, qualification and test production of a prototype MH-53E.

a. (U) FY 1982 Program: Awarded an incrementally funded, cost plus award/incentive fee contract to Sikorsky Aircraft Division to accomplish the completion of prototype aircraft design and to modify, qualify and test a production MH-53E. The contract period of performance terminates in June 1985. FY 1982 also completed flight evaluation of a preproduction CH-53E operating in the airborne mine countermeasures environment. This flight evaluation confirmed engineering predictions of the aircraft performance in the minesweeping environment and validated the MH-53E production prototype design specifications.

b. (U) FY 1983 Program: October - December 1982: Commence modification of production CH-53E aircraft into MH-53E configuration. Initiate logistic support analyses of MH-53E peculiar subsystems to determine fleet support requirements. Commence qualification tests of MH-53E unique components supplied by vendors. January - September 1983: Complete modification of prototype aircraft. Qualify modified accessory gear box, environmental control system, fuel sponsons and fuel management system for flight. Certify MH-53E prototype for air worthiness and safety of flight. Incorporate development, qualification and test of tail rotor and mission systems into development contract.

c. (U) FY 1984 Planned Program: The FY 1984 program increased 21,761 over the FY 1983 program as follows: (1) Increased effort in the aircraft modification contract resulting from the prototype aircraft entering flight test and final airframe system qualification (+4,363). (2) Initiation of the following developments: Improved Tail Rotor System, MH-53E Tow Boom and minesweeping ramp, night capability system, Omega Long Range Navigation system and the MH-53E integrated logistic support program (+17,262). (3) Increased government support for Navy preliminary evaluations (+136).

(U) The FY 1984 program consists of basic MH-53E development work including: Contractor flight test of the aircraft critical limits, air worthiness and handling qualities; qualification and certification of the MH-53E digital automatic flight control computers and coupled flight control system; the airborne mine countermeasures dedicated hydraulic system; the MH-53E fuel system;

the MH-53E environmental control system; the equipment and crew safety rail system; and the MH-53E unique mission avionics. Funding is included to fabricate and qualify for flight test the improved tail rotor system required for the airborne minesweeping mission. FY 1984 efforts are included to fabricate, qualify and install the MH-53E tow boom and minesweeping ramp on the prototype aircraft , to begin system integration of the night capability system and to begin aircraft integration of the Omega Long Range Navigation System. The FY 1984 program also includes efforts to procure, test and evaluate spare parts needed to support the flight test program and to develop the logistic support required for Navy test and evaluation scheduled to begin in FY 1985.

d. (U) Program to Completion: The FY 1985 program includes completion of the development contract; specifically, contractor flight test, MH-53E aircraft system qualification, reliability/maintainability and system safety assessments of the aircraft, and contractor support of the Navy test and evaluation evolution. Also included is completion of the development of the MH-53E integrated logistic support program; completion of flight testing of the improved tail rotor system; completion of the Omega Long Range Navigation system, tow boom and ramp developments; and aircraft integration of the night capability system. Navy operational evaluation will begin in December 1984 and continue through March 1985.

Program completion includes the final Navy test and evaluation of the night capability system; flight and electromagnetic compatability and interference tests of the Omega Long Range Navigation system; final fatigue substantiation of the improved tail rotor system; and final fatigue substantiation of the tow boom system.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64261N
DoD Mission Area: 233 - Anti-Submarine Warfare
Title: Acoustic Search Sensors (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	18,121	10,769	23,648	29,878	Continuing	Continuing
W0478	Expendable, Reliable Acoustic Path Sonobuoy	6,118	4,654	3,817	5,879	9,630	62,998
	Quantities		(DT&E)	(DT&E)	(D/OT&E)	(D/OT&E)	(390)
W0480	Passive Advanced Sonobuoy	3,947	2,587	2,929	7,387	Continuing	Continuing
	Quantities		(DT&E)	(DT&E)	(D/OT&E)	(D/OT&E)	(705)
W0492	Automatic Detection/Computer Aided Classification	1,313	250	0	0	0	4,396
W0495	Dwarf Sonobuoy	698	2,136	0	0	0	8,293
	Quantities	(D/OT&E)					(304)
W1102	Passive Doppler Tracking	6,045	1,142	0	0	0	11,056
W1624	Broadband Acoustic Systems	*	*	9,838	12,775	Continuing	Continuing
	Quantities			(DT&E)	(D/OT&E)	(D/OT&E)	TBD
W1787	Air Common Acoustic Processing	0	0	7,064	3,837	Continuing	Continuing

* Broadband Acoustic Systems funded under Program Elements 63254N/W1292 and 63259N in FY 1982, and funded under Program Element 63259N/W1624 in 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 for Projects W0480, W1624, and W1787 and through completion for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides for the engineering development of acoustic search sensors to: (1) ensure a search capability against the quiet submarine threat of the 1980s and 1990s, (2) improve cost and operational effectiveness, (3) improve logistics support, (4) ensure compatibility with airborne avionics, and (5) provide common advanced sonobuoy acoustic processing software.

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: There was no change in the program total in FY 1982. However, significant within program element reprogramming reduced Project W0480 (Passive Advanced Sonobuoy) by 3,073 to align funding with current program schedule, reduced Project W0495 (Dwarf Sonobuoy) by 1,527 as a result of decreased scope, and reduced Project W0492 (Automatic Detection/Computer Aided Classification) by 93 for revision in cost estimates. Project W1102 (Passive Doppler Tracking) was increased by 3,393 to accelerate completion and for an increased software support effort and Project W0478 (Expendable Reliable Acoustic Path Sonobuoy) was increased by 1,300 to revise the contractors development test schedule. In FY 1983, the net program decrease of 3,831 is due to a 57 decrease due to Navy application of a general Congressional reduction (-37 in W0480 and -20 in W1102) and a Congressional reduction of 4,600 in Project W0478 (Expendable, Reliable Acoustic Path Sonobuoy). Since 826 had already been obligated above the amount authorized by Congress, an actual adjustment of 3,774 was made during the FY 1984 budget process. The Navy will submit a report as required by Congress documenting technical progress, deployment plan, cost effectiveness and affordability of the Expendable, Reliable Acoustic Path Sonobuoy. In FY 1984, the net increase of 18,847 is due to an increase of 9,838 for the transition of Project W1624 (Broadband Acoustic Systems) to engineering development, an increase of 7,064 for the initiation of Project W1787 (Air Common Acoustic Processing), an increase of 2,929 in Project W0480 (Passive Advanced Sonobuoy) for funding as an ongoing project for the engineering development

of advanced sensors, a decrease of 888 in Project W1102 (Passive Doppler Tracking) due to accelerated completion in FY 1983, and a decrease of 96 in Project W0478 (Expendable Reliable Acoustic Path Sonobuoy) caused by laboratory rate change and 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	19,344	18,121	14,600	4,801	Continuing	Continuing
W0478	Expendable, Reliable Acoustic Path Sonobuoy	9,828	4,818	8,428	3,913	12,284	62,363
W0479	Advanced Sonobuoy Communications Link	610	0	0	0	0	18,754
W0480	Passive Advanced Sonobuoy	2,059	7,020	2,624	TBD	TBD	TBD
W0492	Automatic Detection/Computer Aided Classification	1,444	1,406	250	0	0	4,489
W0495	Dwarf Sonobuoy	1,534	2,225	2,136	0	0	9,320
W1102	Passive Doppler Tracking	3,869	2,652	1,162	888	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 63259N, Acoustic Search Sensors (advanced development of acoustic search sensors); Program Element 62711N, Undersea Target Surveillance (low cost sonobuoy manufacturing technology); Program Element 63254N, Air Anti-Submarine Warfare; and Program Element 63708N, Advanced Acoustic Processing (detection algorithm development). Program Element 64217N, S-3 Weapon System Improvement Program, Program Element 64221N, P-3 Modernization and Program Element 64212N, Light Airborne Multi-Purpose System MK III will all employ sensors developed in this program element. Additionally, Program Element 63788N, Rapidly Deployable Surveillance System requires software developed in this program element for Advanced Signal Processor fast time processing.

G. (U) WORK PERFORMED BY: IN-HOUSE. Naval Air Development Center, Warminster, PA; Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Ocean Systems Center, San Diego, CA; and Naval Avionics Center, Indianapolis, IN; and Naval Weapons Support Center, Crane, IN. CONTRACTORS: Bunker-Ramo Corporation, Westlake Village, CA; Magnavox Corporation, Fort Wayne, IN; Hazeltine Corporation, Braintree, MA; Sanders Associates, Nashua, NH; Spartan Corporation, Jackson, MI; IBM, Owego, NY; IBM, Manassas, VA. PRINCIPAL SUBCONTRACTORS: Honeywell Corporation, Seattle, WA; Altus Corporation, San Jose, CA.

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

(U) Project W0478, Expendable, Reliable Acoustic Path Sonobuoy: The AN/SSQ-75 sonobuoy is a long range active search sensor for use by anti-submarine warfare aircraft. It is designed to utilize the long range acoustic propagation mode know as the reliable acoustic path and provides the air anti-submarine warfare forces the option to actively search for a submarine that is undetectable by passive acoustic sensors. The active detection ranges will be significantly greater than those experienced with today's active sonobuoys. The sonobuoy is deployed
The detection is gained by using a low frequency, high power transmitted pulse and a volumetric receiving array. Range, bearing and doppler are provided. To perform required tests, 75 engineering development models and 315 service test models for Navy technical evaluation/initial operational test and evaluation are required.

(U) In FY 1982, engineering development included over-the-side acoustical tests, deployment tests of receiving array, and initial overland airdrop tests. Advanced Signal Processor testbed software development was continued and the special test hardware was completed. The preliminary design review was conducted, and command signal generator modifications were completed (including final delivery).

Program Element: 64261N Title: Acoustic Search Sensors (Engineering)

(U) The FY 1983 program consists of:

- o Completing airdrop mechanical tests (overland, shallow water, and deep water).
- o Commencing design approval tests.
- o Completing over-the-side acoustic tests.
- o Completing the Data Display Simulation System (used to develop special display formats).

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

- o Conduct air drop (full up) acoustic tests (including the contractor demonstration tests).
- o Complete design approval tests.
- o Conduct the critical design review.
- o Initiate procurement of Navy Technical Evaluation/Operational Test and Evaluation buoys.
- o Development and testing (Navy Technical Evaluation/Operational Tests (IIA and IIB)) will continue through completion in FY 1987.

(U) Project W0480, Passive Advanced Sonobuoy: The Passive Advanced Sonobuoy program provides for the development of improved passive sensors to combat the quieting Soviet submarine Threat. Near term project effort has been directed to the Vertical Line Array Directional Frequency Analysis and Recording II sonobuoy, which is an evolutionary improvement to the Vertical Line Array Directional Frequency Analysis and Recording sonobuoy now in production. It is designed to have improved acoustic performance (to include [redacted] capability), an extended in-water life and an ON/OFF function by command of the aircraft.

(U) In FY 1982, engineering development included completion of the long-life, command study (which documented the feasibility of implementing these improvements), completion of beamformer study, completion of critical component design, and initiation of over-the-side testing.

(U) The FY 1983 program consists of:

- o Completion of air mechanical tests.
- o Start of specification validation tests.

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

- o Continue specification validation tests.
- o Continue development and testing of Vertical Line Array Directional Frequency Analysis and Recording II sonobuoy through completion in FY 1986.
- o This is a continuing project.

Program Element: 64261N Title: Acoustic Search Sensors (Engineering)

(U) Project W1787, Air Common Acoustic Processing: (NEW START) This project develops common acoustic processing software which implements advanced sensors and increased processing capability in Advanced Signal Processor equipped Anti-Submarine Warfare aircraft. A High Order Language and modular architecture will be employed to reduce Life Cycle Cost of operational software. Air Common Acoustic Processing will provide [ ] Directional Frequency Analysis and Recording passive processing; Passive Tracking Algorithm; [ ] cross-correlation/auto-correlation broadband processing; and new sensors to include Vertical Line Array Directional Frequency Analysis and Recording II, Expendable Reliable Acoustic Path Sonobuoy, and Rapidly Deployable Surveillance System fast time processing. Air Common Acoustic Processing system modular architecture (software builds 1 through 3) was initiated in Program Element 64266N, Advanced Signal Processor.

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

- Complete software Build 3 (system modular architecture) and provide to user systems.
- Complete software Build 4 (passive tracking, broadband correlation and Integrated Acoustic Communication System down link capability) and provide to user system.
- Initiate Build 5 (Vertical Line Array Directional Frequency Analysis and Recording II, Expendable Reliable Acoustic Path Sonobuoy, and Rapidly Deployable Surveillance System) development and testing.
- This is a continuing project which will support integration of software for follow on advanced sensors.

(U) Project W1624, Broadband Acoustic System: Develop passive sonobuoys and processing [ ] by exploiting their broadband acoustic signatures.

[ ] Broadband processing techniques for use with current passive sonobuoys are being developed for incorporation into the AN/AQA-7 acoustic processor (P-3 aircraft) and for software update of the AN/UYS-1 Advanced Signal Processor (P-3C, S-3B and LAMPS MK III aircraft). Sonobuoy developments specifically addressing the [ ] broadband threat include a High Density Field sonobuoy [ ] and a high gain array sonobuoy [ ] The High Density Field Sonobuoy development will consist of two development efforts. The first effort will employ existing sonobuoy technology based on the current AN/SSQ-53 sonobuoy to permit a low risk development of a broadband capable sensor for early operational evaluation and potential fleet introduction. The second effort will investigate sensor designs compatible with advanced manufacturing technology and aimed at producing a High Density Field Sonobuoy at significantly reduced cost (jointly funded with Program Element 62711N, Undersea Target Surveillance). Candidate high gain array sensors are being evaluated for full scale development of the selected design planned in FY 1985.

(U) In FY 1982, Broadband Acoustic Systems was intitiated under Advanced ASW Avionics (Program Element 63254N, Project W1292) and Advanced Passive Sensors (Program Element 63259N, Project W1010) in which broadband sensor options and broadband processing techniques were defined.

(U) The FY 1983 program consists of:

- The FY 1983 effort is funded under Program Element 63254N, Air ASW.
- Awarding contract for modification of the AN/SSQ-53 sonobuoy.
- Initiating Low Cost High Density Field design.

Program Element: 64261N Title: Acoustic Search Sensors (Engineering)

- o Procuring pre-production broadband modification kits for the AN/AQA-7 processor and testing in operational aircraft.
- o Completing software testbed validation of advanced broadband processing algorithms for the AN/UYS-1.

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

- o Transition from Program Element 63254N, Air ASW.
- o Initiate testing of modified AN/SSQ-53 sonobuoys.
- o Complete design definition and initiate fabrication of low cost development models.
- o Complete AN/AQA-7 modification design acceptance and reliability demonstration.
- o This is a continuing program.

I. (U) PROJECT MORE THAN $10 MILLION IN FY 1984: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64264N
DoD Mission Area: 235 - Naval Warfare Support
Title: Life 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	10,297	6,902	4,824	4,982	Continuing	Continuing
W0606	Aviation Personnel Life Support Systems	2,092	6,902	4,824	4,982	Continuing	Continuing
W1100	A-7 Escape System	8,205	0	0	0	0	26,728

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 for project W0606 and through completion in FY 1982 for project W1100.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for the engineering development, technical evaluation, and initial operational test and evaluation of a family of Aircrew Life Support Equipment for Naval aircraft weapons systems. This includes the integrated assemblages of components and techniques required to assure aircrews and passengers the most effective inflight environment, inflight escape capability, and emergency protection and survival provisions. This program element accomplishes the transition of Life Support Equipment from advanced development to engineering development followed by release of production and service use and the development of a replacement ejection seat for the A-7 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: FY 1982 increase of 31 in Project W0606 (Aviation Personnel Life Support Systems) is due to a net total of 8 transferred from Project W1100 (A-7 Escape System) to meet urgent travel requirement; and 23 reprogrammed from Program Element 64215N (Support Equipment), and Project W0601 (Aircraft Handling and Service Equipment) for urgent Chief of Naval Operation's requirement for fabric development for Flight Clothing. FY 1982 decrease of 408 in Project W1100 is due to reprogramming of 400 to higher priority programs, and transfer of 8 to Project W0606 from Project W1100 to meet urgent travel requirement. FY 1984 decrease of 2,460 in Project W0606 was due to budget constraints during development of the FY 1984 budget.

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	11,815	10,674	6,902	7,284	Continuing	Continuing
W0606	Aviation Personnel Life Support Systems	2,234	2,061	6,902	7,284	Continuing	Continuing
W1100	A-7 Escape System	9,581	8,613	0	0	0	27,136

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS RELATED TO 64264N:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
APN-5 (A-7B/C/E, TA-7C Ejection Seat)	7,079					7,079
APN-5 (SEAWARS)		8,173	5,052	510		17,735
APN-6 (A-7B/C/E, TA-7C Ejection Seat)						779
APN-6 (SEAWARS)		842	574	493		1,909

Note: Quantities for above consist of various components and equipment.

Program Element: 64264N Title: Life Support Equipment

F. (U) RELATED ACTIVITIES: Program Element 62241N, Aircraft Technology; Program Element 62758N, Biomedical Technology; Program Element 63216N, Airborne Life Support Systems. Related Air Force efforts, supported by Program Element 64706F, Life Support Equipment, are coordinated through the tri-service Life Support Equipment Steering Group.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Ordnance Station, Indian Head, MD; Naval Air Test Center, Patuxent River, MD; Naval Weapons Center, China Lake, CA. CONTRACTORS: Stencel Aero Engineering, Asheville, NC; Vought Aeronautics, Dallas, TX; and others to be determined.

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

(U) Project W0606, Aviation Personnel Life Support Systems: This project provides maximum functional capability of aircrews during normal missions and also provides a means to enhance safe and reliable escape, descent, survival, and recovery in combat and peacetime emergency situations. This continuing project provides for the conduct of necessary engineering development, test and evaluation, and initial operational test and evaluation of Aviation Personnel Life Support Systems. This project accomplishes the transition of life support systems from advanced development to completion of full scale development to demonstrate that the design meets necessary operational requirements prior to the first major production decision.

(U) In FY 1982 the following engineering development efforts were conducted on the program:

- o Conducted Technical Evaluation on the Helo-Mobile Crewman Flotation Jacket.
- o Conducted Technical Evaluation on the Quick Donning Coverall.
- o Completed Technical Evaluation of the Mini-Raft (One-Man Flotation Platform).
- o Obtained necessary documentation for certification of readiness for Operational Evaluation on the HGU-35/P Helmet.
- o Completed Technical Evaluation on the On-Board Oxygen Generating System.
- o Procured selected designs for Technical Evaluation of the Chemical/Biological/Radiological Flight Crew Protection System.
- o Procured masks for development of the Aircrew Restraint System and conducted engineering analysis.

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

- o Commence Operational Evaluation on the Helo-Mobile Crewman Flotation Jacket.
- o Award contract for Operational Evaluation quantities of the Quick Donning Coverall.
- o Conduct and complete Operational Evaluation on the Mini-Raft (One-Man Flotation Platform).
- o Conduct Technical Evaluation on the Mobile Vertical Replenishment Survival System.
- o Conduct Technical Evaluation on the Emergency Oxygen System.
- o Complete Operational Evaluation on the On-Board Oxygen Generating System.
- o Complete Technical Evaluation on selected designs of the Chemical/Biological/Radiological Flight Crew Protection System.

Program Element: 64264N Title: Life Support Equipment

- o Procure additional Technical Evaluation quantities to establish design requirements for the Aircrew Restraint System.
- o Conduct Technical Evaluation on the Automatic Inflation Modulation Parachute.
- o Conduct Technical Evaluation on the Aircrew Automated Escape System Sequence Time Delay (Joint Navy/Air Force).
- o Develop components and instrumentation for the manikin for testing escape systems equipment.
- o Conduct Technical Evaluation and conduct Initial Operational Evaluation on the Search and Rescue Radio.
- o Conduct Technical Evaluation on the Laser Protective System.

(U) The FY 1984 program consists of the following:

- o Obtain Approval for Service Use on the Helo-Mobile Crewman Flotation Jacket of the Anti-Exposure System.
- o Conduct Operational Evaluation on the Quick Donning Coverall.
- o Complete Technical Data Package and award contract for Operational Evaluation quantities of the Helo-Pilot Survival System.
- o Prepare documentation for Approval for Service Use on the Mini-Raft (One-Man Flotation Platform).
- o Obtain certification for readiness for Operational Evaluation on the Mobile Vertical Replenishment Survival System.
- o Conduct Operational Evaluation on the Emergency Oxygen System.
- o Conduct Technical Evaluation on the Quick Don Smoke Mask/Oxygen System.
- o Continue Technical Evaluation and commence Operational Evaluation on the Chemical/Biological/Radiological Flight Crew Protection System.
- o Continue Technical Evaluation and conduct Operational Evaluation on selected components of the Aircrew Restraint System.
- o Continue Technical Evaluation on the Laser Protective System.
- o Complete Initial Operational Evaluation on the Search and Rescue Radio.

(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: 64266N
DoD Mission Area: 213 - Anti-Submarine Warfare

Title: Advanced Signal Processor
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
	TOTAL FOR PROGRAM ELEMENT	3,292	501	-	-	-	93,183
W0491	Advanced Signal Processor	3,292	501	-	-	-	93,183

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT NEED: The Advanced Signal Processor Program provided for engineering development of a standard Navy signal processor which will be used to meet the acoustic signal processing requirements of active and passive sensors designed for the 1980's and 1990's submarine threat.

C. (U) EXPLANATION OF CANCELLATION: Congress reduced the FY 1983 request to zero with direction that the program be concluded with the FY 1983 effort.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64267N
DoD Mission Area: 231 - Anti-Air Warfare

Title: AWG-9 Update
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	4,206	6,975	3,030	8,013	TBD	TBD
W0467	F-14 Target Identification Software	2,494	2,821	3,030	8,013	TBD	TBD
W1254	F-14 Programmable Signal Processor	1,712	4,154	0	0	0	51,869
	(Quantity)	(Test and Evaluation)	(Test and Evaluation)				(8)

The above funding includes out-year escalation and encompasses all work development phases now planned or anticipated except for Project W0467 which is through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This operational system improvement will integrate the Programmable Signal Processor into the F-14 AWG-9 weapon control system converting the system from analog to high speed programmable digital signal processing technology. This digital upgrade will provide improved Electronic Counter Countermeasures performance and increased Reliability and Maintainability. Additionally, the digital processing will allow incorporation of the Target Identification Software being developed under W0467, Target Identification Software. When incorporated, the Target Identification Software will provide long range positive target identification which will permit more effective employment of beyond visual range missiles. Target Identification Software development efforts include integration of various identification techniques into an optimum Non-cooperative Target Recognition scheme. Work done under Program Element 63515N, Advanced Identification Techniques project provides the identification techniques used in the Target Identification Software 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 are as follows: a FY 1983 decrease of 3 and a net decrease of 49 in FY 1984 and 98 in FY 1985 due to revised cost estimates for Project W0467. Additional to completion and total estimated cost changes to TBD for Project W0467.

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	24,218	4,206	6,978	3,079	23,350	88,342
W1254	F-14 Programmable Signal Processor	20,693	1,712	4,157	0	0	51,872
	(Quantity)	(Test and Evaluation)	(Test and Evaluation)	(Test and Evaluation)			(8)
W0467	F-14 Target Identification Software	3,525	2,494	2,821	3,079	23,350	36,470

21

Program Element: 64267N Title: AWG-9 Update

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
	TOTAL AIRCRAFT PROCUREMENT NAVY (APN)	18,265	88,100	48,233	86,500	218,587	459,685
WO467	F-14 Target Identification Software	0	0	0	0	0	*
W1254	F-14 Programmable Signal Processor	18,265	88,100	48,223	86,500	218,587	459,685
	Quantity						(450)

* RDT&E funding only required for development and integration into tactical software.

F. (U) RELATED ACTIVITIES: The F-15 and F-18 are incorporating a Programmable Signal Processor into their weapons control systems. These Progammable Signal Processors have commonality with the F-14 Signal Processor. Program Element 63515N Advanced Identifiction Techniques is developing the various identification techniques to be incorporated through software in the Target Identification Software project.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Pacific Missile Test Center, Point Mugu, CA; Naval Research Laboratory, Washington, DC; Contractors: Hughes Aircraft Company, El Segundo, CA.

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

(U) Project WO467, Target Identification Software. This project will provide long range positive target identification which will permit more effective employment of beyond visual range missiles. Target Identification Software development efforts include integration of various identification techniques into an optimum Non-Cooperative Target Recognition scheme.

(U) In FY 1982, limited laboratory and roof house testing was accomplished.

(U) In FY 1983, program consists of:

- o Laboratory and flight testing of Non-Cooperative Recognition in the Track-While-Scan mode.

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

- o Complete the technical evaluation and operation evaluation of Non-Cooperative Target Recognition capability in the Track-While-Scan mode.

(U) Program to Completion:

- o Initial Operational Evaluation starts.
- o Development and testing will continue to completion in FY 1988.

I. (U) PROJECT OVER $10 MILLION IN FY 1984: None.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64268N
DoD Mission Area: 235 - Naval Warfare Support
Title: Aircraft Engine Component 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	81,593	89,486	97,513	118,616	Continuing	Continuing
W1355	Aircraft Engine Component Improvement Program	81,593	89,486	97,513	118,616	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: Successful completion of an aircraft engine development is followed by a Component Improvement Program designed to identify and correct engine problems revealed during service use and to upgrade durability, maintainability, reliability, and suitability during the service life of the engine. Significant life cycle cost savings may result from reduced maintenance man-hours, spare parts and engine requirements, and overall level of support logistics. The program effort does not increase or expand the basic performance characteristics beyond those defined in the engine model specification. This is a continuing program representing the minimum level of engineering support required for improvements essential to ensure satisfactory performance of aircraft engines in the fleet. Where applicable, funds include the Navy share of joint programs mutually supported with Air Force, Army, and foreign users of like engines.

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 745 in FY 1982 and an increase of 893 in FY 1984. These changes were the net result of Navy budget adjustments and 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	71,202	82,338	89,486	96,620	Continuing	Continuing
W1355	Engine Component Improvement Program	71,202	82,338	89,486	96,620	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Air Propulsion Center, Trenton, NJ; OTHERS: Naval Air Test Center, Patuxent River, MD; Naval Air Development Center, Warminster, PA; Naval Weapon Support Center, Crane, IN. CONTRACTORS: Detroit Diesel - Allison, Indianapolis, IN; General Electric Company, Lynn, MA and Evendale, OH; Garrett Turbine Engine Co., Phoenix, AZ; Pratt and Whitney Aircraft of Canada, Limited, Montreal, Canada; Pratt and Whitney Aircraft Group, West Palm Beach, FL; Rolls Royce, London, England; Solar Division, IHC, San Diego, CA; Bendix Corporation, Utica, NY; Hamilton Standard Division, Windsor Locks, CT; Lucas, Englewood, NJ; Williams International, Walled Lake, MI.

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

Program Element: 64268N Title: Aircraft Engine Component Improvement Program

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

(U) Project W1355, Aircraft Engine Component Improvement Program

1. (U) DESCRIPTION: It is necessary to maintain an engineering test and analysis capability for aircraft engines following the engine development period to address problems that occur over the operational lifetime of the engine. During an engine development program, specified engine requirements for performance, weight, durability, maintainability, reliability, etc., are met. The limitations of ground testing and a comparatively short flight testing period during development will not uncover all operational difficulties. Experience has confirmed that the engine will not achieve its final maturity level until after it has been in operational use for many years. It is during these subsequent years when many of the engine's problems are identified and solved via the Component Improvement Program. As the engine progresses through its life cycle, increased component failure or malfunctions, operational problems, and hardware condemnation will occur with increasing age. These problems must have timely corrective action through modification with redesigned components. It is essential that this program exist and operate in order for an engine to reach maturity and remain a useful power plant throughout its life cycle. Without timely engineering solutions of the service revealed problems, reduced operational readiness and increased maintenance and overhaul costs will jeopardize the capability of the fleet to meet its mission requirements. Component Improvement Program is an engineering effort obtained from the original engine manufacturer and procured and managed by either the Air Force or Navy, or both. During the early production periods, the Component Improvement Program effort concentrates on resolving early operational problems found with the emphasis placed on engine component durability, maintainability, and reliability through redesign of low reliability parts and the development of repair procedures to return used parts to a serviceable condition. The end result of the Component Improvement Program is improved engine readiness, longer engine useful life, lower follow-on engine parts costs, and reduced logistic support costs.

ENGINE MODEL	AIRCRAFT	MANUFACTURER
F404	F-18	General Electric
F402	AV-8	Rolls Royce

ENGINE MODEL	AIRCRAFT	MANUFACTURER
TF30	F-14, A-7	Pratt and Whitney Aircraft Group
TF41	A-7	Detroit Diesel - Allison
TF34	S-3	General Electric
J52	A-4, A-6	Pratt and Whitney Aircraft Group
T700	SH-60B	General Electric
T56	P-3, C-130, E-2, C-2	Detroit Diesel - Allison
T58	H-2, H-3, H-46	General Electric
T64	H-53	General Electric
T76	OV-10	Garrett
T400	H-1	Pratt and Whitney Aircraft of Canada
J85	F-5, T-38, T-2	General Electric
J79	F-4	General Electric
R1820	C-1, S-2	Curtiss Wright
J57	RF-8G	Pratt and Whitney Aircraft of Canada

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: There are at least 15 different engines included in this effort. Important accomplishments were achieved for the following engines:

Program Element: 6426CN Title: Aircraft Engine Component Improvement Program

F404 - Work continued on various service revealed difficulties requiring engineering and testing support. Completed engineering programs include throttle sensitivity improvement, control system changes, temperature sensor improvement, and combustor life extension. Through 1982 the F404 Component Improvement Program accumulated 2,195 hours of full scale engine testing and 303,000 cycles of spin pit testing for low cycle fatigue. The first three years of the F404 Component Improvement Program have a potential 20-year life cycle cost saving of $694 million for a payback ratio of 7 to 1.

F402 - The F402 Component Improvement Program has provided a systematic series of improvements to the basic F402/AV-8A engine. Investigation and engineering support for service revealed difficulties led to design changes and material substitutions resulting in a safer, more reliable, and more maintainable engine. Significant improvements include, new first stage fan module, new fuel control adjusters, faster engine acceleration times, and a new second stage low pressure compressor vane configuration. These improvements have been incorporated into the design for the F402-RR-406 for the AV-8B which will help the AV-8B meet its performance and reliability goals.

TF30 - Substantiation endurance testing of P-414A hardware was completed and the P-414A configuration approved in February 1982. Efforts were initiated to reduce visible smoke emissions. P-408 engine disk low cycle fatigue analysis, P-408 high pressure turbine blade stress evaluation, and redesign of the P-414 intermediate case were significant engineering efforts in FY 1982. A strategic materials substitution program was implemented.

TTF41 - Completed lead-the-fleet program to go to a 500-hour hot section refurbishment interval. Initiated the Hot Section Extended Life Program and the Engine Monitoring System Program. Continued accelerated mission testing and spin pit testing to qualify engineering change proposals and engine component life limits.

TF34 - Continued life management and investigation of service revealed difficulties. Conducted thrust deterioration analysis, fan disk and blade life testing.

J52 - Most engineering programs completed in FY 1982 were concerned with improving durability and repairing wear related difficulties. 470 engine test hours were accumulated in support of these engineering programs. These included testing of the number 4 bearing house sump, redesigned eighth stage stator, and low cycle fatigue analysis of J52-P-6 engine rotating parts.

b. (U) FY 1983 Program: Although this program continues engineering support for all engines and related hardware in the Navy inventory, a significant portion of the effort will be directed toward the following engines:

F404 - Extensive full scale engine test and component spin pit testing comprise major program effort in FY 1983. Continue work on durability improvement programs for high pressure turbine blades, afterburner durability, and the fan compressor. New start durability improvement programs cover high pressure/low pressure turbine nozzle improvement, ignitor durability, and stage 1 fan disk life improvement. System capability improvements will continue for the afterburner, electronic control unit system, the decel/flameout problem, and stage three blade/vane performance. Work will continue on weight and cost reduction.

F402 - Initiate 1,000-hour accelerated mission testing program for final AV-8B engine configuration. Complete development of engineering programs for shrouded turbine assembly, improvement of high pressure turbine 1 and 2 stator cooling, combustor chamber life, and high pressure turbine 1 and 2 vanes. Engine, rig, and flight testing will continue to improve design, establish life limits, and identify problem areas.

TF30 - First operational use of P414A engines. Strategic material substitution, redesign of the intermediate case, and smoke reduction efforts will continue. Hardware redesign modification, necessary as result of low cycle fatigue life analysis, will be initiated. Accelerated mission testing will continue for the P-414A and P-408 configurations.

T700 - Initial Component Improvement Program effort for accelerated testing and correctional engineering programs addressing functional and durability problems. Verification of performance margins, extension of rotating component life, airflow improvement and analysis of material substitution potential.

Program Element: 64268N Title: Aircraft Engine Component Improvement Program

TF34 - Completion of fan disk and blade life testing. Continue engine test and evaluation efforts, investigations of service revealed problems, and repair engineering.

J52 - Low cycle fatigue testing continues. Engineering evaluations and potential solutions will be pursued to solve wear and cracking problems developing in this older engine.

c. (U) FY 1984 Planned Program: Engineering support is planned for the following effort:

F404 - Accelerated mission testing and correctional engineering programs addressing functional and durability problems. Major Efforts: 2,000 hours of endurance and performance testing and component life verification, turbine blade and rotor improvement, weight and cost reductions. Variable Exhaust Nozzle/Afterburner improvements and lubrication system improvements.

F402 - Complete 1,000-hour accelerated mission testing program validating final AV-8B engine configuration and verifying maintenance and reliability goals. Continued engineering support for service revealed difficulties including improvements to high pressure turbine 1 and 2 blade material, low pressure compressor 1 disk life, water injection systems, torch igniter solenoid valve, high pressure turbine cooling air system, and application of brush seals in various turbine locations. Joint US/UK funding and management.

TF30 - Component Improvement Program purpose will shift from redesign to development of repairs as the P-408 and P-414 engines mature. Accelerated mission testing continues and takes on increased significance as the engines age. Major engineering programs started in FY 1983 will continue.

T700 - Major emphasis on resolution of service revealed difficulties and repair engineering requirements resulting from introduction of the SH-60B (LAMPS) into the fleet.

TF41 - Life analyzing program to determine life limits in the areas of low pressure compressor/low pressure turbine shafts and low pressure compressor third stage disk. Continue engineering support for service revealed difficulties.

T34 - Continue evaluation of operational failures, readiness, and safety related programs and determine proper repair engineering. Continue engine test and evaluation efforts including damage assessment and life management.

J52 - Continue engineering support to determine life limits and repair procedures to maintain an adequate level of reliability and maintainability. Low cycle fatigue analysis should be substantially complete by FY 1984. Work continues for wear and cracking problems.

T56 - Continue engineering support for service revealed difficulties, component life extension, and material durability. Significant engineering programs include reduction gearbox improvements and investigation of single crystal turbine blades. Emphasis on sustaining material and hardware availability for logistic support.

T58 - Continue engineering support for service revealed difficulties and implement incremental improvements to bearings/lube systems, turbine, compressor, and fuel control system. Continue effort on cost reduction programs and repair engineering to maintain fleet support.

T64 - Continue engineering support for service revealed difficulties. Completion scheduled for all Engineering Change Proposals and engine test and evaluation efforts. Continue repair engineering and investigations of service revealed difficulties.

T76 - Continued investigation and solving of safety of flight and economic problems and engineering support for service revealed difficulties.

Program Element: 64268N Title: Aircraft Engine Component Improvement Program

T400 - Continue work to improve durability of hot section components and major life limited components. Provide engineering support for service revealed difficulties.

J85 - Continue component life verification, repair procedure development, and engineering support for service revealed difficulties.

J79 - Continue minimum support for service revealed difficulties. Gradual reduction of Component Improvement Program effort as J79's are removed from operational service.

R1820 - Continue minimum support for service revealed difficulties and overall materials and service logistics.

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

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64301N
Title: MK-92 Fire Control System
DOD Mission Area: 231 - Anti-Air 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	17,484*	24,628	35,593	54,284	TBD	TBD
S0179	MK 92 Fire Control System Upgrade	17,484*	24,628	14,130	19,144	Continuing	Continuing
S1783	MK 92 Upgrade (Phase III)	--	--	21,463	35,140	TBD	TBD

* S0179 Funded in FY 1982 in Program Element 64352N, Surface Launched Weaponry Ship Systems.

The above funding profile includes outyear 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 supports improvements to the MK 92 Fire Control System installed on FFG-7 Class Frigates, PHM-1 Class Hydrofoil Patrol Boats and WMEC-270 Coast Guard Cutters, and is associated with missile and/or gunfire control, depending on the installation. Project S0179 provides for continued development of weapons compatibility, reliability and maintainability improvements for all modifications used on the above ship classes. The primary effort is the development of a coherent receiver/transmitter for the MK 92 Fire Control System on FFG-7 Class Ships. Project S1783 provides funding for the development of an X-band Phased Array Radar for the MK 92 Fire Control 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: An increase of 15,000 in FY 1983 for initiation of the phased-array radar development. New Project S1783 increases the program element by 21,463 in FY 1984 and 35,140 in FY 1985. Other minor changes result from budgeting 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	20,087*	17,701**	9,628	14,445	Continuing	Continuing
S0179	MK 92 Fire Control System Upgrade	20,087*	17,701**	9,628	14,445	Continuing	Continuing

* S0179 funded in Program Element 64652N Gun System Improvement Program in FY 1981.

** Funded in Program Element 64352N Surface Launched Weaponry Ship Systems in FY 1982.

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 (MK 92 Fire Control System)	64,160	52,930	52,930	65,600	244,656	980,470
OPN (MK 92 Fire Control System)	2,300	3,300	2,300	5,200	Continuing	Continuing

Program Element: 64301N Title: MK-92 Fire Control System

F. (U) RELATED ACTIVITIES: PE 24294N Guided Missile Frigate.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA. CONTRACTORS: Sperry Corporation, Great Neck, NY is the prime. OTHERS: Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; Automation Industries, Vitro Laboratories Division, Silver Spring, MD.

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

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

(U) Project S0179, MK 92 Fire Control System Upgrade

1. (U) DESCRIPTION (Requirement and Project): The MK 92 Fire Control System is a lightweight multi-purpose gun/missile fire control system in use in the Navy's FFG-7 Class Frigates, PHM-1 Class Patrol Hydrofoil, and Coast Guard WMEC-270 Class Ships. On the FFG-7 Class Frigates, it is designed to control the 76mm/62 caliber dual purpose gun and SM-1 (Medium Range) Missiles against both air and surface targets, and to provide targeting information for the HARPOON Weapon System. On the PHM-1 Class Hydrofoils, it provides gun control to the 76mm gun and targeting information for the HARPOON Weapon System. Operational Test and Evaluation was successfully completed and Approval for Service Use obtained in FY 1976. Systems compatibility, reliability and performance improvements to correct deficiencies incurred in Fleet introduction/Follow-on Test and Evaluation have been identified and tested. Ordnance Alterations production has been initiated (Phase I improvements). Design of a new coherent receiver/transmitter to improve MK 92 performance in adverse weather and Electronic Countermeasures environments is underway (Phase II improvements).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed testing of near-term, (Phase I) performance and reliability improvements. Began design and development of the coherent receiver/transmitter. Began hardware and software design. System specifications and a Proposal Request were formulated for the phased-array radar development.

b. (U) FY 1983 Program: Continue design and development of a coherent transmitter. Initiate refurbishment of the MK 92 Fire Control System Engineering Development Model. Start computer program update. Issue the Request for Proposals for the phased-array radar. Conduct contract negotiations. Begin hardware and software design. Order long-lead equipment and materials.

c. (U) FY 1984 PLANNED PROGRAM: Complete engineering development of the coherent transmitter and digital signal processor. Complete integration into the Engineering Development Model for testing. Commence design of SYS ( )/MK 92 interfaces. Commence design and engineering to improve the Weapons Direction System Scheduler. Continue computer program update.

d. (U) Program to Completion: Continue computer program update. Test and evaluation to be conducted at Land Based Test Site on coherent receiver/transmitter and digital signal processor. Continue development of MOD 1 and MOD 2 system improvements for FFG-7, PHM, WMEC, and WMEC class ships.

Program Element: 64301N Title: MK-92 Fire Control System

e. (U) Milestones Not applicable.

(U) Project S1783, MK 92 Upgrade (Phase III)

1. (U) DESCRIPTION (Requirement and Project): This project, directed by Congress, will develop a four-faced X-band Phased Array Radar for the MK 92 Fire Control System to provide FFG-7 Class Ships an increased capability against high altitude threats, particularly in high Electronic Countermeasures. The Phased Array Radar will also provide a nominal increase in firepower and improved reaction time.

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 Program: Conduct Preliminary Design Review, Commence component testing. Begin computer programs development. Begin system integration and testing.

d. (U) Program to Completion: Conduct Engineering Development Model testing at MacArthur Field Combat Systems Test Site. Conduct environmental testing. Conduct full systems testing at Wallops Island, Virginia. A decision to test the system at-sea will be made pending results of systems testing at Wallops Island Combat System Test Site.

e. (U) Milestones: To be determined.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64303N
Title: AEGIS Area Air Defense
DoD Mission Area: 231 - Anti-Air 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	36,696	8,149	16,580	21,297	TBD	TBD
S0165	AEGIS	12,894	8,149	0*	0*	*	*
S1275	SPY-1 Radar Improvements	18,862	**	**	**	N/A	N/A
S1447	Combat System Improvements	4,940	**	**	**	N/A	N/A
S1711	Anti-Tactical Missile	---	---	---	4,910	TBD	TBD
S1776	AEGIS Weapon System Mods	---	---	16,580	16,387	TBD	TBD

* Work under Project S0165 shifted to Project S1776N in FY 1983
** Transferred to PE 64307N (CG-47 Product Improvement) in FY 1983.

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 Fleet of the 1980's and beyond must be capable of operating in a multi-threat environment of long-range, high powered jammers screening coordinated, high density, anti-ship missile attacks. Prior funding for this program element provided for the development of the AEGIS shipboard area air defense system to provide the short reaction time, high firepower, continuous weapons availability and immunity to electronic counter measures necessary to protect the Battle Group in the face of that growing Soviet threat. The funds currently budgeted in this element provide for the operation and maintenance of AEGIS Engineering Development Model-1 in USS NORTON SOUND for testing purposes, development of an Automatic Test Set to be resident at an AEGIS-unique depot, STANDARD Missile-2(N) integration with the AEGIS Weapon System, alterations to update the AN/SPY-1A radar system, completion of solid state circuit breaker development, and Part Task Trainer development to facilitate AEGIS crew training.

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 2,500 in FY 1982 and a decrease of 9 in FY 1983 is due to cost refinements including inflation. The net increase of 8,204 in FY 1984 is due to restructuring of the Program Element. Project S0165 will be closed out starting in FY 1984, and the effort will transfer to new Project S1776, AEGIS Weapon System Mods. Two efforts previously funded under PE 64307N, Project S1447, Combat System Improvements, also will be transferred to Project S1776 in FY 1984. In addition, two FY 1984 new efforts (development of Part Task Trainers and studies pursuant of integration of the STANDARD Missile-2(N) warhead) have been programmed for Project S1776.

Program Element: 64303N Title: AEGIS Area Air Defense

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	16,807	34,196	8,158	8,376	86,103	712,800
S0165	AEGIS	11,124	10,394	8,158	8,376	86 103	712,800
S0324	Battle Group Anti-Air Warfare Coordination	5,683	0	*	*	*	*
S1275	SPY-1 Radar Improvements	+	18,862	**	**	**	**
S1447	Combat System Improvements	--	4,940	**	**	**	**

* Project S0324 Battle Group Anti-Air Warfare Coordination is transferred to Program Element 63382N in FY 1983. See PE 63382N for detailed description of that program.

** Project S1275 SPY-1 Radar Improvements and S1447 Combat System Improvements are transferred to Program Element 64307N in FY 1983. See PE 64307N for detailed description of the program.

\+ Congress appropriated $40 million under Program Element 63589N Major Surface Combatant Development, Project S1558 AEGIS Product Improvement (Advanced) for the FY 1981 start to SPY-1 Radar Improvement Project.

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 (AEGIS CG-47)	2,917,400	2,885,700	3,435,000	3,519,000	TBD	TBD
(Quantity)	(3)	(3)	(3)	(3)		

F. (U) RELATED ACTIVITIES: PE 64307N, CG 47 Product Improvements; PE 63382N, Battle Group Anti-Air Warfare Coordination; PE 64366N, STANDARD Missile Improvements; PE 64353N, Vertical Launch System; PE 63589N, DDG-51; and PE 64212N, LAMPS III.

G. (U) WORK PERFORMED BY: IN HOUSE: Naval Surface Weapons Center, Dahlgren, VA; Naval Ship Weapons Systems Engineering Station, Port Hueneme, CA; Fleet Combat Direction System Support Activity, Dam Neck, VA, and San Diego, CA; Pacific Missile Test Center, Point Mugu, CA; Long Beach Naval Shipyard, Long Beach, CA. CONTRACTORS: RCA, Moorestown, NJ, is the prime contractor OTHERS: Raytheon Company, Wayland, MA; Computer Sciences Corporation, Moorestown, NJ; Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; VITRO Laboratory, Silver Spring, MD; Bird Associates, Vienna, VA.

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

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

(U) Project S1776, AEGIS Weapon System Mods

1. (U) DESCRIPTION (Requirement and Project): The threat posed to the Battle Group and Fleet by Soviet offensive air capability has necessitated a quantum improvement in the Navy's Anti-Air Warfare capability. The Fleet of the 1980's and beyond must be capable of operating in a highly sophisticated, multi-threat environment characterized by coordinated saturation attack of long-range, anti-ship missiles launched under cover of massive electronic countermeasures. The requirement to meet this challenge was recognized in the 1960's. In December 1969, the Navy awarded a contract to RCA to engineer and test a third generation advanced Anti-Air Warfare System now known as the AEGIS Weapon System. The AEGIS Weapon System today is a high performance Area Air Defense System which features rapid reaction, high firepower, longer range and improved reliability and performance over its predecessors. The heart of the system is the AN/SPY-1A, a multi-function, phased array radar which automatically detects the target, provides target tracking solutions, and transmits midcourse guidance commands to STANDA

40 40

Program Element: 64303N Title: AEGIS Area Air Defense

Missiles in flight. The AEGIS Weapon System also forms the "core" of the combat system for CG 47 Class Ships and for the new DDG-51 Class. The AEGIS Combat Direction System integrates all of the elements of the ship's combat system and provides the capability to conduct Anti-Air Warfare, Anti-Submarine Warfare, Anti-Surface Warfare and Surface Strike simultaneously. This project will be initiated in FY 1984 to continue work previously underway in Project S0165 and some items started under PE 64307N, Project S1447, Combat System Improvements. Project S1776 will support work to modify and upgrade the AEGIS Weapon System.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued support was provided to USS NORTON SOUND (under Project S0165, AEGIS) for AEGIS Weapon System testing, Vertical Launch System and STANDARD Missile tests. Complete modifications of AEGIS Development Model-1 to AEGIS Engineering Model-1 to support Vertical Launch System evaluation. Development of computer programs for automatic test equipment for Navy depots was initiated and the test set was procured. Integration of the Vertical Launch System with the AEGIS Weapon System was completed. These efforts will be transferred to Project S1776 in FY 1984.

b. (U) FY 1983 Program: Continue support for AEGIS Engineering Model 1 in USS NORTON SOUND (under Project S0165, AEGIS) for testing of AEGIS, the Vertical Launch System, STANDARD Missile, and Battle Group Anti-Air Warfare Coordination. Continue development of Depot Automatic Test Set computer programs. These efforts will be transferred to Project S1776 in FY 1984, and Project S0165 will be closed out.

c. (U) FY 1984 Planned Program: Continue support of AEGIS Engineering Model-1 in USS NORTON SOUND for continued testing of AEGIS, the Vertical Launch System, STANDARD Missile, and Battle Group Anti-Air Warfare Coordination. Continue development of Depot Automatic Test Set computer programs. Start development of Part Task Trainers and training alternatives to provide more cost-effective training for AEGIS crew equipment operators and maintenance personnel. Start engineering studies pursuant to integration of the STANDARD Missile-2(N) warhead capability into the AEGIS Weapon System. Continue development of solid state circuit breakers and development of improvements to the AN/SPY-1A radar system initiated under PE 64307N, Project S1447, and transferred to Project S1776 in FY 1984.

d. (U) Program to Completion: Continue test and operational support of AEGIS Engineering Model-1 in USS NORTON SOUND for testing AEGIS Combat System improvements including STANDARD Missile Block II, TOMAHAWK and communications link improvements. Support at-sea testing of Battle Group Anti-Air Warfare Coordination and Technical and Operational Evaluation of TOMAHAWK/Vertical Launch in USS NORTON SOUND. Complete Depot Automatic Test Set Development and solid state circuit breaker development and testing. Complete AN/SPY-1A improvements development and testing. Complete development and testing of Part Task Trainers and training alternatives. Complete integration of STANDARD Missile-2(N) warhead capability with AEGIS Weapon System.

e. (U) Milestones (cont)

MILESTONE		DATE
1. Defense System Acquisition Review Council II - AEGIS		December 1969
2. Award Engineering Development Contract		December 1969
3. Complete Fabrication of Engineering Development Model-1		July 1972
4. Defense System Acquisition Review Council IIA		June 1974
5. Complete Development Test IIIA AEGIS STANDARD Missile-2 Medium Range		May 1977
6. Complete Initial Operational Test and Evaluation IIIA AEGIS/STANDARD Missile-2		July 1977
7. Defense System Acquisition Review Council III		January 1978
8. Complete AEGIS System Level tests at Combat System Engineering Development Site		May 1979
9. Support STANDARD Missile/Vertical Launching System Firings		September 1981 -
	(March 1982)*	December 1982
10. Depot Equipment for Digital Test Programs Procurement	(February 1982)**	November 1981

41

Program Element: 64303N Title: AEGIS Area Air Defense

(U) Milestones (cont)

MILESTONE	DATE
11. Support STANDARD Missile-2 BLK II/Vertical Launch System Technicl Evaluation in USS NORTON SOUND	FY 1983
12. Support STANDARD Missile-2 BLK II/Vertical Launch System Operational Evaluation in USS NORTON SOUND	FY 1984
13. TOMAHAWK/Vertical Launch System installation and checkout in USS NORTON SOUND	April 1984
14. TOMAHAWK/Vertical Launch System Technical Evaluation in USS NORTO SOUND	December 1984
15. TOMAHAWK/Vertical Launch System Operational Evaulation in USS NORTON SOUND	FY 1985
16. Part Task Trainers in place and tested	June 1985
17. Full Depot Automatic Test Set capability	May 1988

* Date listed in FY 1983 Program Element Descriptive Summary. Delay in STANDARD/Vertical Launching System firings due to delay in missile deliveries.

** Date listed in FY 1983 Program Element Descriptive Summary. Procurement contract initiated earlier than anticipated. Milestone description changed to better describe event.

J. (U) TEST AND EVALUATION DATA

1. (U) Development Test and Evaluation: AEGIS Weapon System Engineering Development Model-1 is a partial system which was fabricated for at-sea testing. The elements of Engineering Development Model-1 underwent stringent performance and environmental qualification testing prior to installation in a Land Based Test Site Located at Moorestown, N.J. Land based testing was completed in November 1973 and Engineering Development Model-1 was installed in USS NORTON SOUND. In parallel with Engineering Development Model-1 Land Based testing, the Guided Missile Launching System MK 26 MOD 0 successfully completed a factory functional integration test, a factory reliability test, and preliminary evaluation in USS NORTON SOUND. Also in parallel, STANDARD Missile-2 Medium Range development testing was conducted at White Sands Missile Range with 18 missile firings conducted between October 1972 and September 1976. Continous phases of testing have occured since Engineering Development Model-1 was installed in USS NORTON SOUND. To date, 37 STANDARD Missile-1's have been fired at sea. In all instances the AEGIS shipboard system performed as required: 28 missiles intercepted the target within lethal range; and 9 unsuccessful intercepts were caused by missile-related failures. STANDARD Missile 1 firings were made against target drones, TALOS Low Altitude Supersonic Targets, and BOMARC missiles, all of which are representative of known threats. During FY 1975/6 Engineering Development Model-1 was upgraded with a STANDARD Missile-2 Medium Range capability by adding additional equipment and computer programs. Comprehensive at-sea system testing of AEGIS and STANDARD Missile-2 was conducted in 1977-1978. AEGIS Development Test-IIIA and STANDARD Missile-2 compatibility/firepower tests were successfully conducted between December 1976 and May 1977. Of the 9 STANDARD Missile-2s fired, 6 successfully intercepted the targets. All AEGIS/STANDARD Missile-2 compatibility technical goals were successfully demonstrated. One test of note was a very successful high firepower scenario against BQM-34 targets. Additional tests were conducted during FY 1978. Included in these tests were the evaluation of Moving Target Indicator and Electronic Counter Countermeasures design improvements, demonstration of MK 26 Guided Missile Launching System rapid fire capability and successful STANDARD Missile-2 firings against [redacted]. All STANDARD Missile-1 and STANDARD Missile-2 firings were conducted by the USS NORTON SOUND Navy crew.

(U) Engineering Development Model-3C is an improved version of Engineering Development Model-1 in USS NORTON SOUND. It has been installed at the Combat System Engineering Development Site, Moorestown, N.J. AEGIS Intermediate milestone-1 testing was conducted with this model in November 1978. During a 48 hour period AEGIS MK-7 Weapon System was manned by Navy personnel and exercised by real and simulated targets. All objectives and thresholds were achieved. Development Test-IIIB was conducted at Combat System Engineering Development Site on 16-19 May 1979, and the system was certified ready for Operational Test-IIIB. During this 48 hour exercise the Combat System Engineering Development Site was manned and maintained by Navy personnel. AEGIS

Program Element: 64303N Title: AEGIS Area Air Defense

Intermediate Milestone-2 was conducted at Combat System Engineering Development Site in January 1980, demonstrating the Weapon System's capability to detect, track and engage targets. All objectives were achieved. AEGIS Intermediate Milestone-3 was conducted in August 1980. The program consisted of _ _ hours of simultaneous warfare engagements in Anti-Air Warfare, Surface Warfare and Anti-Submarine Warfare, in clear and adverse environments. All objectives were accomplished. Development Test - IID (formerly DT-IIID) was conducted at the Combat System Engineering Development Site Site from 5 to 9 January 1981. Simulated Anti-Air Warfare, Surface Warfare and Anti-Submarine Warfare engagements were conducted with various weapon options against single and multiple target scenarios. Anti-Air Warfare engagements were conducted utilizing STANDARD Missile-2 missiles _ Surface Warfare engagements were accomplished utilizing STANDARD Missile-2 and Harpoon. ASROC and over-the-side torpedo engagements were conducted on underwater threats presented by the Sonar Environmental Group Simulator. Underwater engagements (beyond ownship weapon envelope) were conducted utilizing P-3C aircraft. Controlled aircraft simulations of hostile missile profiles were provided by F-4, F-14, A-4 and Lear jet aircraft. Electronic countermeasures environments were presented by the NKC-135A and EA-6B aircraft. Various mixtures of self-screening and standoff jamming and fighter assets were utilized in presenting Electronic Countermeasures scenarios with mainlobe and sidelobe screening. F-4 and F-14 aircraft were employed to intercept targets. All Anti-Air Warfare engagements were validated by automatic Identification Friend or Foe Mode IV interrogations. Engagement orders were generated manually and automatically through implementation of Weapon Selection doctrine. Raid sizes ranged from _ controlled aircraft and/or one to six targets. Operations were conducted in a Battle Group environment. Link-11 was utilized between CSED Site and other participating units including USS DAHLGREN (DDG-43), USS BRISCOE (DD-977), E-2C, P-3C and Fleet Combat Direction System Support Activity, Dam Neck, VA. Simultaneous multi-warfare engagements were conducted to assess performance of Navy watch sections in utilizing standardized procedures. In 1980-1981 three multi-day exercises were conducted by the Navy Crew. These progressively more difficult operations culminated in the first phase of DT-IIA, which was successfully conducted at CSEDS in February 1982. The AEGIS Combat System was subjected to simultaneous attack by aircraft, missiles, submarines, and surface ships in a two day exercise. Massive electronic jamming was employed by the "enemy".

(U) In August 1982, TICONDEROGA (CG-47) went to sea for her second set of trials, Trial BRAVO. Over three days, every anti-air and anti-surface weapon was fired successfully. One thousand rounds of PHALANX, 5"/54, Super Rapid Blooming Offboard Chaff, HARPOON, and STANDARD Missile, to test the combat system and the launchers, were fired by the Navy crew. The exercise ended with two completely successful SM-1 Block VI intercepts of BQM-34A targets, including one direct hit. TICONDEROGA is the first ship in Navy history to fire guided missiles before commissioning.

2. (U) Operational Test and Evaluation: Initial operational test and evaluation was conducted by Commander Operational Test and Evaluation Force during June and July 1977 in USS NORTON SOUND. It was determined that the AEGIS Weapon System has the potential to be operationally effective and operationally suitable. As a result of the 1977 tests, Commander Operational Test and Evaluation Force determined that Engineering Development Model-1 performance (detection, tracking, and engagement success rate) offers a significant increase in operational capability over existing fleet systems. _ due to the early design state of Engineering Development Model-1, were the major constraints on system effectiveness. Seven missiles were fired during 12 firing engagements_

_ For the purpose of comparing test results to threshold requirements, the last engagement was not counted. The probability of successfully engaging, Pe, (firing order to intercept, single shot with STANDARD Missile-2, nominally clear environment), was demonstrated as 0.67 with an Operational Test-IIIA threshold of 0.66. This represents the ratio of targets killed to targets fired upon. For non-warhead configured missiles, warhead effectiveness is assumed if missile successful intercept criteria is satisfied for a specified warhead. Psel (Detection to single shot with SM-2, nominally clear environment) was _ runs were used to conduct nonfiring engagements in clear and electronic countermeasures (active and passive) environments. Reliability and maintainability results were better than thresholds during 478 hours of

operation by the crew of USS NORTON SOUND. All Engineering Development Model-1 faults that were detectable by the Operational Readiness Test System were detected; these represented 44% of the faults that occurred. During these tests in USS NORTON SOUND, the system was operated and maintained by the Navy crew. Based on the results of these tests and the recommendation of Commander Operational Test and Evaluation Force, Provisional Approval for Service Use was granted.

(U) Initial Operational Test and Evaluation was continued 20-23 May 1979 (Operational Test IIIB) at the Combat System Engineering Development Site, Moorestown, N. J. The full AEGIS Weapon System MK 7 Mod 3 was represented by a combination of installed equipment (Engineering Development Model 3-C), equipment simulators, and/or computer program simulations. The AEGIS Weapon System was exercised in simulated Anti-Air Warfare engagements against single and multiple threats. Over 400 simulated engagements were conducted against A-4 and F-14 aircraft, simulated targets, and targets of opportunity. Raid size varied from 1 to 12, with most raids of size one, two, three, or six.

With the AN/SPY-1A Radar System on-line, these simulated and real targets were superimposed.

The failures were due to a single computer system malfunction which resulted in 3 failures. Pse3 is the same as Pse2 except that the target is simulated.

With the AN/SPY-1A on-line six simultaneous engagements occurred (maximum number due to design limit on the number of simulated missiles). The radar system was replaced with a SPY-1A simulation for tests requiring simultaneously arriving targets. Using the AN/SPY-1A simulation,

Two reliability criteria are used: mean time between (critical/major) events which is mostly equipment and mean time between (critical/major) interrupts which is mostly computer programs. Mean time between (critical/major) events data was collected from 2 January to 23 May 1979 and projected, using a simulation, to three AEGIS Weapon System configurations in CG-47. Result were for a one Guided Missile Launching System and three fire control system channels configuration; for a one Guided Missile Launching System, four Fire Control System channels configuration; for a two Guided Missile Launching System, four Fire Control System channels configuration. Logistic supportability and maintainability were evaluated. Commander Operational Test and Evaluation Force concluded that the AEGIS Weapon System is potentially both operationally effective and operationally suitable, that the planned maintenance system (which included the Operational Readiness Test System) criteria are not adequate to permit a high level of operational availability. Commander Operational Test and Evaluation Force recommended procurement of all six systems covered by the current Provisional Approval for Service Use and consideration of alternative provisioning criteria. Operational Evaluation Report for OT-IIIB was approved December 1979.

(U) Initial Operational Test and Evaluation was continued through October 1980 (OT-IIC; formerly OT-IIIC). The purpose of the evaluation was to assess the potential operational suitability of the AEGIS Weapon System and AEGIS Combat System. Data collected during AEGIS Intermediate Milestone-2 testing (January 1980), AEGIS Intermediate Milestone testing (August 1980), and during Development Test and Evaluation at CSEDS (January 1979 through September 1980) were used. Commander, Operational Test and Evaluation Force assessed reliability, maintainability, availability, and logistic supportability factors and assessed the capability of the AEGIS Combat System to control and integrate information for individual elements. Commander, Operational Test and Evaluation Force determined the AEGIS Combat System to be potentially operationally suitable. Initial Operational Test and Evaluation was completed February 1981 (OT-IID; formerly OT-IIID). During operations conducted at CSEDS 9-12 February 1981, the AEGIS Combat System and AEGIS Weapon System were exercised in simulated multi-warfare engagements including Anti-Air Warfare, Surface Warfare, and Anti-Submarine Warfare singly and in combinations. Over 300 simulated engagements were conducted against both aircraft and simulated targets. EA-6Bs and an NKC-135 provided low and high-power threat-representative jamming in both stand-off and self-screening jamming roles. Link-11 operations were conducted with USS CALIFORNIA (CGN-36) and E-2C aircraft. Air control and Link 4A operations were conducted with F-14's. Anti-Submarine Warfare air control was conducted with S-3 and P-3C aircraft. Surface Combat Air Patrol operations using A-6E were conducted. Constructive submarines and surface units were also used in the scenarios. The AEGIS Combat System demonstrated a capability to control and integrate information from individual

elements for Anti-Air Warfare, Surface Warfare, Anti-Submarine Warfare, Command-Control-Communications, and Electronic Warfare. While conducting Anti-Air Warfare with live targets and simulated STANDARD Missiles, a Pse2 of [redacted] was demonstrated. While no Pse3 criteria were established, impressive capability was demonstrated against simulated Anti-Ship Missiles. A capability to control [redacted] simulated STANDARD Missile-2 Missiles in simultaneous flight was demonstrated. Reaction time for clear environment engagements was calculated to be as low as [redacted] Reaction time for adverse environment was calculated to be as low as [redacted] The AN/SPY-1A radar detected and tracked all manned aircraft presentations in both clear and adverse environments. The AEGIS Combat System was assessed to have satisfactory passive and active survivability features. Using the same reliability criteria and methodology as OT-IIIB (except with a data base collected from 2 January 1979 to 12 February 1981) the CG-47 AEGIS configuration Mean Time Between (Critical/Major) Events were: 147.5 hours (criterion: greater than or equal to 55 hours) for a one Guided Missile Launching System and three Fire Control System configuration; 31.4 hours (criterion: greater than or equal to 16 hours) for a one Guided Missile Launching System and and Fire Control System configuration; 13.3 hours (criterion: greater than of equal to 8.5 hours) for a two GMLS and four FCS configuration. The demonstrated Mean Time Between (Critical/Major) Events during OT-IID was 1.03 hours (criterion: greater than or equal to 5.5 hours). A maintainability assessment resulted in a demonstrated Mean Time To Repair - I (geomentric mean time to restore interrupts) of 25.3 seconds (criterion: less than or equal to 24 seconds). A statistical test indicated the difference equates to sampling error. Scheduled maintenance time per 24 hours was computed to be 1.15 hours (criterion: less than or equal to 2.5 hours). Restoration time: 2 minutes (criterion: less than or equal to 12 minutes), from scheduled maintenance; 0 minutes (criterion: less than or equal to 3 minutes) from system test.

(U) Follow-on Operational Test and Evaluation will be conducted at CSEDS and in CG-47. OT-IIIA at CSEDS and CG-47 (3rd and 4th QTR FY 1982) assessed the operational effectiveness and suitability of changes identified in OT-IID testing. OT-IIIB will be conducted at sea in CG-47 during 2nd quarter FY 1983-4th quarter FY 1983. Live missile firings will be conducted in various scenarios including multiple target presentations. Probabilities of successful engagements and simultaneous engagement capability will be among the system performance characteristics assessed. OT-IV will be conducted at-sea in CG-47 in FY 84 to verify system additions and modifications made during the shakedown availability.

(U) An evaluation concerning logistic support and availability showed that an alternative sparing strategy to the current Navy sparing policy (FLSIP) could yield significantly increased levels of operatonal availability. Commander, Operational Test and Evaluation Force concluded that: the AEGIS Weapon System is potentially operationally effective and suitable; the AEGIS Combat System has the potential to be operationally effective and suitable; FLSIP provisioning criteria will not maintain a high level of operational availability. Commander, Operational Test and Evaluation Force recommended: continued procurement, installation, program planning and testing of the AEGIS Combat System, in accordance with the approved AEGIS program; improvement of computer program performance and reliability; provision of complete and accurate technical documentation; use of a provisioning system that will ensure a higher availability than provided by FLSIP. Operational Evaluation Report for OT-IID was approved 23 June 1981.

3. (U) System Characteristics

Characteristics	Unit of Measure	Objective	Demonstrated* Performance
Total Number of Simultaneous Engagements		[redacted]	[redacted]
Mid-course	ea		
Terminal	ea		
Total Number of Targets Automatically Tracked	ea	128	128**
Detecton-To-Fire Time Against Surprise Targets		[redacted]	[redacted]
-Clear Environment (Automatic Mode)	sec		
-Electronic Countermeasures			
-Self Screening Jammer	sec		
-Stand-Off Jammer 100W/MMHZ/M2 Sidelobe	sec	[redacted]	[redacted]

Program Element: 64303N

Title: AEGIS Area Air Defense

(U) System Characteristics

Characteristics	Unit of Measure	Objective	Demonstrated* Performance
-Fully Automatic Mode with Heavy Natural Clutter	sec		
Availability over 66 months	%		
Intercept Range (20k ft - 55k ft, Mach 0.2 - 2.0)	NM		
Intercept Range Against BQM-34 Target at 200 ft.	NM		
Miss Distance (Std. Dev.)			
Clear Environment	FT		
6g Target Maneuvering at 40k ft alt	FT		
MAX Crossing Target Range for BQM-34, 200 ft. alt Target	NM		

*Demonstrated Performance data represent the evaluation of Engineering Development Model-1 at-sea in USS NORTON SOUND with STANDARD Missile-1 except where STANDARD Missile-2 indicated.

**Occurred during Development Test/Operational Test IIIB at the Combat System Engineering Development Site in May 1979 using the Interface Simulator System and Engineering Development Model-3C.

***128 target tracking capability represents the number of system tracks which AN/SPY-1A is itself capable of transmitting across the computer interface to the command and control track file. AN/SPY-1A is itself capable of carrying __ air tracks in its own file. The margin is provided in order to prevent overload of the radar computer in the presence of large numbers of long range tracks of limited interest to command or in the presence of transient spurious tracks caused by clutter or interference.

F' 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64306N
Title: PENGUIN Combat System Development
DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface 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	3,828	0	0	0	0	19,420
S1241	PENGUIN Combat System Development	3,828	0	0	0	0	19,420

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The PENGUIN Combat System consists of a Weapon Control System and a short range, inertially guided, passive infra-red terminal homing anti-shipping missile system developed by the Norwegians. PENGUIN was tested for possible installation on the 65' MK 3 Patrol Boat to provide a close-in surface-to-surface missile capability in the Amphibious Objective Area.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: Congress deleted all funds requested for FY 1983. The PENGUIN program has been terminated.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64307N
DoD Mission Area: 231 - Anti-Air Warfare

Title: CG-47 Product 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	---	43,631	70,452	76,702	TBD	TBD
S0325	Combat System Engineering Development	16,056*	12,215*	5,423	1,650	Continuing	Continuing
S1275	SPY-1 Radar Improvements	18,862**	15,008	13,322	16,193	0	103,385
S1447	Combat System Improvements	4,940**	28,623	51,707	55,133	TBD	TBD
S1712	HM&E Product Improvements	---	---	---	3,726	TBD	TBD

* FY 1982 and FY 1983 funding in Program Element 64304N, Combat System Engineering Development, and not included in Total for Program Element, above.

** FY 1982 funding in Program Element 64303N, AEGIS.

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only except for project S1275 which is through completion.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: TICONDEROGA (CG 47) commissioned in January 1983, is the first of a 24 ship class which will not complete deployment until the 1990's. The AEGIS Combat System in CG 47 was developed under Program Element 64303N, AEGIS, and Program Element 64304N, Combat System Engineering Development, beginning in 1976. This Program Element continues the engineering necessary to upgrade that Combat System so that later ships of the class will retain battle effectiveness against the escalating Soviet threat. It is intended to take advantage of maturing equipment and weapon systems being developed elsewhere in the Navy's budget.

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 1,516 in Project S1447 in FY 1983 is due to cost adjustments including inflation. The increase of 3,652 in Project S1275 in FY 1984 is due to increased test requirements for AN/SPY-1B radar system components imposed by the Navy and not previously budgeted. The increase of 321 in Project S1447 in FY 1984 is the net result of 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	40,000	23,802**	45,147	61,056	Continuing	Continuing
S1275	AEGIS Product Improvements*	40,000*	18,862**	15,008	9,670	15,817	99,357
S1447	Combat System Improvements*	0	4,940**	30,139	51,386	Continuing	Continuing

* FY 1981 Congressional directed new start under Program Element 63589N, DDGX.
** FY 1982 funding in Program Element 64303N, AEGIS.

Program Element: 64307N Title: CG-47 Product 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 (CG 47)	2,917,400	2,885,700	3,435,000	3,519,300	Continuing	Continuing
Quantity	(3)	(3)	(3)	(3)		

F. (U) RELATED ACTIVITIES: AEGIS Area Air Defense, PE 64303N; Vertical Launching System, PE 64353N; Surface ASW, PE 63553N; Vertical Launching System/ASROC, PE 64355N; Tactical Towed Array Sonar System-TACTAS (AN/SQR-19), & 64713N; Joint Tactical Information Distribution System, PE 25604N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; Naval Ship Weapons Systems Engineering Station, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI. CONTRACTORS: RCA, Moorestown, NJ; Applied Physics Laboratory - Johns Hopkins University, Laurel, MD; Raytheon Company, Wayland, MA; Computer Science Corporation, Moorestown, NJ; VITRO Laboratory, Silver Spring, MD; Bird Associate, Vienna, VA.

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

(U) Project S0325, Combat System Engineering Development: This project provides the facility and resources to system engineer and test the AEGIS Combat System and to develop, proof and validate Combat System computer programs at the Combat System Engineering Development Site at Moorestown, NJ. AEGIS Combat System Operational Test and Evaluation logistic support planning, and AEGIS crew training are also conducted at the Site.

(U) In FY 1982, integration of the Gun Weapon System into the AEGIS Combat System was completed, integration of the Light Airborne Multi-Purpose System MK III and STANDARD Missile-2 Block II continued, integration and testing of the AEGIS Display System continued, and systems engineering efforts resulting from Operational Test III-D in 1981 were completed.

(U) The FY 1983 program consists of:

- o Continuing AEGIS Display System integration and testing.
- o Continuing Light Airborne Multi-Purpose System MK III Shipboard electronics integration and testing. Complete computer program development.
- o Conduct STANDARD Missile-2/AEGIS Weapon System computer program integration.

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

- o Complete AEGIS Display System testing.
- o Conduct Light Airborne Multi-Purpose System MK III integration and testing.
- o Complete STANDARD Missile-2 Block II integration with the AEGIS Weapon System.

Program to completion includes support of the Combat System Engineering Development Site as the AEGIS System engineering and training site.

49

Program Element: 64307N Title: CG-47 Product Improvement

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

(U) Project S1275, SPY-1 Radar Improvements:

1. (U) DESCRIPTION (Requirement and Project): In 1975 the Deputy Secretary of Defense directed the Navy to identify options for keeping the CG 47 Class from becoming obsolete during the ship Class construction period which will extend into the 1990's. One of the options identified at that time was to product improve three components of the AN/SPY-1A Radar--the signal processor, transmitter, and array. These product upgrades had as their aim reducing cost and weight, enhancing performance, increasing reliability, simplifying and enhancing producibility while maintaining radar system form and fit. In addition, modifications to current AN/SPY-1A computer programs will be accomplished to make equipment changes. The improved radar system--AN/SPY-1B--will have overall performance and reliability exceeding AN/SPY-1A in all areas. In FY 1981, Congress appropriated $40 million for an early start to this program under Program Element 63589N, Major Surface Combatant Development (Advanced), in order to preserve the option of upgrading an FY 1983 ship. In FY 1982, funds for the work shifted to Program Element 64303N, AEGIS Area Air Defense and in FY 1983 to this Program Element. The improved radar is designated AN/SPY-1B, and its Engineering Model is designated Engineering Development Model 4.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued testing signal processor components, in particular the power supply assembly and the analog and digital assembly. Fabricated a double duty Crossed Field Amplifier tube for the transmitter. Continued design and fabrication of transmitter modification kits. Started testing antenna model and completed phase shifter/driver pilot production. Continued computer program coding and testing.

b. (U) FY 1983 Program: Complete testing the Signal Processor power supply and analog/digital assemblies. Start integration and testing full-up Signal Processor Cabinets. Complete engineering and fabrication of transmitter modifications and qualify the double duty Crossed Field Amplifier tube. Complete assembly of low sidelobe antenna prototype. Complete computer program coding and continue testing.

c. (U) FY 1984 Planned Program: Install Engineering Development Model 4 at the Combat System Engineering Developent Site and start system tests.

d. (U) Program to Completion: Conduct system tests with the improved transmitter, antenna and signal processor at the Combat System Engineering Development Site.

e. (U) Milestones

MILESTONE		DATE
1. Component Testing (DT/OT-IIA)	(FY 1983)*	FY 1983 - FY 1984
2. Milestone IIIA, Limited Production Decision	(FY 1983)*	September 1983
3. System Testing (DT/OT-IIB)	(FY 1984)*	FY 1984 - FY 1985
4. Milestone IIIB, Production Release	(FY 1984)*	Early FY 1985

* Date shown in FY 1983 RDT&E Descriptive Summary.

Program Element: 64307N Title: CG-47 Product Improvement

(U) Project S1447, Combat System Improvements

1. (U) Description (Requirement and Project): This project provides for the continued development of the CG 47 AEGIS Combat System throughout the decade in which the ships will be built. It is founded on the Combat System hereafter called Baseline 1, accomplished under Program Element 64304N, Combat System Engineering Development, for TICONDEROGA (CG 47). Since the construction of the remaining ships will stretch into the 1990's there is a need to upgrade the Combat Systems for these ships to maintain effectiveness against an increasing threat. These upgrades result from maturing systems whose developments, in most cases, are funded elsewhere in the Navy budget. At least two additional baseline upgrades are now necessary encompassing each of the Warfare areas: Anti-Air, Anti-Submarine, and Surface Strike. Baseline II is organized around the introduction of Vertical Launch and the Vertically Launched TOMAHAWK Missile. Baseline III is organized around the introduction of AN/SPY-1B communication system. Other upgrades included in one or more of these baselines are a cruiser-configured communications suite, conversion of the Combat Information Center to AN/UYQ-21 display consoles, Navy Tactical Data System Link 11 Model 5, the Anti-Submarine Warfare Combat System, (Anti-Submarine Warfare Control System, AN/SQQ-89 Underwater Sensor System, Tactical Towed Array Sonar System, and improved hull-mounted sonar), Battle Group AEGIS Display System, automatic gridlock capability, electrical power management techniques, Vertically Launched Anti-Submarine Rocket, and an improved secondary battery. Funds under this project will provide the system engineering, analysis, computer program modification, interface design changes, technical documentation updates, and system testing necessary to assure these new systems function correctly and responsively in the AEGIS Combat System. Work will be performed at the Combat System Engineering Development Site, Moorestown, NJ.

2. (U) PROGRAM ACCOPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Conducted sample lot tests of low-current power controllers and began development of high-current power controllers. Began integration engineering of new Anti-Submarine Warfare systems.

b. (U) FY 1983 Program: Complete testing of low-current power controllers and conduct testing of high-current power controllers. Start combat system computer program development for new Anti-Submarine Warfare elements. Start engineering for conversion of Combat Direction System to AN/UYQ-21 display consoles. Start TOMAHAWK/Vertical Launch System combatant design; conduct development testing at Combat System Engineering Development Site. Install Electronic Warfare System interface hardware at the Combat System Engineering Development Site. Complete Command and Decision/AEGIS Display System interface tests. Start at-sea testing of Automatic Gridlock system. Start integration engineering for Electronic Power Management and CG 47 communications suite upgrade. Complete CG 47 electrical load measurement.

c. (U) FY 1984 Planned Program: Conduct additional TOMAHAWK development testing as required by the Naval Sea Systems Command and continue combatant design. Start long-lead procurement of AN/UYQ-21 display console components. Start Link 11 Model 5 Combat System engineering and modify computer programs to support certification testing. Start Lifetime Support Simulation System coding and debugging. These additional testing requirements and program initiatives account for the $23.1 million increase in funding requirements from FY 1983 to FY 1984. Continue Anti-Submarine Warfare Upgrade computer program development and AN/UYQ-21 display console conversion. Deliver radio system test units to the satellite engineering site at Naval Electronics System Engineering Activity. Continue Electrical Power Management development. Deliver initial Electronic Warfare System computer programs. Complete at-sea development model for AEGIS display system upgrade, and start at-sea testing. Conduct Geodetic Gridlock demonstration at-sea. Complete computer-assisted electrical load management system.

d. (U) Program to Completion: Complete conversion of the Combat Information Center to AN/UYQ-21 display consoles. Complete AEGIS Combat System integration, test and evaluation for new Anti-Submarine Warfare elements including AN/SQQ-89 Underwater Sensor System, AN/SQR-19 Tactical Towed Array Sonar System, AN/SQS-53 Improved hull-mounted sonar, and MK-116 Model 6 Anti-Submarine Warfare Control System. Complete integration of Link 11 Model 5, and the upgraded communication system. Continue updates to the AEGIS Display System. Complete Automatic gridlock development. Complete ship electrical power distribution system redesign. Continue to integrate improved systems as appropriate to keep the CG 47 Class apace with the threat.

e. (U) Milestones: Program is to upgrade the CG 47 combat system using systems developed under other program elements. Milestones may be found under each system Descriptive Summary.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64308N
DoD Mission Area: 235 - Naval Warfare Support

Title: Link Ash
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	3,903	14,642	Continuing	Continuing
R1766	Link Ash	0	0	3,903	14,642	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.

52

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64314N
DoD Mission Area: 221 - Counter Air
Title: Advanced Medium Range Air-to-Air 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	3,294	4,676	6,797	44,082	54,120	187,238
W0981	Advanced Medium Range Air-to-Air Missile	3,294	4,676	6,797	44,082	54,120	187,238
	Quantity (Operational Evaluation)						(70)

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 joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement, to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness as a SPARROW follow-on missile. The need described is an all-weather, all-aspect, beyond visual range air-to-air missile compatible with the F-14, F-15, and F-16, and F/A-18 aircraft, and with a performance envelope significantly improved over the AIM-7F/M SPARROW, increased missile velocity, a "launch and maneuver" employment capability, and the capacity for multiple target attack during a single intercept. This program is jointly funded. The Air Force Counter Air analysis indicates the crucial need for an Advanced Medium Range Air-to-Air Missile to counter the projected threat in 1986 and beyond. This threat includes improved night and all-weather low altitude strike capability and all-aspect air-to-air missiles. The Full-Scale Development phase of the Advanced Medium Range Air-to-Air Missile commenced in FY 1982 and is funded by the Air Force. Navy funds will assure that all Navy-unique applications and analyses of trade-offs will be investigated in addition to conduct of Navy initial operational test and evaluation.

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: Decreases of 1,700 in FY 1982 and 38 in FY 1983 and a decrease of 119 in FY 1984 are a result of revised cost estimates including inflation. The FY 1985 to completion increase of 16,202 is the result of higher unit costs for missiles which are to be utilized during Navy's Operational Evaluation. Air Force program element 64314F provides funding for full-scale development of this joint 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	22,509*	4,994	4,714	6,916	82,000.	172,893
W0981	Advanced Medium Range Air-to-Air Missile	22,509*	4,994	4,714	6,916	82,000	172,893

* Funded under Program Element 63370N, Beyond Visual Range Air-to-Air Missile

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

F. (U) RELATED ACTIVITIES: The development program is a joint service effort with the Air Force as executive service. The Navy is assigned a Deputy Program Manager, a Deputy Chief Engineer, and deputies for Management, Test, Logistics, and Budget. Close relationship with the F-14, F-15, F-16 and F/A-18 program offices is maintained. Other programs which are related to full employment capability included target identification and improved aircraft radar counter-countermeasures and aircraft multiple target track and missile guidance. Air Force Program Element 64314F, Advanced Medium Range Air-to-Air Missile provides funding for full-scale development of this program.

Program Element: 64314N Title: Advanced Medium Range Air-to-Air Missile

G. (U) WORK PERFORMED BY: IN-HOUSE: Armament Division, Advanced Medium Range Air-to-Air Missile Joint System Program Office, Eglin Air Force Base, FL; Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Naval Air Station, Point Mugu, CA; and U.S. Army Missile Research and Development Command, Redstone Arsenal, AL. CONTRACTORS: Hughes Aircraft Company, Canoga Park, CA, was selected as the lead contractor for the Full-Scale Development phase. Raytheon Company, Bedford, MA, was selected as the follower contractor.

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

(U) Project WO981, Advanced Medium Range Air-To-Air Missile: This project provides for unique application of trade-offs and for missile and launchers to accomplish Operational Evaluation leading to approval for service use.

(U) In FY 1982, Milestone II was accomplished and the full-scale development phase began. Navy continued to analyze all unique applications.

(U) The FY 1983 program will continue the analysis of unique applications and conduct the limited evaluation of utility leading to operational evaluation and approach for service use.

(U) The FY 1984 program will continue analysis of unique applications and conduct limited evaluation of utility.

(U) The program to completion will continue intensive developmental refinement of missile components and analysis of trade-offs. Procurement of seventy missiles will be accomplished in FY 1985, 1986, and 1987 to perform operational evaluation leading to approval for service use.

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

J. (U) TEST AND EVALUATION:

1. (U) Development Test and Evaluation: The Advanced Medium Air-to-Air Missile program is managed by a Joint System Program Office under the command of the Armament Division of the Air Force Systems Command. The 3246th Test Wing Air Force Systems Command, is the responsible test organization. The 3246th Test Wing has formed a Joint Test Force to conduct the flight test. The Joint Test Force includes both Air Force and Navy personnel. Hughes Aircraft Company and Raytheon Company were the Validation Phase competitive development contractors. The Advanced Medium Range Air-to-Air Missile program for the concept validation phase Hughes Aircraft Company awarded the Full-Scale Development contract on 11 December 1982.

During Validation Phase, test hardware and software built by Hughes Aircraft Company and the Raytheon Company were evaluated. The following results were achieved with the major test assets:

a. (U) Instrumented Measurement Vehicle - These test assets were designed to measure temperature and vibration characteristics of the missile and launcher during carriage aboard the various aircraft. Hughes Aircraft Company hardware was tested from November 1979 through October 1981. The missions flown included The missions flown included eight on the F-14; 17 on the F-15; and seven on the F-16. The Instrumented Measurement Vehicle tests aided the development of a data base for the Full-Scale Development Test and Analyses and Fix reliability program and resulted in a physical strengthening of the missile airframe and rail launcher.

b. (U) Seeker Test Unit - These test assets were used for development and evaluation of the seeker and guidance subcomponents. Hughes Aircraft Company hardware was tested from December 1979 through September 1982.

functions of the weapon system with Twenty-four missions were flown to evaluate the Raytheon seeker. The seeker test unit tests will result in an

c. (U) Separation and Controlled Test Vehicles were used to provide separation and airframe control data. Hughes Aircraft Company launched four separation test vehicles between June 1980 and October 1981. Raytheon Company launched two control test vehicles between January and April 1981. A launch latch release problem was encountered and corrected (in the Raytheon design).

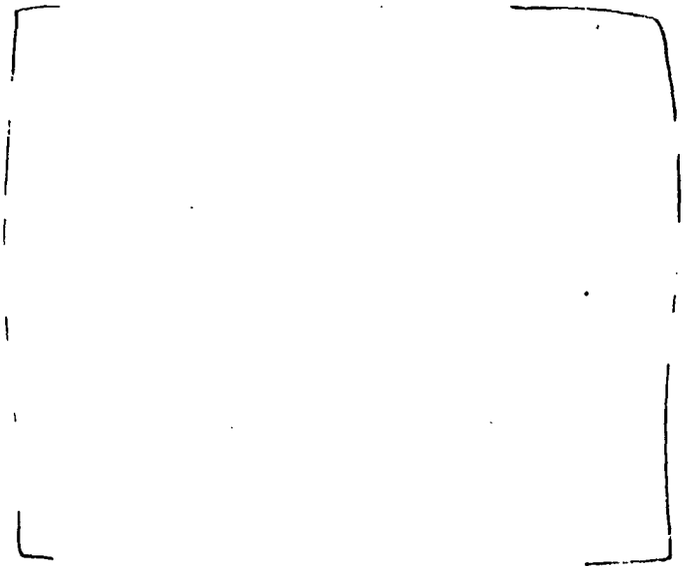
d. (U) Guided Test Vehicle - These test assets were used to The 1981 test plan has a schedule of ten guided test vehicle firings by each contractor. However, the contractors could only deliver six missiles each. These were between June 1981 and September 1982. The only major subcomponent that was not tested as an Target detection devices developed by each contractor were tested at the Navy's Encounter Simulation Lab, Corona, California.

(U) Validation Test Summary: Data was collected to aid the design, to provide the weapons system concept, and support answers to the critical issues listed in the Decision Coordinating Paper. The test hardware used during the Validation Phase was functionally the same as that planned for Full-Scale Development. Design changes during Full-Scale Development will result in lower cost, improved manufacturing, and improved reliability. The Full-Scale Development plan calls for 87 missile firings to accomplish combined test and evaluation of the F-16 and development test and evaluation of the F-14, F-15, and F/A-18 aircraft. Four of these missiles will have warheads. A captive carry program will be conductad similar to that accomplished during Validation Phase. In addition, 17 missiles will be produced for reliability and six missiles for each aircraft for the tactical aircraft modification program.

2. (U) Operational Test and Evaluation: During the Validation Phase, operational test and evaluation consisted of monitoring developmental tests. During Full-Scale Development, combined test and evaluation will be conducted on the In addition, ten missiles will be used in a captive carry reliability demonstration program as part of initial operational test and evaluation. A separate phase of initial operational test and evaluation will be conducted for the F/A-18 at the end of full-scale development. Data collected during both the combined and separate phases of initial operational effectiveness and suitability testing will be used to support the production milestones. Full-scale development testing will be conducted from Fiscal Year 83 through early Fiscal Year 86 with separate Initial Operational Test and Evaluation in the Fiscal Year 84 timeframe. The Air Force Test and Evaluation Center will have the overall management responsibility for Advanced Medium Range Air-to-Air Missile Operational Test and Evaluation planning. Specific test locations have been determined for each service. The White Sands Missile Range, New Mexico, and the Eglin Gulf Test Range, Florida, will be used to support Air Force tests. The Pacific Missile Test Center, California, and the Naval Weapons Center, China Lake, California, will be used to support Navy tests. Preliminary Advanced Medium Range Air-to-Air Missile Initial Operational Test and Evaluation planning has been accomplished. Air Force and Navy personnel will operate the Advanced Medium Range Air-to-Air Missile throughout the development program. Contract personnel will maintain the Advanced Medium Range Air-to-Air Missile at the beginning of full-scale development. Therefore, all equipment will be maintained by Air Force and Navy personnel.

Program Element: 64314K Title: Advanced Medium Range Air-to-Air Missile

3. (U) Systems Characteristics: The system is being defined in response to the Mission Element Need Statement and the Joint System Operational Requirement document. The objectives data listed below reflect the system specification of the Decision Coordinating Paper thresholds.



FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64352N
DoD Mission Area: 231 - Anti-Air Warfare

Title: Surface Launched Weaponry, Ship 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 FCS PROGRAM ELEMENT	63,862	3,037	1,412	1,452	Continuing	Continuing
S0170	SAM Anti-Missile Capability	2,919	1,540	0	0	0	95,808
S0171	Ultra-High Frequency Telemetry	1,292	1,497	1,412	1,452	Continuing	Cont'nuing
S0179	MK-92 FCS Upgrade	17,484	*	*	*	*	*
S0188	New Threat Upgrade	27,471	**	**	**	**	**
S0964	TARTAR CGN New Threat Upgrade	14,696	**	**	**	**	**

* Project S0179 funded under element 64301: MK 92 FCS Upgrade FY 1983 and beyond.
** S0188 and S0964 funded under element 64372N: New Threat Upgrade FY 1983 and beyond.

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 except for project S0170 which completes in FY 1983.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element supports development of shipboard missile systems to counter major anti-ship missile threats. It encompasses improvements to both the TERRIER and TARTAR systems employed on our guided missile cruisers and destroyers and associated telemetering equipment used for weapon system readiness assessments.

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 changes: A net increase of 21,357 in FY 1982 due to 17,484 for S0179 being erroneously omitted from FY 1983 Descriptive Summary and shown instead in the Descriptive Summary for PE 64301 (MK 92 FCS Upgrade), and 3,950 added to S0188 (New Threat Upgrade) was a Congressional addition to support an extension of Operational Evaluation; A net decrease of 376 in FY 1983 due to revision of cost estimate. In addition in FY 1984, S0170 (SAM Anti-Missile Capability) was decreased by 1,930 due to completion of program and S0171 decreased by 30 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	38,352	42,505	3,413	3,372	Continuing	Continuing
S0170	SAM Anti-Missile Capability	3,068	2,935	1,916	1,930	Continuing	Continuing
S0171	Ultra-High Frequency Telemetry	1,135	1,320	1,497	1,442	Continuing	Continuing
S0188	New Threat Upgrade	25,282	23,521	**	**	Continuing	Continuing
S0964	TARTAR CGN New Threat Upgrade	8,867	14,729	**	**	Continuing	Continuing

** S0188 and S0964 funded under element 64372N: New Threat Upgrade in FY 1983 and beyond.

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

F. (U) RELATED ACTIVITIES: STANDARD Missile Improvements, PE 64366N; Surface Missile Warhead Development, PE 64365N.

57

Program Element: 64352N Title: Surface Launched Weaponry, Ship Systems

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Applied Physics Laboratory, John Hopkins University, Laurel, MD., Automation Industries, Inc., Vitro Laboratories, Silver Spring, MD.

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

(U) Project S0171, Ultra-High Frequency Telemetry: This project develops improved, portable, shipboard telemetry equipment to enhance reception, recording and display of missile telemetry in the mobile sea range environment.

(U) In FY 1982, the Pulse Amplitude Modulation/Pulse Coded Modulation data reconstruction was completed. The dual-channel scanning/tunable receivers were configured. Receiver requirements for a miniature militerized unit were developed.

(U) In FY 1983, the principal objectives are:

- o To develop improved autotrack antenna performance.
- o To finalize testing of dual-channel scanning receiver.
- o To develop miniature telemetry receiver.
- o To evaluate portable multiband polarization antennas.
- o To test baseband Pulse Coded Modulation simulation and analysis equipment.

(U) For FY 1984, the objectives are:

- o To add Radio Frequency link capability to the Pulse Coded Modulation simulation laboratory.
- o To evaluate applicability of newly developed commercial receivers and combiners.
- o To conduct compatibility tests of the KGR-66 decryptor for secure telemetry applications.
- o To investigate video doppler processing techniques.

(U) Program to completion: Continue to support new program requirements with telemetry equipments.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64353N
Title: Vertical Launching 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	74,923	53,578	45,813	43,435	TBD	TBD
S0177	Vertical Launch STANDARD Missile	7,773	3,808	1,807	704	0	68,241
S1004	Vertical Launch Adaptation	6,621	3,985	5,537	16,241	TBD	TBD
S1035	Vertical Launch Test Missile	4,262	3,159	5,620	5,838	TBD	TBD
S1364	Vertical Launch TOMAHAWK	52,301	22,926	32,849	20,652	TBD	TBD
S1504	Vertical Launch ASROC	3,966	19,700	*	*	*	*

* Vertical launch ASROC will be funded in Program Element 64355N.

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated for Project S0177 and through FY 1985 only for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops a Vertical Launching System for surface combatants for launching Anti-Air, Anti-Surface, Anti-Submarine and Strike Warfare missiles. The primary objective is to develop a system for integration with AEGIS/STANDARD Missile (Medium Range). The program also provides for procurement of test missiles and test support for Development and Operational Test and Evaluation and for integration of the Vertical Launching System with other missiles such as TOMAHAWK and their respective Weapons 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: An increase of 3,966 in project S1504 (Vertical Launch ASROC) in FY 1982 is due to 3,500 being authorized for the initiation of the Vertical Launch ASROC program plus 466 being reprogrammed into project S1504 from project S1364 (Vertical Launch TOMAHAWK). The increase of 19,700 in FY 1983 in project S1504 (Vertical Launch ASROC) is due to a reprogramming from Program Element 63367N ASW Stand Off Weapon. An increase of 19,267 to project S1364 (Vertical Launch TOMAHAWK) in FY 1984 is to support the restructured Vertical Launching System/TOMAHAWK development and testing program. Other changes result from revised cost estimates including inflation and adjustments during FY 1984 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	67,672	70,424	33,878	26,832	Continuing	Continuing
S0177	Vertical Launch STANDARD Missile	12,354	7,773	3,808	1,846	719	68,295
S1004	Vertical Launch Adaptation	5,387	6,621	3,985	5,659	Continuing	Continuing
S1035	Vertical Launch Test Missile	3,923	4,262	3,159	5,745	Continuing	Continuing
S1364	Vertical Launch TOMAHAWK	46,008	51,768	22,926	13,582	Continuing	Continuing

Program Element: 64353N Title: Vertical Launching 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
SCN (CG-47 Class, PE 24292)	194,063	214,996	223,998	235,270	Continuing	Continuing
Procurement Quantity (Ship Sets, two 61 cell magazines per ship set)	(2)	(3)	(3)	(3)	Continuing	Continuing
OPN (VLS/DD-963 Class)	65,708	40,283	23,058	102,762	Continuing	Continuing
Procurement Quantity (Ship Sets, one 61 cell magazine per ship set)	(2)	(1)	(0)	(4)	Continuing	Continuing

F. (U) RELATED ACTIVITIES: STANDARD Missile Improvements, PE 64366N; Area Air Defense, PE 64303N; TOMAHAWK Missile System, PE 64367N; DDG-51 Combat System, PE 63589N

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Laboratory is the Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA. OTHERS: Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Ordnance Missile Test Facility, White Sands, NM; Naval Weapons Center, China Lake, CA; Naval Weapons Station, Earle, Colts Neck, NJ; Fleet Analysis Center, Corona, CA; Operational Test and Evaluation Force, Norfolk, VA. CONTRACTORS: Martin Marietta, Baltimore, MD is the prime contractor. OTHERS: RCA, Moorestown, NJ; General Dynamics/Pomona, Pomona, CA; General Dynamics/Convair, San Diego, CA; VITRO Laboratory/Automation Industries, Silver Spring, MD; Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; McDonnell Douglas Astronautics Corporation, St. Louis, MO; Lockheed Missiles and Space Co., Sunnyvale, CA; Martin Marietta, Orlando, FL.

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

(U) Project S0177, Vertical Launch STANDARD Missile: This project develops the Vertical Launching System with SM-2 (MR) Block I and AEGIS interfaces.

(U) In FY 1982, the Preproduction Model (PPM-1) was installed in USS NORTON SOUND (AVM-1) and used for the successful Technical and Operational Evaluations of the Vertical Launching System utilizing AEGIS and SM-2(MR) Block I. Provisional Approval for Service Use and Initial Production Release were granted and production has commenced.

(U) The FY 1983 program consists of:

- o Continuing development of Vertical Launching System canistered round certification at Naval Weapons Stations.
- o Determining, designing, fabricating and testing modifications required as a result of Technical and Operational Evaluations of the baseline Vertical Launching System.

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

- o Continue production transition support.
- o Complete incorporation of modifications resulting from Technical and Operational Evaluation into the data package.
- o Continue development of installation interfaces for tactical ships and support certification of tactical ships operational computer programs.

(U) Program to Completion, will support introduction of the Vertical Launching System into CG-47 Class ships.

Program Element: 64353N Title: Vertical Launching System

(U) Project S1004,Vertical Launch Adaptation: This project provides for the design and development of the modifications necessary to expand the basic Vertical Launching System design to be compatible with other fire control systems and to launch present and future generation missiles, including STANDARD Missile 2 (Medium Range) Block II.

(U) In FY 1982, development continued on equipment and computer program modifications to adapt the Vertical Launching System to STANDARD Missile 2 (MR) Block II. Fabrication and incorporation of modifications to the Vertical Launching System for SM-2 Block II compatibility was initiated.

(U) FY 1983 program consists of:

- o Continuing development of modifications to Vertical Launching System equipment and computer programs for SM-2 Block II compatibility .
- o Conducting system integration tests with SM-2 Block II components including Inert Operational Missile.
- o Supporting integration of Vertical Launching System with SM-2 Block II capability with the AEGIS Weapon System.
- o Supporting installation, checkout and system integration of Vertical Launching System with SM-2 Block II capability in USS NORTON SOUND (AVM-1).
- o Providing support for Technical and Operational Evaluations of AEGIS/Vertical Launching System /SM-2 Block II in USS NORTON SOUND (AVM-1).

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

- o Complete development and fabrication of modifications to Vertical Launching System equipment and computer programs for SM-2 Block II compatibility.
- o Support land based system integration testing/demonstrations between AEGIS Weapon System, Vertical Launching System and SM-2 Block II at the Combat Systems Engineering Development Site, Moorestown, N.J.
- o Support completion of Technical and Operational Evaluations of AEGIS/Vertical Launching System/SM-2 Block II in USS NORTON SOUND (AVM-1).
- o Incorporate changes as a result of Technical and Operational Evaluations.
- o Obtain Approval for Production for Vertical Launching System with SM-2 Block II.

(U) Program to completion, will continue to develop Vertical Launching System hardware and software modifications required to support missiles, missile propulsion and weapons systems currently in the inventory and future weapons and weapons control systems designated for Vertical Launch.

(U) Project S1035, Vertical Launch Test Missile: This project provides test missiles and supports tests using both fully guided missiles and launch test vehicles (unguided except for a preprogrammed pitchover maneuver) for current and future weapons designated for integration with the Vertical Launching System.

(U) In FY 1982, the project provided test missiles in support of SM-2 Block II/Vertical Launching System compatibility tests. Support for Technical and Operational Evaluation of the Vertical Launching System utilizing AEGIS and SM-2 (MR) Block I in USS NORTON SOUND (AVM-1).

Program Element: 64353N Title: Vertical Launching System

(U) The FY 1983 program consists of:

- o Conduct land based compatibility test firings at White Sands Missile Range with Vertical Launching System/SM-2 Block II.
- o Procure STANDARD missile Launch Test Vehicles to support Vertical Launching System/SM-2 Block II Technical and Operational Evaluations.
- o Initiate procurement of STANDARD Missile Launch Test Vehicles to support Vertical Launching System multiwarfare capability demonstrations during Vertical Launching System/TOMAHAWK Technical and Operational Evaluations.
- o Provide support for Technical and Operational Evaluations of AEGIS/Vertical Launching System/SM-2 Block II in USS NORTON SOUND (AVM-1).

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

- o Support completion of Technical and Operational Evaluations of AEGIS/Vertical Launching System/SM-2 Block II in USS NORTON SOUND (AVM-1).
- o Conduct Launch Test Vehicle missile firings from USS NORTON SOUND (AVM-1) for multiwarfare capability demonstration.
- o Conduct missile rapid fire tests from USS NORTON SOUND (AVM-1).
- o Provide missiles for Weapons Station Certification.

(U) Program to completion, will continue to procure missiles/Launch Test Vehicles in support of Vertical Launching System development and operational events, tests and certification demonstrations.

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

(U) Project S1364, Vertical Launch TOMAHAWK

1. (U) DESCRIPTION (Requirement and Project): In September 1979, A TOMAHAWK Missile (Anti-Ship variant) was launched from a vertical canister demonstrating the feasibility of vertically launching TOMAHAWK missiles. In October 1979, the Vertical Launching System Program was expanded to include Vertical Launch/TOMAHAWK to exploit the inherent advantages of the Vertical Launching System and to provide a surface strike capability for surface combatants. CG-47, DD-963, and DDG-51 Class ships were identified to receive this capability. The purpose of this project is to develop and test the interfaces and modifications to the Vertical Launching System, TOMAHAWK missiles and the TOMAHAWK Weapons Control System to achieve a Vertical Launch/TOMAHAWK capability.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed the TOMAHAWK/Vertical Launching System interface definition. Continued development of modifications for TOMAHAWK compatibility. Completed fabrication of TOMAHAWK capable Preproduction Model Vertical Launching System for land based testing. Conducted TOMAHAWK missile and Vertical Launching System canister compatibility demonstration. Conducted System Integration Tests between the Vertical Launching System Preproduction Model (PPM-2) and the TOMAHAWK Simulator/Inert Operational Missiles. Procured installation support material and initiated preparations for installation of the Vertical Launching System (PPM-2) and TOMAHAWK Weapons Control System in USS NORTON SOUND (AVM-1) for Technical and Operational Evaluations at-sea tests. Initiated Basic Alteration Class Drawing development for DD-963 Class ships.

Program Element: 64353N Title: Vertical Launching System

b. (U) FY 1983 Program: Complete system integration testing of the Vertical Launching System with TOMAHAWK Inert Operational Missiles. Conduct land based test firing of TOMAHAWK missile from the Vertical Launching System Preproduction Model at the Pacific Missile Test Center. Conduct canister Packaging, Handling, Storage and Transportation certification tests at Naval Weapons Handling Center, Earle, NJ. Conduct Vertical Launching System Integration tests with TOMAHAWK inert missiles at Baltimore, Maryland. Complete fabrication of the TOMAHAWK capable Vertical Launching System Preproduction Model (PPM-2) and install PPM-2 in USS NORTON SOUND (AVM-1). Provide TOMAHAWK Missiles for the conduct of land-based missiles firing tests from Vertical Launching System Module at the Pacific Missile Test Center. Deliver all up rounds for subsequent firing tests. Complete TOMAHAWK Weapons Control System hardware definition and design. Complete delivery of TOMAHAWK guidance sets.

c. (U) FY 1984 Planned Program: Complete TOMAHAWK Weapon Control System/Vertical Launching System development and conduct integration testing at Naval Ship Weapon Center, Dahlgren, VA. between the TOMAHAWK Weapons Control System and TOMAHAWK missiles. Conduct land based firing of TOMAHAWK Missiles from Vertical Launching System Preproduction Model (PPM-2) at the Pacific Missile Test Center. Demonstrate TOMAHAWK Weapon Control System/missile/Vertical Launching System installation and conduct system checkout in USS NORTON SOUND (AVM-1). Initiate Technical Evaluation of Vertical Launch/TOMAHAWK capability in USS NORTON SOUND (AVM-1). The increase of 9,923 in FY 1984 over the amount required in FY 1983 provides for the restructured Vertical Launching System TOMAHAWK development and testing program.

d. (U) Program to Completion: Conduct Operational Evaluation in USS NORTON SOUND (AVM-1). Obtain Approval for Production for the Vertical Launching System with TOMAHAWK. Complete Technical and Operational Evaluations and support Vertical Launching System transition to production for CG-47, DD-963 and DDG-51 classes of ships. Identify and develop modifications to Vertical Launching System resulting from Technical and Operational Evaluations. Support continuation of Vertical Launching System, TOMAHAWK Weapon Control System and AEGIS integration testing at Moorestown, NJ, and in USS NORTON SOUND (AVM-1).

e. (U) Milestones

MILESTONE		DATE
1. Program Definition		January 1980
2. DD-963 Configuration Study		May 1980
3. TOMAHAWK/Vertical Launching System Compatibility Test Firing		November 1980
4. STANDARD Missile/Vertical Launching System (TOMAHAWK sized) Compatibility Firing		August 1981
5. Land based test firing at the Pacific Missile Test Center		February 1983
6. Packaging, Handling, Storage and Transportation Demonstration Certification	(Jul 1982)*	April 1983
7. Vertical Launching System/TOMAHAWK Weapons Control System/TOMAHAWK Integration Tests	(Oct 1982)*	April 1984
8. Land based Vertical Launching System/TOMAHAWK compatibility	(Nov 1982)*	July 1984
9. System installation and checkout in USS NORTON SOUND (AVM-1)	(FY 1983)*	August 1984
10. Technical Evaluation in USS NORTON SOUND (AVM-1)	(FY 1984)*	December 1984
11. Operational Evaluation in USS NORTON SOUND (AVM-1)	(FY 1984)*	FY 1985
12. Approval for Production	(FY 1984)*	FY 1985

* Date shown in FY 1983 RDT&E Descriptive Summary. Delay in Vertical Launching System/TOMAHAWK Technical and Operational Evaluation caused by addition of battleship TOMAHAWK/Common Weapons Control System effort at a higher priority.

Program Element: 64353N Title: Vertical Launching System

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: An advanced prototyping program that demonstrated a successful vertical firing of special configured STANDARD 1 missiles was concluded in January 1977. Initial engineering development testing, which demonstrated the adequacy of the gas management system design of the Vertical Launching System, was conducted at the White Sands Missile Range in January 1978 with STANDARD Missile 1 Launch Test Vehicles and a restrained firing of a STANDARD Missile MK 56 Rocket Motor. Compatibility test firings were conducted in November 1978 that confirmed that STANDARD Missile performance is not affected by vertical launch. A feasibility demonstration of launching the TOMAHAWK missile vertically from its canister was successfully conducted in September 1979. Integration testing was completed which demonstrated that Vertical Launching System components, including computer programs, are compatible. Canister certification as an ordnance shipping container for STANDARD Missile has been completed. Initial STANDARD Missile 2 Block I (VL) firings were successfully conducted at White Sands Missile Range from the Vertical Launching System. The Secretary of the Navy direction for program expansion in October 1979, to include TOMAHAWK capability, resulted in compatibility modifications to the Vertical Launching System. Subsequently, a TOMAHAWK (Land Attack) missile and a STANDARD Missile Launch Test Vehicle were successfully launched from the Vertical Launching System Engineering Development Model, modified for TOMAHAWK compatibility, at Pacific Missile Test Center, Pt. Mugu, CA, and White Sands Missile Range, NM. Integration tests between Vertical Launching System and the AEGIS Weapons Control System were completed successfully at the AEGIS Computer Program Test Site, Moorestown, NJ; Testing to evaluate the maintainability of the system in a shipboard environment was conducted and initial crew training was completed. Technical Evaluation, including reliability determination of the Vertical Launching System was completed on 28 March 1982 on board USS NORTON SOUND. The Vertical Launching System performance was satisfactory for all of the DTIIG Technical Evaluation firing and suitability tests. DT-IIG consisted of seven missile firing tests which resulted in the launch of five LTV's and five SM-2 Block I VL missiles. Technical Evaluation of Vertical Launching System with SM-2 Block II capability is planned for FY 1983. Technical Evaluation of Vertical Launching System with TOMAHAWK is planned for FY 1984. The Development Contractor is Martin Marietta Corporation.

2. (U) Operational Test and Evaluation: Operational Evaluation of Vertical Launching System commenced in 1981 with the successful evaluation of the Vertical Lauching System canister operational suitability. No significant discrepancies were found. Action has been taken to correct minor discrepancies. Operational Evaluation of Vertical Launching System/AEGIS/STANDARD Missile 2 Block I (VL) capability was completed on 13 April 1982 on board USS NORTON SOUND (AVM-1). Tests demonstrated that VLS is operationally effective and potential operationally suitable. Six live firings (3 LTV's and 3 SM-2 Block I) and nine reload cycles were conducted. Provisional Approval for Service Use was granted in the third quarter FY 1982). The Initial Production Release preceded a contract award for initial production which was signed on 30 July 1982. VL/SM-2 Block II and VLS/TOMAHAWK Operational Evaluations will be conducted in FY's 1984 and 1985. Further (Commander Operational Test and Evaluation Force) will monitor all phases of DT&E and will conduct operational tests.

3. (U) System Characteristics: The Vertical Launching System is a guided missile launcher for surface combatants for launching Anti-Air-Warfare, Anti-Surface Warfare, Surface Strike Warfare and Anti-Submarine Warfare missiles. It is designed to simultaneously interface with up to three weapons control systems. The modular concept employed in the VLS design is based on an eight missile module which is replicated to meet requirements of a ship class installation. One module in each magazine will contain a strikedown crane in the space of three missile cells to replenish canistered missiles in missile cells. Any missile type adapted for vertical launch can be located in any cell.

Program Element: 64353N Title: Vertical Launching System

Required Characteristics:

Parameter	Threshold	Demonstrated
1. VLS/AAW reaction time (seconds) (1)	[redacted]	[redacted]
2. VLS/AAW firing interval (seconds) (2)		

(1) Reaction time is defined as the time from missile select order to missile first motion, assuming no delay in fire order generation.

(2) Firing interval is defined as the time between successive missile firings based on a multiple module system. Firing interval for a single module will be less than [redacted] seconds per missile.

4. (U) Program Documentation:

(U) Operational Evaluation of the EX 41 Mod 0 Vertical Launching System (OPNAV) Report Symbol 3960-12)	5 August 1982
(U) Quick Look Report of CNO Project 463 DT IIG/H, VLS Techeval	18 March 1982
(U) Quick Look Report on Operational Evaluation of EX 41 Mod 0 (msg)	25 April 1982

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64354N
DoD Mission Area: 231 - Anti-Air Warfare
Title: Air-to-Air Missile Systems 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	37,065	22,844	3,987	23,524	TBD	TBD
W0456	AIM-9M Product Improvement Program	600	0	0	15,186	TBD	TBD
	(Quantity)						(69)
W0457	Sparrow Improvement	5,000	0	0	0	0	55,600
	(Quantity)						(44)
W0614	AIM-54C Improvement	31,465	22,844	3,987	0	0	171,824
	(Quantity)		(Initial Operational Test and Evaluation)				(45)
W1671	Outer Air Battle Missile	0	0	0	3,442	TBD	TBD
S1695	Fuze-Warhead Guidance Improvement	0	0	0	4,896	TBD	TBD

The above funding profiles include out-year escalation and encompasses all work or development phases now planned or anticipated for Projects W0457 W0614 and through FY 1985 only for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Project W0614 - This program provided development of improved missile units within the AIM-54 PHOENIX long-range air-to-air missile to meet the threat of the 1980's and 1990's. Project W0456 - The short range air-to-air product improvement program SIDEWINDER will provide increased head-on acquisition range, increased background discrimination and increased counter-countermeasures capability. The primary timeframe of need is 1989-1994, to fill the threat gap until the Advanced Short Range Air-to-Air Missile initial operational capability in approximately 1995, and as a backup for the Advanced Short Range Air-to-Air Missle. Project W0457 - This progam provides the improved monopulse seeker to the medium range air-to-air and surface-to-air missile to meet the threat project during the 1980's. Project W1671- The Outer Air Battle Missile program is to develop a smaller follow-on replacement for the PHOENIX long range air-to-air missile.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes betweeen the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Project W0614 - FY 1982 was increased by 1,115 due to cost growth resulting from delays experienced in the pilot production deliveries leading to a late start-up of the Navy Technical Evaluation. The funds were used to rework initial missile assembly problems and retest of the units. The delay was approximately three months, with resulting cost growth. A decrease of 1,000 in FY 1983 resulted from Congressional Reductions imposed and revision of cost estimates. A change of scope within the progam resulted in an additional 3,987 in FY 1984. The increase in scope consists of reevaluation of the need for Follow-On Test and Evaluation following the AIM-54C Operational Evaluation and testing of the Electronic Counter-Countermeasures improvement development to be completed in FY 1983. Some changes to missile software, with additional flight testing required, is anticipated for FY 1984. Project W0456 - An increase of 15,186 in FY 1985 is a result of the initiation of the AIM-9M Product Improvement Progam. Project W0457 - No change. Projectr W1671 and S1695 - FY 1985 reflects 3,442 and 4,896 to initiate research and development under this program element for the Outer-Air-Battle Missile project and Fuze-Warhead Guidance Improvement.

Program Element: 64354N Title: Air-to-Air Missile Systems Engineering

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	37,062	35,350	23,844	0	0	254,003
W0614	AIM-54C Improvement	35,402	30,350	23,844	0	0	167,722
	(Quantity)	(Initial Operational Test and Evaluation)					(45)
W0456	Short Range Air-to-Air Missile Component Engineering	1,660	0	0	0	0	30,681
	(Quantity)	(Initial Operational Test and Evaluation)					(69)
W0457	Medium Range Air-to-Air Missile Component Engineering	0	5,000	0	0	0	55,600
	(Quantity)						(44)

E. (U) OTHER APPROPRIATIONS FUNDS:

		FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
W0614							
	WPN	161,600	234,400	398,400	476,700	Continuing	Continuing
	(Quantity)	(72)	(108)	(290)	(464)		
W0456							
	WPN	50,900	40,771	29,600	64,700	Continuing	Continuing
	(Quantity)	(700)	(500)	(450)	(1000)		
W0457							
	WPN	134,500	129,400	153,700	209,500	Continuing	Continuing
	(Quantity)	(559)	(620)	(698)	(1085)		

F. (U) RELATED ACTIVITIES: The AIM/RIM-7M, W0457, development is a joint service effort involving both the Navy and the Air Force. Funding for this effort is also under Program Elements 24668N, 64305N, and 63316F. W1617 - Exploratory development under Program Elements 63221N and 63222N with advanced development under Program Element 63308N will demonstrate propulsion, seeker development, and system packaging allowing full scale development to meet the program requirements.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Air Development Center, Warminster, PA; CONTRACTORS: Raytheon, Lowell, MA; General Dynamics, Pomona, CA.

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

(U) Project W0614 - This program provides performance and reliability improvements to the AIM-54 PHOENIX missile through development of (1) a digital electronics unit with auto-pilot functions; (2) an improved receiver/transmitter; and (3) an improved Target Detection Device. The digital electronics unit will be software programmable and will provide expanded capabilities against electronic countermeasures, high-altitude targets, maneuvering targets, very low altitude targets and cluster targets. The improved receiver/transmitter will include a frequency modulated transmitter with a frequency reference system and will provide the capability to track through the target's beam aspect and to guide on targets in a stream raid. The improved Target Deception Device will be totally solid state and will provide expanded capabilities in adverse environments. These new units will provide a significant increase in missile reliability over the existing AIM-54A.

Program Element: 64354N Title: Air-to-Air Missile Systems Engineering

(U) In FY 1982 the pilot production missiles were delivered for Navy test programs. The Navy Technical Evaluation was started in May 1982 and completed in November 1982.

(U) The FY 1983 program consists of:

- o Commencing Operational Evaluation, to be completed in November.
- o Completing Electronic Counter-Countermeasures improvement development program.

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

- o Obtain Approval for Service Use in the second quarter.
- o Conduct Follow-On Operational Testing and Evaluation (including the basic AIM-54C PHOENIX missile and the Electroni Counter-Countermeasures improvements).

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

J. (U) Development Test and Evaluation:

a. (U) The PHOENIX missile development and testing was initiated in 1963 with Hughes Aircraft Company as the developm contractor.

b. (U) In response to Specific Operational Requirement 416-68, the basic missile design was created and verified during initial development, test and evaluation phase from 1963 to 1969 with 19 of the missiles being launched in 1970.

c. (U) Design and producibility changes resulting from value engineering and Production Improvement program efforts w verified in launches in 1971 and 1972 and were incorporated into the 69 pilot production missiles which were delivered in 19 Pilot production missiles were produced in four different versions. Each new version introduced reliability, maintainability performance improvements. The final pilot production missiles resulted in the production AIM-54A PHOENIX which commenced deliv in 1973.

d. (U) Since the initial AIM-54A production deliveries, several performance improvements have been incorporated i production and retrofitted into existing inventory missiles. These changes were verified by successful launches through FY 1 of modified production missiles. A separate reliability upgrade program, initiated in 1975, resulted in improvements in production processes and procedures.

e. (U) The most significant aspect of test exprience to date has been the high success rate of AIM-54A missile firings. data in the chart below is grouped to show overall results for all AIM-54A missile firings. The data in the chart below is gro to show overall results for all AIM-54A firings through 30 July 1982:

Program Element: 64354N

Title: Air-to-Air Missile Systems Engineering:

	All Launches TA-3B, F-111, F-14	F-14/AIM-54A
Launches 1/	247	203
No tests	20	19
Valid Firings	[redacted]	
Guide Successfully 2/		
Guide and Fuze Successfully		
Guide Success (%) 3/		
Guide and Fuze Success (%)		

Notes: 1/ Includes Operational Evaluation firings
2/ Within ' of the target (lethal warhead radius)
3/ Successful performance considering only valid firing tests (no-tests excluded)

f. (U) An improved PHOENIX missile (AIM-54C) development program commenced in 1976. The AIM-54C is a technology update of selected components of AIM-54A missiles to counter the threat during the 1980's and 1990's.

Mean flight hours between failure, missile on aircraft test, and maintainability are improved over the AIM-54A.

g. (U) Contractor test and evaluation of the AIM-54C has been completed by utilizing fifteen (15) Engineering Development Model missiles. Laboratory and qualification testing has been performed to verify basic design concepts, ensure (within constraints of laboratory testing) the design meets performance, environmental, and reliability requirements and to prove workmanship, manufacturing processes, and functional operation prior to integration and higher level testing. A joint contractor/Navy flight and launch program was conducted as part of the engineering development program to evaluate technical performance in the flight environment.

Four missiles were launched in scenarios designated to complement the contractor/Navy Engineering Development Model launches. As a result of captive carry analysis and data obtained from Navy Technical Evaluation missile launches it was concluded the AIM-54C met its major design objectives.

These problems are understood and fixes will be incorporated in the Operational Evaluations missiles. Modified ground support test equipment, test procedures, and manuals were utilized to evaluate proper support with no significant problems and Operational Evaluaton will be conducted by Air Test and Evaluation Squadron (VX-4) at the Pacific Missile Test Center beginning in January 1983 using the pilot production and first low rate production missiles. A total of 15 AIM-54C's will be captive carried and fired in operational scenarios to evaluate missile effectiveness (Pk) and suitability in the fleet environment including shipboard operations.

Program Element: 64354N Title: Air-to-Air Missile Systems Engineering:

2. ( ) Operational Test and Evaluation

a. (U) The PHOENIX missile program preceded DOD and Navy test and evaluation policies now incorporated in OPNAVINST 3980.10. Accordingly, the missile was authorized for production before Operational Test and Evaluation was completed.

b. (U) Air Test and Evaluation Squadron FOUR (VX-4), Point Mugu, California, prosecuted PHOENIX testing for Commander Operational Test and Evaluation Force. Initial Operational Test and Evaluation was conducted under project Capability Validation-21 between November 1972 and November 1974. Operational evaluation and follow-on test and evaluation were conducted under project Operational Validation-118 and Chief of Naval Operation project 146-OT-III and V.

(1) (U)

(2) (U) Operational testing of the F-14A/AIM-54A weapon system has resulted in the following conclusions:

(a) (U)

(b) (U)

(c) (U)

(d) (U)

(e) (U)

(f) (U)

(g) (U)

c. (U) AIM-54C PHOENIX missile Operational Test and Evaluation is being conducted under CNO Project 337-OT-I and -II by COMOPTEVFOR and Air Test and Evaluation Squadron - Four.

3. (U) Characteristics Section: From the extensive flight testing of the AIM-54A PHOENIX missile to date, the following characteristics have been demonstrated in close simulation of tactical environments.

Program Element: 64354N

Title: Air-to-Air Missile Systems Engineering:

	Objective	Demonstrated
a. Performance		
b. Description		

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64355N
DoD Mission Area: 233 Anti-Submarine Warfare

Title: Vertical Launch Anti-Submarine Rocket
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	3,966*	19,700**	30,504	27,575	113,448	195,193
S1504	Vertical Launch ASROC	3,966*	19,700**	30,504	27,575	113,448	195,193

* Funded in Program Element 64353N, Vertical Lanching System.

** Funded in Program Element 64353N, Vertical Launching System (originally budgeted in Program Element 63367N, Common Anti-Submarine Warfare Standoff Weapon).

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 program element provides for the development, design and testing of a replacement for the current Anti-Submarine Rocket and modifications to the Vertical Launching System and affected weapons control systems to permit launching replacement anti-submarine rocket missiles from the Vertical Launching System in CG 47, DD 963 and DDG 51 class ships as well as backfitting the replacement anti-submarine rocket missiles on selected, existing anti-submarine rocket launching systems. The replacement missile will provide an intermediate range, all weather, quick reaction, anti-submarine weapon delivery capability.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: Not applicable

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

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

F. (U) RELATED ACTIVITIES: Vertical Launching System, Program Element 64353N and Submarine ASW Standoff Weapon, Program Element 63367N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (lead laboratory); Naval Weapon Center, China Lake, CA; Naval Surface Weapon Center, Dahlgren Laboratory, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Weapons Evaluation Facility, Albuquerque, NM; Naval Ordnance Station, Indian Head, MD; Naval Weapons Handling Center, Earle, Colts Neck, NJ. CONTRACTORS: Prime contractor to be determined; Martin Marrietta Corporation, Baltimore, MD; Vitro Laboratory/Automation Industries, Silver Spring, MD; Washington Analytical Services Center/EG&G Rockville, MD; and TRACOR, Austin, TX.

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

Program Element: 64355N Title: Vertical Launch Anti-Sumbarine Rocket

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

(U) Project S1504, Vertical Launch Anti-Submarine Rocket

1. (U) DESCRIPTION (Requirement and Project): This project provides for the development, design and testing of a replacement for the current Anti-Submarine Rocket and modifications to the Vertical Launching System and affected weapons control systems to permit launching the replacement Anti-Submarine Rocket Missiles from the Vertical Launching System in CG-47, DD-963, and DDG-51 class ships as well as backfitting the replacement Anti-Submarine Rocket to existing Anti-Submarine Rocket launching systems on other surface ships.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The Vertical Launch Anti-Submarine Rocket project was initiated in March 1982 under Program Element 64353N, Vertical Launching System.

b. (U) FY 1983 Program: Develop new rocket motor and thrust cutoff system, airframe, autopilot and thrust vector control system. Conduct demonstration and validation testing. Qualify components for full scale development and prepare development specification. Complete design changes for modifications to Vertical Launching System to accommodate Vertical Launch Anti-Submarine Rocket.

c. (U) FY 1984 Planned Program: Continue effort previously funded under Program Element 64353N, Vertical Launching System. Award major Vertical Launch Anti-Submarine Rocket missile contract. Complete demonstration and validation phase with three all-up missile flight tests and prepare for Milestone II decision on full scale engineering development. At the time of Milestone II all necessary experimental work will have been performed and the proposed system will be ready for full scale development.

d. (U) Program to Completion: Conduct all-up full scale engineering development flight tests. Install modifications and conduct full function at sea flight tests on USS NORTON SOUND for a Milestone IVIA decision and limited production release. Modify a DD 963 to conduct Vertical Launch Anti-Submarine Rocket technical and operational evaluations. Complete full scale engineering development and technical and operational evaluations for a Milestone IIIB decision in FY 1988.

e. (U) Milestones: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64358N
DoD Mission Area: 231 - Anti-Air Warfare

Title: Close In Weapon System (PHALANX)
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	1,357	1,346	1,253	4,252	14,636	154,443
S0172	Close-in Weapon System (PHALANX)	1,357	1,346	1,253	4,252	14,636	154,443

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: PHALANX is a fully automatic, extremely fast reaction terminal defensive gun system designed for a large variety of Navy ships. The system is designed to defeat low-flying, subsonic and supersonic anti-ship missiles which have been rapidly proliferating in Soviet, Satellite and Third World Fleets over the past two decades.

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 14 in FY 1982, 41 in FY 1983, and 76 in FY 1984 are due to a combination of inflation, economies, Contractor Support Services reductions and program 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	2,105	1,371	1,387	1,329	4,252	139,938
S0172	Close-In Weapon System (PHALANX)	2,105	1,371	1,387	1,329	4,252	139,938

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
WPN*	133,260	109,200	126,700	163,400	278,400	1,208,472
Quantity	(49)	(37)	(42)	(50)	(60)	(381)
SCN	55,493	61,081	88,293	43,200	175,195	423,262
Quantity	(15)	(20)	(22)	(12)	(37)	(106)
OPN (All Ammo)	17,040	21,553	24,618	47,274	135,726	246,211
WPN (Spares)	28,100	14,872	3,525	5,700	8,675	94,002
WPN (Mods)	1,200	2,600	4,500	39,700	160,400	208,400

* Due to reductions in earlier procurements, inflation and increases in system costs, only 52 systems could be purchased in FY 1981, a reduction of 2 systems. This has resulted in an increase of two units in FY 1987.

F. (U) RELATED ACTIVITIES: None

Program Element: 64358N Title: Close In Weapon System (PHALANX)

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA (Lead Laboratory); Technical Support Agent - Naval Ordnance Station, Louisville, KY. CONTRACTOR: General Dynamics, Pomona, CA (Prime Contractor); Major subcontractor - General Electric Corporation, Burlington, VT and Pittsfield, MA.

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

(U) Project S0172, Close-In Weapon System: This project will complete the increased firing rate test and evaluation and complete development and test of the Block I system Built-In-Test-Equipment. In addition it will integrate and test the new algorithm to improve PHALANX fire control kill probability against future highly maneuvering targets and inveatigate larger caliber gun alternates. Reliability upgrades as required will be pursued.

(U) In FY 1982:

- o Testing of the expanded search capability was completed.
- o Development of the increased capacity magazine was begun and will continue in FY 1983 along with test and evaluation of this change.
- o Examination of system changes needed to maintain or improve operational effectiveness against the future threat began and will continue in 1983.

(U) The FY 1983 Program consists of:

- o Development of Block I software and hardware corrections identified by recent operational tests.
- o Continue development and test and evaluation of the adaptive fire rate.
- o Evaluation of a new fire control algorithm developed by Naval Surface Weapons Center, Dahlgren.

(U) FY 1984:

- o Adaptive fire rate test and evaluation will be completed.
- o Evaluation of the Dahlgren algorithm will continue, utilizing various threat models.
- o Block I Built-In-Test-Equipment Development and testing to be completed.

(U) Program to completion will consist of improvements to PHALANX needed to counter the evolving threat. Testing will be conducted as necessary, to provide confidence in proposed system changes. Also included to completion are any cost-effective reliability upgrades to the system as required.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64361N
Title: NATO SEASPARROW
DoD Mission Area: 231 - Anti-Air 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	5,598	1,067	11,122	8,591	4,399	65,547
S0173	NATO SEASPARROW	5,598	1,067	11,122	8,591	4,399	65,547

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 program provides for the integration of the AIM/RIM-7M monopulse SPARROW Missile into the NATO SEASPARROW Surface Missile System. The missile has improved performance in the areas of low altitude guidance/fuzing against sea-skimming threats and in the presence of electronic countermeasures. The program also provides for the development of a blast fragmentation missile warhead for use in both the air and surface launched modes; and for improvements to the shipboard system to increase effectiveness in the areas of Electronic Counter-Countermeasures, radar tracking, signal data processing and on-board training. In FY 1985 the development of the Ordnance Alteration required to fire the Rolling Airframe Missile from the SEASPARROW System will commence. This improvement will, when complete, double the available firepower on SEASPARROW equipped units.

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: An increase of 1,800 in FY 1982 was for the RIM-7M Ordnance Alteration, Operational Evaluation. An additional increase of 331 in FY 1982 provided partial funding for the Rolling Airframe Missile Ordnance Aleration, specifically for interface studies and specification development. Increase of 11,122 in FY 1984 and 12,990 in FY 1985 to completion is to develop the Rolling Airframe Missile Ordnance Alteration for the NATO SEASPARROW Surface Missile 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	3,507	3,467	1,067	0	0	39,304
S0173	SEASPARROW Improvements	3,507	3,467	1,067	0	0	39,304

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
WPN (RIM-7M Missile)	63,000	65,000	66,500	66,200	1,932,000	2,212,400
Quantity	(286)	(336)	(321)	(315)	(883)	(2221)
OPN (RIM-7M NSSMS ORDALT/Multi-Year)	23,640	32,938	12,606	12,000	6,000	94,316
Quantity	(12)	(16)	(15)	(17)	(6)	(72)

F. (U) RELATED ACTIVITIES: Advanced Monopulse Seeker, Program Element 64305N.

Program Element: 64361N Title: NATO SEASPARROW

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Ships Weapon Systems Engineering Station, Port Hueneme, CA; Pacific Missile Test Center, Point Mugu, CA; Fleet Analysis Center, Corona, CA and Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Raytheon Company, Lowell, MA; General Dynamics Corp., Pomona, CA; Raytheon Company, Wayland, MA; Applied Physics Laboratory/John Hopkins University, Laurel, MD; VITRO, Silver Spring, MD.

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

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

(U) Project: S0173, SEASPARROW Improvements

1. (U) DESCRIPTION (Requirement and Project): The NATO SEASPARROW Surface Missile System was developed in the mid-70's to counter aircraft and anti-ship missile threats with a capacity for product improvements to stay current with the projected anti-ship air threats through the 1990's. These improvements include upgrades to the Surface Missile System installed in each ship and also to the missile (AIM/RIM-7) itself. This system satisfies the Specific Operational Requirement (SOR 17-48) [ ] which is under review as a follow-on improvement in the mid-80's. In addition, this project represents a co-development, co-production and mutual support effort within the NATO community with Belgium, Canada, Denmark, Germany, Greece, Italy, The Netherlands and Norway in full cooperation with the United States, on a shared basis. At present, there are [ ] installed on units of the participating nations and in the USN. It is the main anti-air ship system of CV/CVN's, DD-963 class destroyers, AOR's and AOE's, and is presently planned for installation on newer class ships such as the LHA and a backfit for the reactivated Battleships. The system is composed of a Launcher Group, an 8-cell trainable launcher containing 8 ready-to-fire RIM-7 missiles with associated loading, testing, handling equipment, fire control group, transmitter, receiver, and computer sub-system required to determine precise intercept points.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The installation, check-out and testing of the RIM-7M Ordnance Alteration was started and the Operational Test and Evaluation of the AIM-7M was completed. [ ] A multi-year procurement contract was initiated with the prime contractors to procure all shipboard Ordnance Alteration Kits in the most economical manner. Missile production is also underway.

b. (U) FY 1983 Program: This effort is devoted to the correction of minor deficiencies discovered during both development and operational testing of the shipboard system. It includes the analysis of all firings for Operational Evaluation and range support (targets) to complete this effort. [ ]

c. (U) FY 1984 Planned Program: Three NATO SEASPARROW Missile System/Rolling Airframe Missile Ordnance Alteration Kits will be developed for testing in a variety of environments leading to a freeze in the design of the Ordnance Alteration in mid-1985. Major development in the subsystems of the launcher, fire control system, computer and loading/handling equipment will be required to field this much-needed improvement in firepower. The combat system integration of the SEASPARROW, MK-73 Target Acquisition System Acquisition Radar and the SLQ-32 electronic warfare equipment will also be addressed and finalized. All necessary experimental work has been performed and the proposed Ordnance Alteration is ready for full-scale development. The increase of $10,055 in FY 1984 is to commence follow-on product improvement development of the Rolling Airframe Missile Ordnance Alteration for the NATO SEASPARROW Surface Missile Systems.

d. (U) Program to Completion: The testing of the NATO SEASPARROW Missile System/Rolling Airframe Missile Ordnance Alteration will be accomplished; first at the Land Based Test Site in Wayland, MA; then with live firings of both Rolling Airframe

77

Program Element: 64361N Title: NATO SEASPARROW

Missile and RIM-7M missiles at the White Sands Missile Test Center, including system integration testing of the full combat direction system, including the MK-23 Target Acquisition System and the SLQ-32; and finally, the installation, check-out and verification of the Ordnance Alteration. Integrated Program Summary documentation will be accomplished onboard a designated test platform prior to commencing Operational Evaluation in early 1986. A restructured RIM-7M Product Improvement program, The potential threat will also be continually examined to ensure these improvements address the improvements being achieved in cruise missiles and other anti-ship weapons.

e. (U) Milestones: Not applicable

78

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64365N
DoD Mission Area: 244 - Sea Control Theater Nuclear Warfare

Title: Standard Missile-2 (N)
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 ELEMENTS	13,105	18,808	18,845	26,382	49,621	146,862
S0175	STANDARD Missile - 2 (N)	13,105	18,808	18,845	26,382	49,621	146,862

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

(Note: The Department of Energy funds the W81 Nuclear Warhead. Above amounts include DOD (Navy) funds for EX-62 Target Detecting Device (Fuze), STANDARD Missile-2 Flight Test Rounds, integration with shipboard weapon systems, and the Development/Operational Test and Evaluation required to provide a weapon with approval for service use in the Fleet.)

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: To provide the STANDARD Missile-2 with nuclear capability for the STANDARD/TERRIER System and for the STANDARD/AEGIS and STANDARD/TARTAR Systems. This Nuclear STANDARD Missile-2 Block II will provide increased range, intercept and advanced capability for the AEGIS and TARTAR Systems and replace the current Beam Riding TERRIER Nuclear Missile. The nuclear capability is intended to improve the effectiveness against targets and provide an assured defensive capability against anti-ship cruise missiles.

C. (U) COMPARISON WITH FY 1983 RDT&E DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 Descriptive Summary and this Summary are as follows: For FY 1982 thru FY 1983 the minor differences between amounts shown in the two summaries reflect Navy directed program adjustments. The 82 increase in FY 1984 is due to a need to meet a nuclear hardening requirement and system integration cost increases. The remaining increase in the total estimated cost column, amounting to 25,753, for FY 1985 - FY 1988, is due to the following: in FY 1985, a 2,673 increase is attributed to the escalation of a FY 1981 estimate to a FY 1985 then-year dollar cost estimate, a 654 increase due to a cost increase for developing the EX-62 Target Detection Device and associated items, and a 4,145 increase due to revised estimates for the integration of the STANDARD Missile-2(N) into the shipboard combat systems. In FY 1986, an increase of 949 resulting from the escalation of FY 1981 estimate to a then-year FY 1986 estimate, an additional 7,105 for the Target Detection Device and Combat System Integration effort, and a 562 increase due to the escalation of estimates from the various in-house support agencies. In FY 1987, a 262 adjustment decrease, and in FY 1988, an additional 9,927 resulting from a change in the program's overall scope.

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	4,000	13,193	18,810	18,763	50,250	121,117
S0175	STANDARD Missile - 2 (N)	4,000	13,193	18,810	18,763	50,250	121,117

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: Not Applicable (WPN Funding begins in FY 1985)

Program Element: 64365N Title: Standard Missile-2 (N)

F. (U) RELATED ACTIVITIES: PE 64303N, AEGIS; PE 64366N, STANDARD Missile Improvement; PE 64352N, Surface-Launched Weaponry, Systems and Technology; PE 64353N, Vertical Launching System; and PE 64372N, New Threat Upgrade.

G. (U) WORK PERFORMED BY: IN-HOUSE The Technical Direction Agent (Lead Laboratory) is the Naval Surface Weapons Center, White Oak Laboratory, Silver Spring, MD. OTHERS are: Naval Weapons Center, China Lake, CA; Naval Weapons Evaluation Facility, Kirtland AFB, Albuquerque, NM; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Surface Weapons Center Dahlgren Laboratory, Dahlgren, VA; Naval Ordnance Missile Test Facility, White Sands, NM; Fleet Analysis Center, Corona, CA; Naval Weapons Handling Center, Earle, NJ; Ships Parts Control Center, Mechanicsburg, PA; Weapons Quality Engineering Center, Seal Beach, CA; and Naval Ordnance Station Detachment, McAlester Army Ammunition Depot, McAlester, OK. CONTRACTORS: General Dynamics, Pomona, CA; Johns Hopkins University Applied Physics Laboratory, Laurel, MD; RCA, Moorestown, NJ; Martin Marietta Corporation, Baltimore, MD; Northern Ordnance Division, Food Machinery Corporation, Minneapolis, MN; Sperry Gyroscope Co., Great Neck, NY; and Advanced Technology, Inc., Reston, VA.

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

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

(U) PROJECT SO175 STANDARD Missile-2(N)

1. (U) DESCRIPTION: (Requirement and Project): Specific Operational SOR 17-09R1 states the need for a Nuclear STANDARD Missile-2 Extended Range missile to replace the obsolescent [redacted] TERRIER Nuclear Missile and for a Nuclear STANDARD Missile-2 Medium range missile to provide a nuclear capability for the AEGIS and TARTAR Systems. In May 1982, the W81 Military Characteristics were submitted to the Chief of Naval Operations, to specify the characteristics of the W81 Nuclear Warhead to be developed by the Department of Energy. The approach for the nuclear warhead and fuzing developments will be an integral nuclear ordnance section configured for use with both extended range and medium range versions of the STANDARD Missile, completely alternate and interchangeable with the existing conventional ordnance section. STANDARD Missile flight test rounds and Target Detecting Devices will be procured to support required development, test and evaluation. In all systems, the nuclear warhead capability will improve effectiveness against [redacted] targets [redacted] and provide an assured defensive capability against anti-ship cruise missiles. It will provide increased range, [redacted] intercept and advanced nuclear capability for the AEGIS and TARTAR Systems. This missile will also simplify the TERRIER shipboard fire control configuration by eliminating the beam riding feature maintained solely for the current TERRIER nuclear missile.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The Project Officers Group, with Navy as lead service, convened twice to coordinate functional and hardware interface responsibilities among participating agencies. EX-62 Target Detecting Device development at the Naval Weapons Center led to the release of an RFP to industry for Engineering Development; at this time, the contractor has not been selected. Procurement was initiated for STANDARD Missile Flight Test Rounds to be used in the Navy Technical Evaluation, scheduled for White Sands Missile Range in 1984 and 1985. Development continued on the MK-58 Guided Missile Destructor to be used for development flight test termination and dispersal of classified material in at-sea Quality Assurance Service Tests. Work continued on development of ordnance alternations for the TERRIER and AEGIS Combat Systems, and began on the TARTAR Combat System.

b. (U) FY 1983 Program: Work begun in FY 1982 or earlier will continue. The Engineering Development Contractor for the EX-62 Target Detecting Device will be awarded the initial contract and will begin work. There are no significant milestones scheduled in FY 1983. Numerous joint ground tests with the Department of Energy will be conducted covering areas of mechanical and electrical compatibility, safety, and functional operability. The Initial Safety Study will be conducted.

c. (U) FY 1984 Planned Program: Captive Flight Tests of the EX-62 Target Detecting device will be conducted. Planning and preparations for Navy Technical Evaluation will be conducted. Flight Test Missile rounds for this evaluation will

80

Program Element: 64365N Title: Standard Missile-2 (N)

begin deliveries. Joint ground tests with the Department of Energy will continue. Deliveries of Developmental Flight Test Unit versions of the W81 Nuclear Warhead will begin from the Department of Energy. Deliveries of flight test models of the EX-62 Target Detecting Device will begin from the Engineering Development Contractor.

d. (U) Program to Completion: The Navy Technical Evaluation will begin in early FY 1985 with flight tests at the White Sands Missile Range of Extended Range versions of STANDARD Missile-2, Block II, carrying the W81 Nuclear Warhead Developmental Flight Test Units and the Engineering Development Models of the EX-62 Target Detecting Device. Five such tests are planned, followed by three flight tests of the Medium Range version of STANDARD Missile-2, Block II with Prototype Model EX-62 Target Detecting Devices. This last group of tests will be completed in FY 1986. The EX-62 Target Detecting Device will be released to production in FY 1985. Initial Operational Capability will occur.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64366N
DoD Mission Area: 231 - Anti-Air Warfare

Title: STANDARD Missile Improvements
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 Estimat Cost
	TOTAL FOR PROGRAM ELEMENT	59,991	50,789	40,262	60,185	TBD	
S0176	STANDARD Missile-2 Testing	24,221	15,870	7,547	11,769	TBD	
S0189	STANDARD Missile-2 Improvements	11,336	8,128	7,410	2,338	TBD	
S0439	STANDARD Missile-1 Improvements	15,434	10,308	9,062	2,436	9,957	98
S1632	STANDARD Missile-3	0	16,483	16,243	43,642	TBD	

The above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated project SC439 and through FY 1985 only for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Missiles of the STANDARD Missile family are the primary surface-to missile employed in AEGIS, TARTAR and TERRIER weapon systems. STANDARD missiles are operational in some 60 ships and programmed for over 100 ships through the 1980's. This Program Element upgrades STANDARD Missile to substantially incr kinematics, ordnance, and electronic counter-countermeasures performance to make it more effective against projected high and altitude, high velocity anti-ship missile threats. The Program Element also provides missiles and support for test with systems such as Vertical Launch, AEGIS CG-47, TERRIER/TARTAR New Threat Upgrade Systems, and for development and operational of missile improvements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A net increase of 399 in FY 1982, a net decrease of 1,711 in FY 1984 are due to a combination of inflation and economies. In FY 1984, Project S0176, STAN Missile-2 Testing, was decreased by 10,418 due to a Navy redistribution of funds during budget developments. Also in FY Project S1632 STANDARD Missile-3 was decreased by 10,000 to re-structure the program so that it might better fall in line the "Outer-Air Battle Study" effort. The change in S0189 STANDARD Missile-2 Improvements in Outyears from 6,302 to To Determined is due to the additional requirement for development of low altitude improvements for which cost cannot yet determined.

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 Estima Cost
	TOTAL FOR PROGRAM ELEMENT	64,618	50,592	50,789	62,391	Continuing	Contin
S0176	STANDARD Missile-2 Testing	23,719	24,221	15,870	17,965	Continuing	Contin
S0189	STANDARD Missile-2 Improvements	25,071	11,336	8,128	7,575	6,302	13
S0439	STANDARD Missile-1 Improvements	15,828	15,035	10,308	9,263	12,449	9
S1632	STANDARD Missile-3	0	0	16,483	27,588	TBD	

82

Program Element: 64366N Title: STANDARD Missile Improvements

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
WPN SM-2 Procurement						
STANDARD Missile-2 Extended Range, Block II, Pilot Line and Production*	56,000#	113,300#	83,100#	275,000#	TBD***	N/A
Quantity	35	165	100	450		
STANDARD Missile-2 Medium Range, Block II, Pilot Line and Production	---	33,800#	252,900#	374,000#	TBD***	N/A
Quantity		30	431	650		

* 1st year Pilot Line, Following Years Production.
** Pilot Production and Support Costs. General Dynamics/Pomona Contract N0002482C5106 on 9/30/82.
# Hardware and Procurement Support Costs only.
*** Continuing Program.

F. (U) RELATED ACTIVITIES: Program Element 64303N, ARGIS (ARGIS Weapon System employing New Threat Upgrade and STANDARD Missile-2 Blocks I and II Medium Range); Program Element 64352N, Surface Launched Weaponry (TERRIER/TARTAR employing STANDARD Missile-1 and STANDARD Missile-2 Block II Extended Range and Medium Range New Threat Upgrade Systems); Program Element 64365N, STANDARD Missile Warhead Development (providing nuclear warhead development for anti-air missiles); Program Element 64353N, Vertical Launch System (utilized in ARGIS ships for increased system capability). Program Element 64372N (TARTAR CG New Threat Upgrade employing SM-2 Block II Medium Range Missiles).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Ordnance Station, Indian Head, MD. CONTRACTOR: General Dynamics, Pomona, CA. is the prime contractor. OTHERS: Thiokol, Huntsville, AL; Thiokol, Wasatch, UT; Atlantic Research Corp., Gainesville, VA.

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

(U) Project 80176, STANDARD Missile-2 Testing: (U) This is a support project to provide test missiles, interface test units and associated test support to evaluate STANDARD Missile improvements and their interfaces with weapons systems and new ship construction. It is designated as a separate project at Navy and Congressional request and is not monitored with respect to thresholds and Test and Evaluation events independent of the project supported.

(U) In FY 1982 the project supported special ground testing of 24 STANDARD Missile-2 Block I missiles for introductory testing in the ARGIS leadship CG 47, 100 STANDARD Missile-2 Block I special missiles for vertical launch Development and Operational Testing, and partial fabrication and test of 10 TERRIER and 10 ARGIS missiles for STANDARD Missile-2 Block II Operational Evaluation.

(U) The FY 1983 program consists of:

- Completing delivery and testing of 24 ARGIS STANDARD Missile-2 Block I missiles.
- Supporting integration testing of STANDARD Missile-2 Block I TERRIER, STANDARD Missile-2 Block II TERRIER and STANDARD Missile-2 Block II ARGIS missiles.

Program Element: 64366N Title: STANDARD Missile Improvements

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

- o Complete delivery and testing of 10 AEGIS STANDARD Missile-2 Block II missiles for Operational Evaluation .
- o Complete delivery and flight testing of 5 TARTAR STANDARD Missile-2 BLock I missiles.
- o Complete delivery and testing of one Propulsion Test Vehicle and 11 to 15 Blast Test Vehicles to proof shipboard compatibility and safety characteristics in TERRIER, TARTAR and AEGIS systems.

(U) Project to Completion will:

- o Provide Blast Test, Launch Test and Shipboard Shock Test Vehicles for introduction of STANDARD Missile-2 Block II Medium Range in AEGIS and TARTAR Systems
- o Initiate parallel testing for the future area defense missile under development under Project S1632.

(U) Project S0189, STANDARD Missile-2 Improvements: (C) Project provides development, test and evaluation of improvements for STANDARD Missile-2 and interfacing of the missile with the TERRIER, TARTAR and AEGIS Weapons Systems including conventional and vertical launchers. Beginning in 1977, the effort has been directed toward major improvements [ ] antiship missiles in standoff jamming environments. Improvements encompass development of: a higher impulse booster rocket motor for the Extended Range missile; a narrow band signal processor for the terminal seeker; an ordnance package adapted to [ ] on airframe and control system for [ ] maneuverability. Completed to date for the Extended Range missile are: basic design booster rocket motor qualification, propulsion and control test vehicle flight tests, four development flight test rounds, two Technical Evaluation flight tests and three Operational Evaluation flight tests. Overall flight test results have been very good. Investigations are in process to define improvements [ ]

(U) In FY 1982, four successful STANDARD Missile-2 Block II Extended Range flight tests were conducted [ ]

(U) The FY 1983 program consists of:

- o Conducting development test flights for the Medium Range Missile.
- o Conducting Technical Evaluation flight tests for the Extended Range and Medium Range Missiles.
- o Conducting Operational Evaluation flight tests for the Extended Range Missile.
- o Achieving Approval for Production for the Extended Range Missile.

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

- o Conduct Operational Evaluation flight tests for the Medium Range Missile.
- o Achieve Approval for Production for the Medium Range Missile.

Program Element: 64366N Title: STANDARD Missile Improvements

(U) The Project to Completion will:

- o Include definition and incorporation of improvements learned from flight tests.
- o Development of low altitude improvements.

(U) Project S0439, STANDARD Missile-1 Improvements: (U) The Project provides development and qualifications of a dual thrust rocket motor, airframe and control improvements for STANDARD Missile-2 Medium Range. Test and evaluation of medium range missile for AEGIS is accomplished under Projects S0189 and S0176. The mission objective and nature of the overall missile improvements are stated under Project S0189. Completed to date are: wind tunnel testing, basic design, rocket motor development test and preflight readiness test, and one propulsion test vehicle flight test. Resolution of a rocket motor expansion cone failure in flight test is in process.

(U) In FY 1982, engineering development continued on the MX-104 Dual Thrust Rocket Motor, and wind tunnel test and analysis was completed. In addition the STANDARD Missile-2 Block II autopilot was adapted for vertical launch, and guidance and ordnance designs were integrated.

(U) The FY 1983 program consists of:

- o Conducting Propulsion Test Vehicle flight testing.
- o Conducting rocket motor qualification static testing.
- o Conducting control test vehicle flight testing.

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

- o Conduct TARTAR flight tests for Technical/Operational Evaluation.
- o Update the documentation package for the STANDARD Missile Medium Range Upgrade.

(U) The Project to Completion will:

- o Develop final propellant characterizations, refine processes to improve producibility.
- o Conduct shipboard interface and safety tests.

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

(U) Project S1632, SM-3

1. (U) DESCRIPTION (Requirement and Project): The need is to counter [ ] antiship missile threats of the 1990's in severe stand-off jamming environments. STANDARD Missile-2 Block II Extended Range missile in TERRIER systems provides the best in production, kinematic capabilities against such threats. The missiles [ ] are planned for TERRIER ships being phased out in the 1990's. Substantial improvements are being provided for AEGIS systems in new DDG-51 Class destroyers, as well as later ships in the CG 47 Class, with introduction of vertical launchers and the advanced SPY-1 radar. The subject missile, notionally termed STANDARD Missile-Three, is directed to the 1990 threat by taking full advantage of upgraded AEGIS systems and advanced missile technology. This is a new start in FY 1983. Generic developments are planned in initial phases covering: development of a booster for increased kinematics and range; incorporation

of an infra-red guidance mode complimenting semi-active guidance; definition of higher velocity and maneuverable aerodynamic designs; design of linear autopilot more compatible with high altitude guidance; design of a directional, aimable ordnance system for greater lethal radius and effectivity against harder threats; definition of thermal requirements at higher velocities; and tradeoffs between performance drivers, system capabilities and cost. Development will proceed to flight design model fabrication and testing, missile hardware and software integration, and full up missile round flight testing.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Project is not funded until FY 1983 but basic definition has been conducted over the last two years.

b. (U) FY 1983 Program: Initiate basic generic developments covering: wind tunnel tests of aero designs, competitive assessment of booster alternatives, directional ordnance design, and adjunct infra-red guidance conceptual design. Continue refinement of system level requirements and initial subsystem specifications. Initiate breadboard designs of basic missile elements.

c. (U) FY 1984 Planned Program: Complete breadboard design and test of major missile elements, wind tunnel test and analyses, and definition of missile configuration and sizing. Conduct booster definition, competitive demonstration and source selection. Conduct Preliminary Design Review to establish missile configuration and certify that all necessary experimental work has been performed and the proposed system is ready for full scale development. Initiate fabrication of guidance, control, and ordnance design models and booster development test units.

d. (U) Program to completion: Complete booster development and qualification. Demonstrate booster-missile vertical launch capability. Complete and test flight design model guidance, control and ordnance sections. Fabricate and test propulsion test vehicles, control test vehicles and full-up flight test rounds. Complete Technical and Operational Evaluations.

e. (U) Milestones: Milestones have yet to be determined pending the recommendation of the "Outer Air Battle" study.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64367N
DoD Mission Area: 242 - Theater Wide Nuclear Warfare

Title: TOMAHAWK
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	144,545	108,934	135,690	50,586	Continuing	Continuing
X0545	TOMAHAWK	144,545	108,934	129,285	43,545	Continuing	Continuing
	(Quantity - Test Vehicles						(42)
	Development Test and Evaluation						(33)
	Operational Test and Evaluation)						
K1696	Cruise Missile Survivability Program	0	0	6,405	7,041	Continuing	Continuing

As this is a continuing program, the above funding profiles 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 TOMAHAWK conventional land attack mission requirement is to counter the threat against U.S. naval forces by destroying primarily: air-launched anti-ship cruise missiles, their support facilities, and their carriers on the ground; fleet command and control systems; ships and submarines in port; and suppressing ground-based air defense systems to enhance carrier aircraft penetration. The anti-ship TOMAHAWK mission requirement is to redress the current Soviet anti-ship cruise missile stand-off range advantage and to complement U.S. sea-based aircraft strikes against combatant ships which have effective air defense systems. The mission requirement for nuclear land attack TOMAHAWK is to provide the Navy with a highly survivable and distributed worldwide theater nuclear capability, by complementing carrier aircraft, to strike selected naval targets ashore and other fixed targets in support of national policy. Long range TOMAHAWK Cruise Missile Weapon System, with land attack and anti-ship applications, is sized to fit submarine torpedo tubes and is capable of being launched from a variety of subsurface, surface, air and land platforms against both land and surface ship targets.

C. (U) COMPARISION WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profiles shown in the FY 1983 Descriptive summary and those shown in this Descriptive Summary are as follows: RDT&E,N: (1) The FY 1982 appropriation was increased by 1,852 for [redacted] programs and 2,200 for the BGM 109C Live Warhead Test, Joint Munitions Effectiveness Manual Update and Anti-Ship survivability testing. This increase was partially offset by a decrease of 1,242 for Navy studies and analyses. (2) The FY 1983 program was increased by 30,00 due to a program restructure resulting from technical difficulties with baseline systems, including the conventional Land Attack baseline having [redacted] and funding shortfalls. (3) The FY 1984 estimate was increased for the Common Weapon Control System Baseline Adaption (14,300) as well as the program restructure and inflation change (88,623). Project K1696 is a new start in FY 1984 at 6,405. Weapons Procurement, Navy: The program restructure also reduced quantities and revised funding in FY 1982 and FY 1983. The new procurement quantities for FY 1982 and FY 1983 are 61 and 51 vice 88 and 120. FY 1984 was reduced by 292,000 by Navy to help cover the increase in the Trident Weapons System which resulted in a revised procurement quantity of 124 vice 312. Other Procurement, Navy: FY 1982, FY 1983, and FY 1984 show a decrease as funding for the Vertical Launching System program was transferred into the program elements relating to vertical launch for surface/submarine. FY 1984 was also reduced to reflect a reduction of 4 Combat Weapons Control System units also relating to cover the increase in the Trident Weapon Systems. 4,000 was transferred from OPN in FY 1984 to the Weapons Procurement, Navy appropriation for Mission Planning Systems. In addition, the program restructure increased Other Procurement, Navy as follows: FY 1982 - 4,500, FY 1983 - 14,600, and FY 1984 - 15,500. The increases are to fund an integrating contractor, lead laboratory and logistics shortfalls.

Program Element: 64367N Title: TOMAHAWK

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	133,922	141,735	78,934	26,362	8,472	1,151,725
X0545	TOMAHAWK Missile System	133,922	141,735	78,934	26,362	8,472	1,151,725

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
28009N (Weapon Procurement, Navy)*	232,550	221,221	392,615	728,255	2,962,942**	9,741,953
Quantity	(61)	(51)	(124)	(353)	(1,384)**	(3,994)
24229N (Other Procurement, Navy, Surface)*	68,620	105,232	48,777	86,725	TBD	TBD
28009N (Other Procurement, Navy, Submarine)*		24,431	15,529	11,141	TBD	TBD

*Includes initial spares

F. (U) RELATED ACTIVITIES: HARPOON engineering guidance development, which terminated in FY 1979, (Program Element 64364N, Project W1174, Anti-Ship Weaponry) provided technology support applicable to a tactical cruise missile; Air-Launched Cruise Missile program (Program Element 64361F) is the Air Force development applicable to a strategic cruise missile; Ground-Launched Cruise Missile (Program Element 64361F) is development of the TOMAHAWK cruise missile in the ground-launched mode. The Joint Engine Project Office (Program Element 64361F) is the program for development of small turbofan cruise missile engines. Over-the-Horizon Targeting program (Program Element 63530N) develops use of the products of the ocean surveillance system to provide targeting definition outside the detection capability of the missile launch platform. The TOMAHAWK II Medium Range Air-to-Surface Missile program is developing tactical air launch versions of the TOMAHAWK Cruise Missiles (Program Element 63369N, Project X0650). The surface ship vertical launch capability for TOMAHAWK and STANDARD missiles is being developed in Program Element 64353N. A TOMAHAWK vertical launch capability for SSN 688 class attack submarines is being developed in Program Element 64370N.

G. (U) WORK PERFORMED BY: IN HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Air Propulsion Test Center, Trenton, NJ; Naval Air Development Center, Warminster, PA; Naval Surface Weapons Center, White Oak, MD; Naval Sea Systems Command, Washington, DC; Pacific Missile Test Center, Pt. Mugu, CA; Naval Undersea Systems Center, Newport, RI; Naval Weapons Evaluation Facility, Albuquerque, NM; Naval Avionics Center, Indianapolis, IN; Fleet Combat Direction System Support Activity, Dam Neck, VA; Department of Energy, Germantown, MD; Defense Mapping Agency, Washington, DC. CONTRACTORS: McDonnell Douglas Astronautics, St. Louis, MO (prime contractor); General Dynamics Convair, San Diego, CA; Williams Research Corporation, Walled Lake, MI; Applied Physics Laboratory, Johns Hopkins University, Laurel, MD.

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

(U) Project K1696, Cruise Missile Survivability Program: (NEW START) The purpose of this program is to develop preplanned product improvements based on authoritative assessments of TOMAHAWK Cruise Missile post-launch survivability shortfalls over a complete range of campaign scenarios. It includes required modeling, analysis and full-scale testing. Survivability improvements will affect hardware in all TOMAHAWK variants and software in the Theater Mission Planning System in addition to that in the missile.

Program Element: 64367N Title: TOMAHAWK

(U) This program is a new start FY 1984, and will consist of:

- o [redacted]
- o Current efforts are funded in PE 64367N Project X0545.

(U) This is a continuing program:

- o To resolve existing issues.
- o Identify survivability shortfalls.
- o Develop hardware/software improvements.

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

(U) Project X0545, TOMAHAWK

1. (U) DESCRIPTION: On 6 November 1972, the Chief of Naval Operations directed that existing long range cruise missile efforts be combined and redirected to build and test a prototype cruise missile that would fit into a submarine torpedo tube envelope. Complete test articles were delivered in FY 1976 by prime contractors for testing. First airframe flight, surface and underwater launches were accomplished. Land launch of the TOMAHAWK cruise missile continued during FY 19TQ with the systems integration stage of the validation phase, and first underwater anti-ship flight was completed. Defense Systems Acquisition Review Council II in January 1977 approved TOMAHAWK Full Scale Engineering Development. Deputy Secretary of Defense memo of 14 January 1977 further directed establishment of a Joint Cruise Missile Program Office for the Air Force and Navy cruise missiles with Navy as lead service. In February 1978, the first launches of land attack and anti-ship TOMAHAWK missiles from a submerged submarine were conducted off San Clemente Island from USS BARB (SSN 596). The land attack missile flew a successful mission and was recovered at Edwards Air Force Base, California, for later use in the test program. The anti-ship TOMAHAWK, after completing a successful launch and boost phase, failed to transition to sustained flight on the turbofan engine. The anti-ship TOMAHAWK had two more submarine launches in July 1978 which also failed to transition to cruise flight. Both failures were caused by pyrotechnic system contamination. A land attack TOMAHAWK was ground launched during September 1978. Following a successful boost flight, it failed to transition to cruise flight because of an electrical system malfunction. A development was undertaken to convert the Scene Matching Area Correlator to a digital configuration. New pyrotechnic and missile sealing designs were incorporated and verified in ground testing during the period October 1978 to January 1979. Subsequent boosted launches in FY 1979, three ground and six submarine, were successful and the new designs are considered validated. Several significant firsts were achieved in FY 1979. The submarine Fire Control System MK 117 including OUTLAW SHARK Over-the-Horizon Detection, classification and targeting information was first used to program and launch an anti-ship TOMAHAWK in June 1979. The first flights of anti-ship TOMAHAWK with a Passive Identification/Direction Equipment and land attack TOMAHAWK with a Department of Energy package also occurred. In addition, an anti-ship TOMAHAWK was successfully vertically launched on 13 September 1979. In FY 1979, the project finished contractor technical evaluation and began combined development test/operational test with the Operational Test and Evaluation Force. Performed free flight demonstration of Digital Scene Matching Area Correlator as a major step toward the development of a conventionally armed land attack TOMAHAWK; continued full scale development of conventionally armed land attack TOMAHAWK, including development of land attack mission planning facilities and data bases; [redacted] baseline Theater Mission Planning Centers have been installed and operational users trained; [redacted]

89

Program Element: 64367N Title: TOMAHAWK

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: In early September 1982, Joint Cruise Missile project decertified TOMAHAWK missiles for flight tests due to possible common component and Mission Control Module sources for the flight failures of missiles T46 and T61. After analysis of specific items of concern raised by Commander, Operational Test and Evaluation Force, Joint Cruise Missile Project decertified Theater Mission Planning System for Land Attack Conventional Misson planning. In-depth analysis of recorded missile telemetry data and recovered hardware components has shown that the risk associated with continued flight testing are now confidently assured as acceptably low, given that specified additional component testing is applied without redesign of the Mission Control Module. In late September 1982, Joint Cruise Missile Project provisionally recertified TOMAHAWK missiles for continued flight testing.

b. (U) FY 1983/FY 1984 Planned Program: The program restructure for FY 1983/1984 is to accomplish baseline recovery, directed changes resulting from internal Navy review, logistics shortfalls, lead lab and integrating contractor and surface ship deficiencies. The restructure also includes adding a [ ] capability to the land attack conventional variant beginning in FY 1983 and completing [ ] respectively. Operational Evaluation is planned to be completed on the submarine/surface land attack, nuclear and anti-ship variants.

c. (U) Program to Completion: Complete corrective action on deficiencies noted in prior testing. Continue development of terminal dive and submunitions dispenser capability and conduct technical and operational evaluations.

d. (U) Milestones

MILESTONE	DATE
Milestone No. 1 - Defense Systems Acquisition Review Council I	
Land Attack	February 1974
Anti-Ship	February 1974
Milestone No. 2 - First Flight	
Land Attack	June 1976
Anti-Ship	March 1976
Milestone No. 3 - First Guided Flight	
Land Attack	June 1976
Anti-Ship	December 1976
Milestone No. 4 - Defense Systems Acquisition Review Council II	
Land Attack	January 1977
Anti-Ship	January 1977
Milestone No. 5 - First Full Scale Development Flight	
Land Attack	January 1977
Anti-Ship	February 1977
Milestone No. 6 - Combined Development Testing/Operational Testing	(July 1980 and June 1981)* July 1980 and October 1981
Sub-Ship	
Milestone No. 7 - Operational Test and Evaluation Start	
Sub-Ship - Conventional Land Attack	(Apr 1981 and Jan 1983)* April 1981 and July 1982
Sub-Ship - Anti-Ship	(Jan 1981 and Jan 1983)* January 1981 and July 1982
Nuclear Land Attack	(Jan 1981 and Jan 1983) October 1982 and January 1983
Milestone No. 8 - First Operational Platform Launch	
Sub-Ship - Conventional Land Attack	(Feb 1978 and Dec 1981)* February 1978 and January 1983
Sub-Ship - Anti-Ship	February 1978 and March 1980

Program Element: 6436/N Title: TOMAHAWK

MILESTONE	DATE
Milestone No. 9 - Operational Test and Evaluation Complete	
Sub-Ship - Conventional Land Attack	TBD
Sub-Ship - Anti-Ship	(Sep 1981 and Jun 1983)* August 1983 and February 1984
Sub-Ship - Nuclear Land Attack	June 1983 and November 1983
Milestone No. 10 - Department of the Navy Acquisition Systems Review Council III	
Sub-Ship - Conventional Land Attack	(Dec 1981 and Feb 1983)* TBD
Sub-Ship - Anti-Ship	(Dec 1981 and Feb 1983)* TBD
Sub-Ship - Nuclear Land Attack	(Feb 1983)* April 1984 and TBD
Milestone No. 11 - Initial Operational Capability	
Sub-Ship - Conventional Land Attack	(Jan 1982 and Jul 1983)* September 1985 and September 1983
Sub-Ship - Anti-Ship	(Jun 1982 and Jul 1983)* September 1983 and March 1984
Sub-Ship - Nuclear Land Attack	June 1984

*Dates shown in FY 1982 Descriptive Summary. Changes in Milestones 7-11 are due to restructure of TOMAHAWK program.

J. (U) TEST AND EVALUATION DATA:

(U) 1. Development Test and Evaluation:

a. (U) Since the start of TOMAHAWK flight testing in March 1976 and through 31 October 1982, 93 TOMAHAWK test flights (11 airframe, 51 land attack, and 31 anti-ship) have been conducted. These flights included 33 submarine launches, 14 ground launches (including 5 Ground Launched Cruise Missiles), 41 air launches (including 10 AGM-109A), 1 ship launch, and 4 launches from an underwater hydraulic torpedo tube. Twenty-one flights have been significant demonstrations of Over-the-Horizon Targeting capability including 15 flights exercising real-time targeting with the MK 117 Fire Control System and AN/USQ-81(V). The Land Attack TOMAHAWK and Ground Launched Cruise Missile flights have generated over 300 Terrain Contour Matching Navigation map updates (both free flight and captive carry) and 70 Digital Scene Matching Area Correlation Scene updates. The Theater Mission Planning System has demonstrated the capability to generate complete Conventional Land Attack Missions from launch through Terrain Contour Matching Navigation and the Digital Scene Matching Area Correlation Scene updates to target. Twelve flights have been conducted. Five Anti-Ship TOMAHAWK's have impacted target hulks including one live warhead detonation. Other significant accomplishments include nine land attack and three anti-ship survivability flights, demonstration of the TOMAHAWK Airfield Attack Mission Module, one night flight of the conventional land attack using Terrain Contour Matching Navigation and Digital Scene Matching Area correlation Scene updates, one underwater launch from the SSN Capsule Launch Subsystem, and one flight from the surface ship Vertical Launching System. Total TOMAHAWK free flight distance through 31 October 1982 was in excess of 39,500 nautical miles with over 90 hours of flight time.

b. (U) In early September 1982, Joint Cruise Missile Project decertified TOMAHAWK missiles to possible common component and flight failure of Mission Control Modules of missiles T46 and T61. After analysis of specific items of concern raised by Commander, Operational Test and Evaluation Force, Joint Cruise Missile Project decertified Theater Mission Planning System for Land Attack Conventional mission planning. In-depth analysis of recorded missile telemetry data and recovered hardware components has shown that the risk associated with continued flight testing are now confidently assured as acceptably low given that specified additional component testing is applied without redesign of the Mission Control Module. In late September 1982, Joint Cruise Missile Project provisionally recertified TOMAHAWK missiles for continued flight testing. Ground Launched Cruise Missile testing resumed in November 1982. Theater Mission Planning System corrective actions supported a Land Attack Conventional Developmental Test in late December 1982 and will be recertified for DT/OT in February 1983. Resumption of flight testing is predicated on presenting a fully baselined system for OPEVAL. DT/OT testing should begin in April 1983.

c. (U) In July 1982, Anti-Ship TOMAHAWK OPEVAL was suspended due to possible design flaws in the terminal attack phase causing target misses experienced with T48 and T107. An Anti-Ship TOMAHAWK Hit Improvement Program is underway at this time to first characterize the problem, and then institute and test appropriate corrective action. If the current analysis yields a near term solution, resumption of DT/OT flight testing will occur in third quarter FY 1983.

2. Operational Test and Evaluation:

a. (U) Commander, Operational Test and Evaluation Force, in January 1977, suppported a decision for full scale engineering development noting the need for developing an over-the-horizon targeting capability to support anti-ship TOMAHAWK. Based on the successful submarine launch of TOMAHAWK in February 1978, Commander, Operational Test and Evaluation Force recommended a preliminary production prototype go-ahead to the Chief of Naval Operations. Since June of 1979, Commander, Operational Test and Evaluation Force has been conducting and participating in combined over-the-horizon targeting testing. Data gathered will be used to make a recommendation to the Chief of Naval Operations regarding the Milestone III decision.

b. (U) Initial operational test and evaluation commenced in January 1981 and will continue throughout full scale engineering development, culminating in an independent operational evaluation for the TOMAHAWK Weapon System by Commander, Operational Test and Evaluation Force.

(1) (U) This operational evaluation is being conducted in several stages. Operational test and evaluation of the submarine launched TOMAHAWK was preceded by a combined development test/operational test period wherein the operational effectiveness test objectives of operational evaluation were combined with the technical requirements of a Navy Technical Evaluation, thus maximizing the utilization of limited test resources. Commander, Operational Test and Evaluation Force will make a recommendation regarding the production Milestone III procurement decision of the submarine-launched TOMAHAWK Weapon System based upon the results of operational test and evaluation.

(2) (U) Operational test and evaluation of the surface TOMAHAWK Weapon System is scheduled to commence in FY 1983 preceded by a period of combined development tests and operational tests to maximize the utilization of limited test resources. Commander, Operational Test and Evaluation Force will make a recommendation regarding the production Milestones III procurement decision based on the results of the surface ship-launched TOMAHAWK Weapon System operational test and evaluation. Preliminary tactics are being operationally evaluated during operational testing.

(3) (U) Follow-on test and evaluation is scheduled to evaluate system performance in multiple command and control configurations, to obtain additional missile captive carry time to assess missile storage availability, to evaluate hardware and software that were not available during Phase II operational test and to assess the correction of deficiencies noted during operational test and evaluation.

92

Program Element: 64367N Title: TOMAHAWK

3. (U) System Characteristics:

LAND-ATTACK - TORPEDO TUBE LAUNCHED MISSILE

Characteristics	Threshold	Demonstrated
Range-Operational	[redacted]	[redacted]
Stand Off Range-Overwater		
Prior to land fall		
Launch Depth		
Cruise Speed-(Mach Number)		
Cruise Altitude-Smooth Terrain		
Accuracy (Circular Error Probable)		
ANTI-SHIP - TORPEDO TUBE LAUNCHER MISSILE		
(Same as above except as noted below)		
Range - Operational (Maximum)		
Cruise Altitude		

Terminal Accuracy (Probability of Hit) - at least [redacted] against a destroyer-sized target, [redacted] nautical miles down range, in sea states through [redacted] and with moderate rain falling at rates up to [redacted] millimeters per hour.

1. (U) Analysis of wind tunnel, engine and flight test for sea level, standard day at Mach [redacted] nautical miles flight test ranges date. Also AGM-109 FLYOFF aerodynamic flight.

2. (U) Captive flight test; [redacted] nautical miles flight test range over water to first land fall map.

3. (U) From hydraulic torpedo tube launcher at [redacted] pounds; successful maximum attack submarine launch depth to date is [redacted] feet keel depth.

4. (U) An acceleration performance test reached [redacted] Mach for a short period of time.

93

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64369N — Title: 5" Rolling Airframe Missile
DoD Mission Area: 231 - Anti-Air 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	17,877	16,153	4,635	4,021	TBD	TBD
S0167	5" Rolling Airframe Missile	17,877	16,153	3,171	2,556	TBD	TBD
S1793	Rolling Airframe Missile Improvements	0	0	1,464	1,465	TBD	TBD
Quantity of Missiles (Development Test and Evaluation and Operational Test and Evaluation							(60)
Quantity of Stand-alone Launching System (Development Test and Evaluation, Operational Test and Evaluation, and Combat System Integration)							(3)

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 purpose of this program is to develop an air defense system utilizing a passive dual mode Radio Frequency/Infrared 5" Rolling Airframe Missile. The baseline system will provide a self-defense capability against incoming active radar guidance equipped anti-ship missiles and will be developed in consort with the Governments of the Federal Republic of Germany and Denmark.

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: Decreases of 1,611 in FY 1982, 137 in 1983, and 155 in FY 1984 are due to a combination of inflation, economies, program adjustments and a reduction in contractor support services. An increase of 1,464 in FY 1984 for Project S1793 (Rolling Airframe Missile Improvements) is to commence incorporating fuze and guidance improvements into the Rolling Airframe Missile.

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	14,040	19,488	16,290	3,326	5,509	102,541
S0167	5" Rolling Airframe Missile	14,040	19,488	16,290	3,326	5,509	102,541
Quantity of Missiles (Development Test and Evaluation and Operational Test and Evaluation)							(96)
Quantity of Stand-alone Launching System (Development Test and Evaluation and Operational Test and Evaluation)							(3/2)

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
WPN	-	-	13,400	23,500	Continuing	Continuing
Procurement Quantity	-	-	-	(30)	Continuing	Continuing

F. (U) RELATED ACTIVITIES: NATO SEASPARROW, PE 64361N; Close-In Weapon System (PHALANX), PE 64358N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, Dahlgren Laboratory,

94

Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA; Naval Ordnance Missile Test Facility, White Sands, NM; Fleet Analysis Center, Corona, CA; Naval Weapons Handling Center, Colts Neck, NJ; Pacific Missile Test Center, Point Mugu, CA. PRIME CONTRACTORS: General Dynamics Corp., Pomona, CA., OTHERS Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; Tecolote Research, Inc., Santa Barbara, CA; EG&G, Washington Analytical Services Center, Rockville, MD; SYSCON Corp., Washington, D.C.

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

(U) Project S0167, 5" Rolling Airframe Missile: Shipboard system to satisfy requirements for high fire-power, low cost, lightweight, self-defense system to engage anti-ship capable missiles. Develop 5" Rolling Airframe Missile with dual-mode, passive Radio Frequency/Infra Red guidance. Develop 24 missiles stand-alone launcher. Cooperative development with Germany and Denmark.

(U) In FY 1982, development continued with:

- o Land-based missile test flights.
- o Integration test demonstrating RADAR Electronic Support Measures correlation.
- o Comprehensive integration at-sea test.
- o Complete combat system firing test and missile critical design review.

(U) The FY 1983 program consists of:

- o Continuing land-based test flights.
- o Over water missile firings.
- o Integration testing.
- o Milestone IIIA, approval for limited production.
- o Continuing requirements definition.

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

- o Introduce fuse and guidance improvements into the system.
- o Conduct Operational Test and Evaluation.
- o Obtain Approval for Production.

(U) Program to completio : The delivery of production rounds and production systems for fleet use is scheduled to begin.

(U) Project S1793, Rolling Airframe Improvements: (NEW START) This project provides for improvements to the Rolling Airframe Missile (Project S0167) as indicated below:

(U) For this FY 1984 new start, it is planned to begin preplanned production improvements that will:

Program Element: 64369N Title: 5" Rolling Airframe Missile

o Improve proximity fuze.

o Investigate active Radio Frequency Guidance mode for Rolling Airframe Missile.

o Investigate imaging Infrared seeker array for missile guidance.

(U) Program to Completion: Continue development of improvements. Commence Engineering Development in FY 1985 to be completed in FY 1988.

(U) Milestones

MILESTONE		DATE
1. Milestone II		December 1979
2. Begin Engineering Model Missile Flight Test		June 1980
3. Begin Environmental, Safety, Compatibility Type Testing		July 1981
4. Milestone IIB		January 1983
5. Complete Combined Tests (DT-IIA/OT-IIA)	(September 1982)*	February 1983
6. Milestone IIIA		September 1983
7. Complete Navy Technical Evaluation (DT-IIB)	(May 1983)*	March 1984
8. Complete Operational Evaluation (OT-IIC)	(September 1983)*	July 1984
9. Milestone IIIB		September 1984
10. Approval for Production		October 1984

* Date shown in FY 1983 RDT&E Descriptive Summary. Changes due to prime contractor schedule slippage, technical difficulties, and test schedule delays caused by weather, target, and missile problems.

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

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: Advanced Developmental Testing (Developmental Test-IA and Developmental Test-IB) was completed in July 1978 and primary objectives were met. The Rolling Airframe Missile Weapon System is currently (November 1981) 42 months into Full Scale Engineering Development. During Full Scale Engineering Development two phase of Developmental Test and Evaluation being accomplished. Developmental Test-IIA began in May 1980 and will continue through February 1983. Developmental Test-IIA testing accomplished through December 1980 included 1 Control Test Vehicle fired at the Land Based Test Site to collect flight engineering data on auto pilot instruments chosen for Full Scale Engineering Development baseline design; 3 Launch Test Vehicles fired at the Land Based Test Site to proof launcher, fiberglass canister, canister and cover and missile restraint design, to evaluate rocket motor blast effects and collect in-flight data on aerodynamic heating and vibration; and 1 week (85 runs) of overwater multipath testing against a stationary brassboard seeker at Pacific Missile Test Center to evaluate seeker performance and update the computer simulation multipath model. Testing from January 1981 through November 1982 included 2 control test vehicles fired at the Land Based Test Site to proof rolling airframe autopilot design and capability to withstand high g maneuvers; 9 Guided Test Vehicles fired at the Land Based Test Site and 2 fired overwater from San Nicolas Island. Of the first 6 Guided Test Vehicles 3 scored direct hits on an augmented BQM-34 target and 3 failed to guide for unrelated causes. Evaluation of data from these firings indicated that necessity for some redesign and change in guidance policy. Since these changes were incorporated in March 1982 all 5 flight tests have been successful. Objectives achieved include maneuver capability, simulation validation, Radio Frequency/Infrared in-flight handover, Infrared Terminal Accuracy, low over-water intercepts, fuze compatibility and Radio Frequency all-the-way Guidance. The 5 recent firings include 4 direct hits in Infrared Terminal Guidance and an intercept within lethal range in Radio Frequency all-the-way guidance. The remainder of Developmental Test-IIA will consist of 7 Engineering Model missile firings from the Rolling Airframe Missile Weapon System at the Land Based Test Site and at-sea to demonstrate capability against a supersonic target, very low altitude over the water against a BQM-34

target, and firings from the full-up combat system. NATO SEA-SPARROW Surface Missile System Rolling Airframes Missile Ordnance Alteration development will begin in FY 1984. From February 1983 to March 1984, the second phase, Developmental Test-IIB (including combined operational testing against supersonic and diving targets), will be conducted with 35 prototype missiles in firings from Land Based Test Sites and at-sea from the Rolling Airframe Missile Weapon System. These tests are to demonstrate compliance with the system specifications; obtain and assess preliminary Reliability, Maintainability and Availability, human engineering, and Integrated Logistics Support data; and to verify system readiness for Operational Evaluation. Testing of initial production rounds and systems in Production Acceptance Test and Evaluation will verify production compliance with specifications.

2. (U) Operational Test and Evaluation: No Operational Testing and Evaluation has been accomplished to date. Commander, Operational Test and Evaluation Force, monitored the program during Developmental Test-I and published an evaluation report providing an initial assessment of the Rolling Airframe Missile Weapon System. Within the limitations imposed by the fact that the evaluation was based on developmental testing only, Commander, Operational Test and Evaluation Force, concluded that the Rolling Airframe Missile Weapon System has potential for operational effectiveness and operational suitability, and recommended proceeding with Developmental Test-II. During Full-Scale Engineering Development, two phases (OT-IIB and OT-IIC) of independent operational test and evaluation are planned. Operational Test-IIB is planned for 1983 and will provide an early evaluation of the system during development. Operational Test-IIB tests will consist of about 5 missile firings at a Land Based Test Site and overwater. Operational Test-IIC (Operational Evaluation of Rolling Airframe Missile Weapon System) will be conducted in 1984 prior to the Milestone III decision to determine operational effectiveness and operational suitability. It will include about 21 missile firings at the Land Based Test Site and at-sea. Land Based Test Site tests will evaluate system performance primarily at short ranges and low-altitudes because of safety considerations in conducting such tests from manned ships. At-sea tests will be conducted in realistic combat scenarios using shipboard configurations operated by fleet personnel. Follow-on Test and Evaluation will be conducted on early production versions of the Rolling Airframe Missile Weapon System.

3. (U) Systems Characteristics:

Parameter	Threshold	Demonstrated
Frequency Spectrum	[redacted]	To be demonstrated in Developmental Test IIB, Operational Test-IIB and Operational Test-IIC.
Accuracy		
Target Capacity		
Designation to 1st Missile Launch		
Cumulative Salvo Pk		
Minimum Range		
Maximum Range		
Min Altitude		

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64370N
Title: SSN 688 Class Vertical Launch System
DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface 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	38,486	39,361	39,936	25,470	32,745	184,914
S1500	SSN 688 Class Vertical Launch System	38,486	39,361	39,936	25,470	32,745	184,914
	(Quantity-TOMAHAWK Missiles)*						(2)
	(Quantity-Capsules)*						(9)

* Development/Operational Test and Evaluation

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 program will provide the SSN 719 and follow-on submarines of the SSN 688 Class with increased firepower. More specifically, it will provide the capability for the stowage and launch of twelve TOMAHAWK Cruise Missiles (in any one of its several land attack or anti-ship variants) from vertical missile tubes in the forward main ballast tank area of the submarine. This capability will greatly enhance the Navy's ability to counter the increasingly large Soviet surface naval forces as well as add to the United States total capability for land 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 this Descriptive Summary are as follows: an increase of 1,000 in FY 1982 due to revised cost estimates; an increase of 3,999 in FY 1983 due to cost growth in the areas of shock testing and fire control system software development; increase of 13,106 in FY 1984 due to aforementioned software development cost growth and a capsule development for a missile with greater range and/or payload. Total program increase is 24,146. The number of test items required for development/operational test and evaluation has been revised (-2 missiles and -4 capsules) due to a reduction of flight tests and the availability of production missiles.

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	8,916	37,486	35,362	26,830	52,174	160,768
S1500	SSN 688 Class Vertical Launch System	8,916	37,486	35,362	26,830	52,174	160,768
	(Quantity-TOMAHAWK Missiles)						(4)
	(Quantity-Capsules)						(13)

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

F. (U) RELATED ACTIVITIES: Related programs include Program Element 64367N, project X0545, TOMAHAWK Missile Systems, and its related programs (e.g., Over-the-Horizon Targeting (Program Element 63530N)); Attack Submarine Combat Control Systems Improvement Program (Program Element 64562N, project S0236).

98

Program Element: 64370N Title: SSN 688 Class Vertical Launch System

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI; Pacific Missile Test Center, Point Mugu, CA. CONTRACTORS: Westinghouse Electric, Sunnyvale, CA; McDonnell Douglas, St. Louis MO; General Dynamics/Electric Boat Division, Groton, CT: General Dynamics/Convair, San Diego, CA; Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; Singer Librascope, Glendale, CA; Aquidneck Data, Newport, RI; Newport News Shipbuilding, Newport News, VA; Raytheon, Portsmouth, RI.

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

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

(U) Project S1500, SSN 688 Class Vertical Launch System

1. (U) DESCRIPTION (Requirement and Project): Under other submarine-related research and development programs, the SSN 688 Class design was found to be amenable to the addition of twelve vertical missile tubes in the forward main ballast tanks without an increase in ship size or a detrimental effect on other ship operational capabilities. Each tube will contain an encapsulated TOMAHAWK Cruise Missile (in any one of its land attack or anti-ship variants) complete with its ejection mechanism. The missile capsule (providing missile ejection mechanism, shock mitigation, and environmental control) is a new development under this program. The TOMAHAWK missile, as modified for vertical launch for surface ship vertical launch TOMAHAWK programs, will be used without further modification. The existing fire control system is utilized with extensive hardware and software modifications to support vertical launch. Two TOMAHAWK missiles and 9 capsules will be procured for development/operational test and evaluation.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Conducted ship system integration studies. Continued fire control system modification development and missile capsule/ejection system full-scale engineering development and prototype production. Conducted launch test at Pop-Up Facility, San Clemente Island, California. Installed missile tubes and associated equipment on Submarine Shock Test Vehicle for developmental shock testing in FY 1983. Initiated detail design of ship system using SCN funds.

b. (U) FY 1983 Program: Continue fire control system modification development and fabrication of prototype hardware. Continue missile/capsule/ejection system full-scale engineering development and prototype production. Conduct translator launch tests at Pop-Up Facility, San Clemente Island, California. Conduct developmental shock tests on Submarine Shock Test Vehicle.

c. (U) FY 1984 Planned Program: Complete fabrication of modified fire control system hardware and initiate hardware interface and system testing. Complete prototype production of submarine launched cruise missiles/capsules. Conduct underwater demonstration launches from translator at Pop-Up Facility, San Clemente Island, California.

d. (U) Program to Completion: Complete development of modified fire control system software and conduct system integration and certification testing. Conduct qualification shock tests on Submarine Shock Test Vehicle. Conduct test and evaluation of vertical launch missile/capsule/ejection system, modified fire control system and total vertical launch system. Develop and integrate system improvements required to support missile and system improvements and future weapons.

99

Program Element: 64370N Title: SSN 688 Class Vertical Launch System

e. (U) Milestones:

Milestone		Date
1. Start preliminary design		July 1980
2. Start combat control system modifications		July 1980
3. Issue requirements document		Nov 1980
4. Award capsule launcher subsystem contract		Jan 1981
5. Complete contract design		July 1981
6. Start ground launch tests		Sep 1981
7. Start detail design		Oct 1981
8. Award first ship contract modification		Dec 1981
9. Start underwater launch tests		Dec 1981
10. Start development shock test		Sep 1982
11. Start first ship installation	(Jul 1982)*	Apr 1983
12. Complete capsule full-scale engineering development		Oct 1984
13. Start developmental shock test		Oct 1984
14. Deliver fire control system hardware		Nov 1984
15. Conduct first ship installation test		Aug 1985
16. Complete first ship installation		Dec 1985
17. Deliver encapsulated TOMAHAWK weapons		Dec 1985
18. Operational test and evaluation		Dec 1986
19. Update system operational software		Dec 1987
20. Incorporate improved missile		Dec 1988

* Date listed in FY 1983 Program Element Descriptive Summary. Delay in developmental shock tests due to unexpected major effort to refurbish submarine shock test vehicle and inclusion of other non-VLS equipment in shock test series.

J. (U) TEST AND EVALUATION DATA:

1. (U) FUNCTIONS/MISSION DESCRIPTION: The SSN 688 Class Vertical Launch System will add an additional twelve TOMAHAWK All Up Rounds to the ship's weapon load by the addition of externally mounted vertical stowage tubes without impact on the currently existing weapon capacity and capability. TOMAHAWK is a long range, low altitude cruise missile capable of nuclear or conventional attacks on land targets or conventional strikes against surface vessel targets. The total Vertical Launch System consists of an encapsulated TOMAHAWK All Up Round, Vertical Launch Ship Systems (including vertical stowage/launch tubes and other ship support systems), modifications to the Combat Control System MK 1 and All Up Round Loading/Shipping fixtures.

2, (U) DEVELOPMENT TEST AND EVALUATION:

a. (U) Naval Sea Systems Command will direct the planning for, and the conduct of all developmental testing, including Technical Evaluation. Commander Operational Test and Evaluation Force will provide independent assessment of Development Test and Evaluation and will direct the last portion, Operational Evaluation, of the Full Scale Engineering Development. Critical issues which will be addressed during Test and Evaluation include, but are not limited to: reliability, maintainability, availability, logistic supportability, compatability, combat control system interfaces, interoperability (including training, safety, security, human factors, transportability and counter detection).

100

b. (U) Development Test and Evaluation to Date:

(1) (U) No DT-I Demonstration and Validation Phase Testing was conducted. The Vertical Launch System Program was initiated in the Full-Scale Engineering Development Phase (Phase II). The Vertical Launch System uses proven hardware and design practices similar to those in use in current shipbuilding programs.

(2) (U) DT-IIA Capsule Launcher Testing has been conducted as follows:

(a) (U) DT-IIA-IA Scale Model Testing. During March - July 1981 a series of scale model testing was conducted at Naval Surface Weapons Center, White Oak, Maryland to obtain experience in launching a thin skin missile into high cross flow. Effects of hatch wake, gas bubbles, and air venting from the missile were observed, and the accuracy of hydrodynamic characteristics used in design predictions was assessed. From these initial scale model results, missile and capsule design calculations were refined.

(b) (U) DT-IIA-IB Capsule Launch Subsystem Ground Qualification Tests. In September 1981 a Mass Eject Test Vehicle was launched from a capsule launcher mounted in a surface test fixture. The launch validated the gas generator prior to commencing the full scale underwater launchers.

(c) (U) DT-IIA-IC Underwater Static Launch. In December 1981, an Inert Test Vehicle was launched from the capsule launcher at a muzzle depth of [redacted] underwater. In August 1982 another underwater launch was accomplished using a Boosted Flight Test Vehicle. Both launchers provided measured effects of launch including eject pressure distributions, muzzle area pressure distributions, vehicle performance, and post launch capsule conditions. The Flight Test Vehicle was propelled from the water under booster power, achieved sustained cruise flight, and flew to recovery.

(d) (U) DT-IIA-IC Underwater Dynamic Launch. A series of three Dynamic Underwater Launches was completed using an Inert Test Vehicle. The Dynamic launchers were similar in scope and purpose to the static launchers except that the launch was conducted from a moving platform. This provided additional data on missile to capsule interaction and underwater trajectory.

c. (U) FUTURE DEVELOPMENT TEST AND EVALUATION:

(1) (U) DT-IIA series Capsule Launcher and Underwater Launch Testing will include the following:

(a) (U) DT-IIA-IB Capsule Launcher System Ground Qualification Test (FY 1983) This will progressively verify design characteristics of the Capsule Launch System. Two scheduled surface test launchers, using simulated crossflow forces, will evalute capsule pad design and performance. Component qualification tests will verify resolution of technical risks and establish confidence that the Capsule Launch System will meet performance requirements.

(b) (U) DT-IIA-IC DT-IIA-IC Underwater Dynamic Launchers (FY 1983) An additional Inert Dynamic Underwater Launch and two Boosted Flight Launchers will provide further data on underwater launch performance.

(c) (U) DT-IIA-2 Underwater Full-Scale Engineering Development Launch and Flight Demonstrations (FY 1984) These are a continuation of the Underwater launch series except muzzle depth will be [redacted] instead of [redacted]. The effects of the greater launch depth will be observed on parameters such as eject velocity, gas generator pressures, launch pleunum pressures, and trajectory.

(2) (U) DT-IIB series Submerged Shock Test Vehicle Underwater Explosion Tests (FY 1983-FY 1984) will include having objectives as follows:

(a) (U) DT-IIB-2 SUBMERGED SHOCK TEST VEHICLE UNDERWATER EXPLOSION DEVELOPMENT TESTS. (FY 1983) These will provide empirical data for correlation with the shock analysis methods being used for shock [redacted] missile tube system design and will provide early disclosure of risk.

(b) (U) DT-IIB-2 SUBMERGED SHOCK TEST VEHICLE UNDERWATER EXPLOSION QUALIFICATION TESTS. (FY 1987) These tests will qualify the above equipment as a system to [redacted] shock standards in accordance with MIL-S-901C through underwater explosion demonstrations.

(3) (U) DT-ICC-1 EXTERNAL ROTARY ACTUATORS RELIABILITY AND QUALIFICATION TESTS (FY 1982-FY 1983) These tests will qualify the actuators for application in the SSN seawater environment and demonstrate capacity to perform through life cycle ship usage to overhaul. The actuators have had no precious combatant ship external hull application.

(4) (U) DT-IID SERIES COMBAT CONTROL SYSTEM MK I TESTS. (FY 1983-FY 1984) These tests will be conducted in conjunction with Chief of Naval Operations Project 234-(number to be assigned). The specific phases as they relate to the Vertical Launch System are: DT-IID-1 Combat Control System Hardware Qualification (FY 1983-FY 1984), DT-IID-2 Combat Control System Hardware Interface Testing (FY 1983-1984), and DT-IID-3 Combat Control System Technical Evaluation. The primary objective of these tests is to certify that the Combat Control System MK I hardware and software unique to the Vertical Launch System are ready for shipboard installation and service use.

(5) (U) DT-IIE MISSILE TUBE SYSTEM PROTOTYPE TESTS. (FY 1983) These tests will demonstrate the performance of the complete Missile Tube System in accordance with the shipbuilding specifications as modified to reflect the Vertical Launch System and applicable weapon interfaces specified in the Veritical Launch System weapon system requirement document.

(6) (U) DT-IIF SSN 688 CLASS VERTICAL LAUNCH SYSTEM TECHNICAL EVALUATION. (FY 1986) This will demonstrate that the Vertical Launch System is a fully operational system. The primary objective is to certify equipment readiness for Operational Evaluation.

(7) (U) DT-III PRODUCTION ACCEPTANCE TEST AND EVALUATION will demonstrate that the Vertical Launch System, subsystem, and components meet contract specifications and operational requirements for Navy acceptance by means of Factory Acceptance Tests, the Shipyard Installation Test and Trials Program, and Post Shipyard Test and Trials.

3. (U) OPERATIONAL TEST AND EVALUATION:

a. (U) Operational Test and Evaluation to Date: None.

b. (U) Future Operational Test and Evaluation:

(1) (U) OT-I - No OT-I Demonstration and Validation phase testing has been or will be conducted on the SSN 688 Vertical Launch System. Previous testing of SSN 688 Vertical Launch System associated systems has been conducted in accordance with the TOMAHAWK Cruise Missile Program and Combat Control System Improvement Program's MK-117 Fire Control System, Data Link Communications System, and Combat Control System MK-I.

(2) (U) OT-IIA - Vertical Launch System hardware and concept testing (FY 1982 - FY 1985) will be limited to the monitoring of developmental testing (DT-IIA, DT-IIB, DT-IIC and DT-IID) for independent evaluation of operational implications as feasible. The objectives of OT-IIA, although not fully achievable, are to provide an early estimate of operational effectiveness and operational suitability, initiate tactics development, estimate program progress and identify additional operational issues for OT-IIC. A recommendation will be provided with respect to base-lining FY 1986 and beyond 688 class submarines with the Vertical Launch System.

(3) (U) OT-IIB - Combat Control System MK-1 (FY 1983 - FY 1985) will independently evaluate the hardware and software changes required of the Combat Control System to interface with and support the Vertical Launch System. OT-IIB will be more specifically addressed, which will encompass not only Vertical Launch System necessitated changes, but also any enhancements to Combat Control System capabilities mandated by the Software Configuration Control Board. Objectives of OT-IIB, achievable to some degree under constraints of land-based testing, are to provide confidence in the Combat Control System's capability to support the needs of the Vertical Launch System without detriment to its existing horizontal (torpedo tube) launching system and to gain an early estimate of the operational effectiveness and operational suitability of the Combat Control System's hardware and software.

(4) (U) OT-IIC - Operational Evaluation (FY 1986) will monitor and independently evaluate DT-IIB Vertical Launch System Technical Evaluation testing and conduct an independent, at-sea operational evaluation of the Vertical Launch System and Combat Control System. The primary objectives are to determine the operational effectiveness and operational suitability of the Vertical Launch System and to continue tactical development. Specific critical operational issues which must be resolved are the capability of Over-the-Horizon Targeting systems to provide timely and accurate information to employ the Vertical Launch System; effect of the installation on the 688 class sonar figure of merit; its operational constraints and its horizontal launch capability; the capability to conduct salvo launch, the capability to employ the Vertical Launch System during all conditions encountered during mission operations; whether Vertical Launch System employment will unacceptably increase the vulnerability of firing SSN; whether Vertical Launch System will adversely affect SSN class safety.

4. (U) SYSTEMS CHARACTERISTICS:

Operational	Threshold
Launch Speed Rate of Launch	[redacted]
Reliability VLS AUR, RVLS	0.88 (Land Attack/Anti-Ship AUR)

NOTE: (1) Nominal rate of launch. Exact times may vary. This includes the four ships Torpedo Tubes which are also capable of launching TOMAHAWK Cruise Missile.

5. (U) TEST AND EVALUATION DOCUMENTATION:

EVENT	REPORT SYMBOL	TITLE	DATE
DT-IIA-1A1	JHU/APL TL-82-125	Hydrodynamic Coefficients for TOMAHAWK Submarine Vertical Launch	2 March 1982
DT-IIA-1A2	GD/EBDiv 01-1310	SSN 688 Class Vertical Launch System Report on Scale Model Missile Hatch and Fairing Test Results	1 April 1982
DT-IIA-1A3	GD/EBDiv 01-1109	Scale Model Missile Ejection Blast Pressure Testing, Addendum A	14 January 1982
DT-IIA-1B	WEC SR-81-SVL	Surface Verification Launch Shot Report	16 November 1981
DT-IIA-1C	GD/CONVAIR 76P-1284	Test Report, ITV Static Launch	March 1982
DT-IIA-1D	GD/CONVAIR 76P-1396	SSN 688 Vertical Launch System Inert Test Vehicle Dynamic Launch Test Data Report.	13 August 1982

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64371N
DoD Mission Area: 223 - Close Air Support and Interdiction
Title: HELLFIRE
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*	9,815	2,832	2,426	0	15,073**
WI415	HELLFIRE	0	9,815	2,832	2,426	0	15,073**

* FY 1982 funding for HELLFIRE missile development is shown under Program Element 63313N, Imaging Infrared MAVERICK.

** Does not include funding shown under Program Element 63313N.

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: HELLFIRE is being developed under a modular missile concept for the United States Army as the primary anti-armor missile for the Advanced Attack Helicopter, the AH-64. The Marine Corps has a similar requirement for such a weapon system for the AH-1T/J. With the HELLFIRE system the Marine Corps will have the ability to penetrate modern armor with minimum exposure of the launching platform to enemy counterfire. HELLFIRE will provide a laser homing, fire-and-forget capability against enemy armor that is currently lacking for Marine Corps attack helicopters.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the FY 1983 and FY 1984 Descriptive Summaries are due to minor adjustments for escalation and removal of funding shown under PE 63313N from the total estimated cost.

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*	9,815	2,879	2,463	18,957*
WI415	HELLFIRE	0	0	9,815	2,879	2,463	18,957**

* FY 1982 funding for HELLFIRE missile development is shown under Program Element 63313N, Project WI415. $8,508 was provided with $3,800 intended for missile development and the balance for helicopter retrofit development.

** Includes $3,800 FY 1982 under Program Element 63313N.

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
WPN HELLFIRE	-	-	17,300	21,200	419,600	458,100
Quantity			(219)	(314)	(10,606)	(11,139)

104

Program Element: 64371N Title: HELLFIRE

F. (U) RELATED ACTIVITIES: HELLFIRE Missile: The United States Army is lead development service for the missile which is the primary weapon system for the Army Advanced Attack Helicopter. Program Element 64310A, Project 074, Heliborne Missile - HELLFIRE.

G. (U) WORK PERFORMED BY: 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 W1415, HELLFIRE: HELLFIRE is a laser homing, fire and forget missile with a range of five miles and a 28-pound shaped charge warhead for use by Marine Attack Helicopters against enemy armor. Laser designation of target will be by means of airborne and ground laser designators.

(U) In FY 1982 the program was reported under Program Element 63313N, Imaging Infrared MAVERICK. Initiated development of arm and fire device for the rocket motor. Conducted safety assessment. Conducted electromagnetic interference testing and certified the missile HERO safe. Received preliminary Weapons System Evaluation Safety Review Board approval. Procured seekers to be provided for test hardware.

(U) The FY 1983 program consists of:

- o Modifying the basic United States Army developed missile to make it shipboard compatible.
- o Procure development and operational test and evaluation hardware.

(U) For FY 1984 it is planned to:

- o Complete necessary modifications for shipboard compatibility.
- o Conduct Development Test and Evaluation on the AH-1J and AH-1T helicopters.
- o Obtain Approval for Service Use on the AH-1J/HELLFIRE weapon system.

(U) Program to Completion: Complete data items and documentation for approval for full production. Conduct study for fixed wing application.

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

105

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64372N
Title: New Threat Upgrade
DoD Mission Area: 231 - Anti-Air 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	42,167*	41,859	47,619	52,474	TBD	TBD
S0188	CG/SM-2/New Threat Upgrade	27,471*	23,723	31,659	29,357	TBD	TBD
S0964	TARTAR SM-2/New Threat Upgrade	14,696*	18,136	15,960	23,117	TBD	TBD

* Funded in program element 64352N Surface-Launched Weaponry/Ship Systems prior to FY 1983.

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: This program element supports development of shipboard combat systems improvements to counter major and projected anti-ship missile threats. It encompasses improvements to the tactical TERRIER and TARTAR systems on guided missile cruisers and destroyers. Significant improvements are required to the detection systems, sensor data processing and the weapons engagement system to meet the projected threat. These improvements involve the AN/SPS-48E three dimensional radar, Navy Tactical Data System/Weapons Directon System software changes, AN/SYS-2 Integrated Automatic Detection and Tracking System and the AN/SPS-49(V)5 two dimensional air search radar.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: A decrease of 33 in Project S0964 (TARTAR SM-2/New Threat Upgrade) in FY 1982 and a net program decrease of 22 in FY 1983 are due to a combination of inflation, economies and program adjustments. An increase of 3950 for Project S0188 (CG/SM-2 New Threat Upgrade) for FY 1982 was required to correct technical deficiencies associated with the AN/SPS-48E Radar. An increase of 1876 for Project S0188 (CG/SM-2/New Threat Upgrade) in FY 1984 was required to fund special purpose programming development and documentation to implement STANDARD Missile-2 (Nuclear) capability in TERRIER New Threat Upgrade ships. An increase of 4145 in FY 1984 for Project S0964 (TARTAR SM-2/New Threat Upgrade) is a result of a Navy decision to transfer OPN funds associated with special purpose programming development and documentation.

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

Project No.	Title	FY 1981 Actual	F. 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional to Completion	Total Estimated Cost
	TOTAL FOR PROGRAM ELEMENT*	34,149*	38,250*	41,881	41,598	Continuing	Continuing
S0188	CG/SM-2/New Threat Upgrade	25,282*	23,521*	23,740	29,783	Continuing	Continuing
S0964	TARTAR SM-2/New Threat Upgrade	8,867*	14,729*	18,141	11,815	Continuing	Continuing

* Funded as part of Program Element 64352N Surface-Launched Weaponry Ship Systems Program prior to FY 1983.

Program Element: 64372N Title: New Threat Upgrade

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
S0188	OPN SMS ORDALTS Area Defense TERRIER (Includes TERRIER CG/SM-2 and New Threat Upgrade)	50,742	50,457	89,450	77,849	Continuing	Continuing
S0964	OPN (TARTAR CGN/SM-2 Upgrade)	24,117	25,563	48,980	88,705	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Standard Missile Improvements, PE 64366N, Surface Missile Warhead Development, PE 64365N; Radar Surveillance Equipment (Engineering), PE 64508N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Combat Direction Systems Support Activity, Dam Neck, VA; Naval Surface Weapon Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Pt. Hueneme, CA. CONTRACTORS: Applied Physics Laboratory, Johns Hopkins University, Laurel, MD; Automation Industries, Inc., Vitro Laboratories, Silver Spring, MD; Raytheon, Wayland, MA; Sperry, Great Neck, NY; General Dynamics, Pomona, CA; Northern Ordnance Corp., Minneapolis, MN; Electronics Communications Inc., St. Peterbury, FL; UNIVAC, Minneapolis, MN; ITT Gilfillan, Van Nuys, CA; Sperry Gyroscope Division of Sperry Rand Corporation, Great Neck, NY.

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

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

(U) Project S0188 CG/SM-2/New Threat Upgrade

1. (U) DESCRIPTION (Requirement and Project): This project provides for continuation of improvements to CG/SM-2 surface missile systems for various TERRIER ship classes to provide baseline Standard Missile (SM-2 Block I) capability. In addition, the element provides for major improvements to the baseline TERRIER CG/SM-2 ships to counter [redacted] Anti-Ship Missile threats. The New Threat Upgrade Program supports improvements to the existing TERRIER ship Combat Systems including the modified Detection Radars (AN/SPS-48E and AN/SPS-49(V)5), a new integrated Automatic Detection and Tracking System (AN/SYS-2), and modified TERRIER Engagement System (Weapons Direction System MK 14, Missile Fire Control System MK 76, Missile Downlink Communications Set (AN/SYR-1)). Computer programs and associated documentation for integration of the new Standard Missile (SM-2 Block II) shipboard capability are also included.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed land based test site evaluation. Completed New Threat Upgrade installation of sub-system modifications and computer programs in test ship (USS MAHAN). Conducted at-sea Technical and Operational Evaluation (Phase I). Continued TERRIER CG/SM-2 unique computer programming and documentation for specific TERRIER ships.

b. (U) FY 1983 Program: Complete New Threat Upgrade Technical and Operational Evaluation (Phase II) leading to Approval for Production for the New Threat Upgrade Combat System. Commence procurement of limited production systems for TERRIER ships/trainers. Commence New Threat Upgrade and continue TERRIER CG/SM-2 unique computer programming and documentation for specific TERRIER ships.

c. (U) FY 1984 Planned Program: Correct any deficiencies resulting from at-sea test and evaluation. Commence full scale production. Commence Standard Missile 2 (Nuclear) and continue TERRIER CG/SM-2 and New Threat Upgrade unique computer programming and documentation for specific TERRIER ships. Increase of $7,936,000 from FY 1983 to FY 1984 is due to increased number of ships requiring production programming and documentation effort.

Program Element: 64372N Title: New Threat Upgrade

d. (U) Program to Completion: Support further improvements to the New Threat Upgrade Combat System design. Co adaptation of computer software and documentation for CG/CGN TERRIER ships.

e. (U) Milestones: Not applicable.

(U) Project S0964 TARTAR SM-2/New Threat Upgrade

1. (U) DESCRIPTION (Requirement and Project): The TARTAR CGN/SM-2 Anti-Air Warfare Weapon System provides a increase in Anti-Air Warfare Engagement System capability by exploiting the already developed Standard Missile-2 Block I. TARTAR CGN/New Threat Upgrade Anti-Air Warfare Weapon System will further increase capabilities to meet an expanding thre exploiting the Standard Missile-2 Block II and the New Threat Upgrade Sensor System. The TARTAR CGN/SM-2 and the TARTAR C Threat Upgrade Systems adapt the TERRIER developed CG/SM-2 and CG/New Threat Upgrade improvements for TARTAR guided m cruisers and destroyers (CGN 36-41 and DDG 993-996)

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed Critical Design Reviews on MK 74 Missile Fire Control System modifications and Weapons Direction System computer program modifications. Began computer program testing.

b. (U) FY 1983 Program: For CGN/SM-2 the following is to be accomplished. (1) Complete design changes and fabric of the Missile Fire Control System engineering development mode. (2) Complete Guided Missile Launching System/Weapons Dir System integration testing. (3) Complete Missile Fire Control System/Weapons Direction System/Communication Tracking Syste based integration testing. Initiate development of changes to specifications for the Anti-Air Warfare Weapon System for C Threat Upgrade.

c. (U) FY 1984 Planned Program: Complete Weapons Direction System/Combat Direction System/Search Radar/MK 86 Gun Control System land based integration testing for CGN/SM-2. Initiate design for hardware and computer program changes for C Threat Upgrade. Continue to incorporate changes into computer programs to resolve problems discovered during land based tes

d. (U) Program to Completion: Continue efforts as necessary to update systems on CGN 36, CGN 38 and DDG 993 Clas meet the changing threats. Complete CGN/SM-2 Block I Follow-on Test and Evaluation. Complete development and tests of ha and computer programs for CGN/New Threat Upgrade.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64502N
DoD Mission Area: 345 - Tactical Communications

Title: Submarine 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	7,037	3,565	6,164	5,918	Continuing	Continuing
X0742	Submarine Integrated Antenna System	7,037	3,565	6,164	5,918	Continuing	Continuing
	(Mast/Periscope Mounted Systems)	(486)	(400)	(1,360)	(1,800)	(Continuing)	(Continuing)
	(Quantity - Service Test Models: AN/BRA-34						(1)*
	OE-158/BRQ)						(1)*
	(AN/BSQ-5 Towed Buoy and Related Improvements)	(3,628)	(2,245)	(1,900)	(1,050)	(Continuing)	(Continuing)
	(Quantity - Advanced Development Model						(1)*
	- Service Test Models)						(3)*
	(Buoyant Cable System Improvements)	(395)	(50)	(660)	(1,000)	(Continuing)	(Continuing)
	(Quantity - Service Test Models)						(3)*
	(Expendable Buoy Systems)	(1,383)	(600)	(200)		(Continuing)	(Continuing)
	(Quantity - Ultra High Frequency Satellite Communications Buoys Engineering Development Models)						(150)*
	(Antenna Signal Distribution Systems)	(196)	(0)	(1,200)	(900)	(Continuing)	(Continuing)
	(Other Sub-tasks)	(947)	(270)	(844)	(1,168)	(Continuing)	(Continuing)

* Development/Operational Test and Evaluation Models procured prior to 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: Submarine Integrated Antenna System is a continuing program to provide present and future nuclear attack submarines with the required antenna systems to support multifunction information exchange capabilities (communications, navigation identification with aircraft, ships, and other submarines and shore stations in support of submarine warfare operational doctrines). Particular emphasis is being placed on command, control, and communication links between attack submarines and other friendly forces. Information exchange is required from operational depths with minimum restriction on speed, depth, and maneuverability. Several generic types of submarine antenna systems must be integrated and balanced to provide operational flexibility, enhanced functional capabilities, and redundancy, while optimizing the use of limited budget resources, and finite submarine space and weight. Hardware developments include: (a) mast/periscope mounted system; (b) towed buoy systems; (c) buoyant cable systems; (d) expendable buoy systems; and (e) antenna signal distribution 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 Descriprive Summary are as follows. (1) The FY 1982, FY 1983, and FY 1984 RDT&E funding has decreased by 150, 2,019, and 2,150 respectively due to Navy funding of higher priority programs.

109

Program Element: 64502N Title: Submarine Communications

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	8,353	7,187	5,584	8,314	Continuing	Continuing
X0742	Submarine Integrated Antenna Systems	8,353	7,187	5,584	8,314	Continuing	Continuing
	(Mast/Periscope Mounted Systems)	(336)	(600)	(800)	(1,400)	(Continuing)	(Continuing)
	(Quantity - Service Test Models: AN/BRA-34						(1)*
	OE-158/BRQ)						(1)*
	(AN/BSQ-5) Towed Buoy and Related Improvements)	(5,092)	(3,625)	(2,100)	(Continuing)	(Continuing)	
	(Quantity - Advanced Development Model						(1)*
	- Service Test Models)						(3)**
	(Buoyant Cable System Improvements)	(383)	(525)	(600)	(700)	(Continuing)	(Continuing)
	(Quantity - Engineering Development Models)						(2)***
	(Quantity - Service Test Models)						(2)**
	(Expendable Buoy Systems)	(1,187)	(1,187)	(1,008)	(800)	(Continuing)	(Continuing)
	(Quantity - Ultra High Frequency Satellite Communications Buoys Engineering Development Models						(150)**
	(Antenna Signal Distribution Systems)	(350)	(250)	(150)	(1,100)	(Continuing)	(Continuing)
	(Other Sub-Tasks)	(1,005)	(1,000)	(926)	(2,164)	(Continuing)	(Continuing)

* Procured prior to FY 1981
** Developmental/Operational Test and Evaluation
*** Material Procurement for In-House Assembly; Development/Operational Test and Evaluation

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
Opn (BA2) (333130)	5,532	9,481	9,838	13,258	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Program Element 62721N, Command and Control Technology, provides submarine communications technology support in radio frequency and optical communications. The Attack Submarine Integrated Communications System program (project X1411 of Program Element 64524N) interfaces with this program including implementation of the High Frequency Improvement Program. Program Element 11228N, TRIDENT Submarine System utilizes similar technology to develop multifunction mast antennas and towed communication buoys. Program Element 11402N, Navy Strategic Communications, utilizes similar technology in the development of towed communication buoys and an improved standardized buoyant cable antenna system for fleet ballistic missile submarines. Development of compatible attack submarine antennas is required by the NAVSTAR Global Positioning System program (Program Element 63401N). The Submarine Advanced Combat System (Project S1347 of Program Element 64524N) provides for development of an integrated combat system for future class of submarines, of which the antennas being developed under the Submarine Integrated Antenna Systems program will be a part.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London, CT; Naval Research Laboratory, Washington, DC; David W. Taylor Naval Ship Research and Development Center, Bethesda and Annapolis, MD; Naval Ship Systems Engineering Station, Philadelphia, PA; CONTRACTORS: Spears Associates, Norwood, MA; International Telephone and Telegraph Corporation, Nutley, NJ; Hazeltine Corporation, Braintree, MA; Computer Sciences Corporation, Falls Church, VA; Bose, Allen and Hamilton, Incorporated, Bethesda, MD.

10

Program Element: 64502N Title: Submarine Communications

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

(U) The purpose of the Submarine Integrated Antenna System program is to provide the attack submarine with antenna systems designed to: (a) permit greater operational flexibility through improved speed/depth performance; (b) improve availability and reliability; and (c) be compatible with existing and emerging communications systems. This can only be accomplished by providing the attack submarine with a mix of antennas systems covering a wide range of frequencies and imposing minimum restrictions on the submarine's operational capabilities.

(U) In FY 1982, mast/periscope mounted antenna accomplishments included laboratory testing of an autotune feature for the AN/BRA-34 antenna to compensate for ocean wave variations; development and evaluation of a NAVSTAR Global Positioning System modification for the AN/BRA-34 and the OE-158/BRQ antennas; and the development of specifications for a Type 18 periscope antenna for reception of ultra high frequency satellite communications. AN/BSQ-5 towed array and related improvement accomplishments and milestones for FY 1982 include completing the fabrication of the first of three service test models and commencement of the installation of that system in the USS SILVERSIDES (SSN 679). At-sea tests were also conducted of a buoy-mounted antenna designed to ride higher above the water surface for improved electrical performance. Full scale development and Development Testing-II of the OE-315(V)/BRC buoyant cable system improvements continued in FY 1982, and three newly designed antenna couplers were fabricated. An ultra high frequency satellite communications expendable buoy system engineering development model was fabricated and a formal Technical Evaluation was conducted near the end of the fiscal year. Preliminary specifications were developed for an improved 688-class prototype antenna signal distribution system designed to optimize radio frequency signal path characteristics and connectivity.

(U) In FY 1983, principal goals and milestones include:

- o Fabricate and evaluate at-sea an advanced development model of the Type 18 periscope antenna incorporating a satellite communications receive capability.
- o An Operational Evaluation of the ultra high frequency satellite communications expendable buoy system is scheduled in early FY 1983, and, if successful, an approval for service use will be requested.

(U) FY 1984 goals and milestones include:

- o Initiate redesign of the AN/BRA-34 control unit to support new ultra high frequency communications systems presently under development;
- o Investigate AN/BRA-34 antenna modifications required to meet the implementation of the High Frequency Improvement Program;
- o Development of advanced development models of the AN/BRA-34 antenna incorporating the high frequency improvement program bandwidth capability;
- o Obtaining approval for installation of Type 18 periscope modification for ultra high frequency satellite communications receive capability.
- o Approval for Service Use for the AN/BSQ-5 towed buoy will be requested.
- o Full scale development of the electronic packaging modification for the towed buoy will be initiated utilizing off-the-shelf rack-mounted electronics housed in buoyancy tanks designed for optimum heat dissipation and minimum electromagnetic interference.

111

Program Element: 64502N Title: Submarine Communications

- o Additional submarine-satellite information exchange system capability.
- o Pursue hydrodynamic improvements
- o This is a continuing program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64503N
Title: Submarine Sonar Development (Engineering)
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	44,603	41,603	61,222	49,781	Continuing	Continuing
S0219	Submarine Sonar Improvements	44,603	41,603	61,222	49,781	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 encompasses engineering development of attack submarine sonar improvements in order to maintain an acoustic advantage over new quieter Soviet submarines. Currently, effort within this element is directed primarily toward development of improvements for the AN/BQQ-5 sonar and integration of attack submarine acoustic equipments applicable to SSN 594/637/688 Class submarines.

C. (U) COMPARISION 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 1982, 4,200 was reprogrammed to fund additional TBX Towed Array Development requirements and to procure an egineering model for use in sea testing. The FY 1983 decrease of 167 was due to reduction in the inflationary factors applied. In FY 1984, 24,639 was added to procure TBX Towed Array Mine Detection and Avoidance System government-furnished material for at-sea testing. The TBX Towed Array Mine Detection and Avoidance System effort has been restructured since FY 1982 to support (1) its development in the Submarine Advanced Combat System and (2) its integration into the AN/BQQ-5 Sonar. This supports the introduction of Submarine Advanced Combat System [ ] The TBX Towed Array and Mine Detection and Avoidance System effort in FY 1983 and FY 1984 is concentrated on joint development with Submarine Advanced Combat System. In FY 1985, the TBX Towed Array Mine Detection Avoidance System/Submarine Advanced Combat System development will proceed in Program Element 64524N, Project S1347, while its integration with the AN/BQQ-5 will be initiated within the Submarine Sonar Improvement.

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	32,026	40,403	41,770	36,583	Continuing	Continuing
S0219	Submarine Sonar Improvements	32,026	40,403	41,770	36,583	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 24281N, Submarines (project S0216), developed the basic AN/BQQ-5 Submarine Sonar. Program element 63504N, Submarine Sonar Development (Advanced), furnishes advanced technological subsystem building-block improvements for engineering development.

Program Element: 64503N Title: Submarine Sonar Development (Engineering)

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London, CT, and Newport, RI; Naval Weapons Support Center, Crane, IN. CONTRACTORS: International Business Machine Corp., Federal Systems Division, Manassas, VA; Hughes Aircraft Company, Fullerton, CA; Gould, Inc., Chesapeake Instrument Division, Glen Burnie, MD; TRACOR, Rockville, MD; EG&G, Washington Analytical Services Center, Rockville, MD; Analysis and Technology, Inc., North Stonington, CT; Hydrotronics, Inc., Falls Church, VA; CBM Electronics Inc., Suitland, MD; Bendix, Sylmar, CA; Raytheon, Portsmouth, RI; NORDEN Systems, Inc., Melville, NY.

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

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

(U) Project S0219, Submarine Sonar Improvements (Engineering)

1. (U) DESCRIPTION: The objective of this project is to provide improvements to attack submarine sonar systems to maintain acoustic advantage over new quieter Soviet submarines. Currently, the main effort is the AN/BQQ-5(C) Expanded Directional Frequency Analysis and Recording development. This development began in FY 1980 and will replace the Multiple Interface Unit/ Digital Spectrum Analyzer (Unit 130) of the AN/BQQ-5 System with a repackaging of three Advanced Signal Processors, (AN/UYS-1's), into one water-cooled cabinet. This cabinet will provide the system[ ]processing concurrent with[ ] and improved target resolution. Other efforts include the development of a TBD Towed Array, the development of AN/BQQ-5(V) block change kits for installed systems, undersea warfare systems integration, computer-aided classification, and the development of suite level guidelines to most effectively employ the systems. Towed Array Developments - The basis of the present AN/BQQ-5 Towed Array (TB-16/BQ) design was the technology available in 1973. Since that time, advances in the laboratory and in preliminary Navy tests have demonstrated improved handling characteristics and reduced self-noise in new thin-line arrays. The objective of the Towed Array Improvement Program is to develop an extended thin-line towed array (TBX). AN/BQQ-5B(V) Block Changes - As various improvements complete development, they are identified with others in logical "blocks" of changes to be incorporated in the installed systems. Block change kits and related documentation are then developed to support the installations. Computer-Aided Classification - The increased detection capability of present sonars provides the operator with large numbers of potential contacts to classify as threats or non-threats. With a computer-based system, the processing capacity of the computer may be utilized to aid the operator in the classification of the contacts. This requires definition of the "clues" and criteria that operators use to classify threats.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: System level integration and test of AN/BQQ-5C(V) and design definition of the TBX Towed Array Mine Detection and Avoidance System integration into the AN/BQQ-5 sonar system were initiated. Development of the High Frequency Transmitter was also continued. Undersea Warfare System Integration continued as well as development of operational/operability guidelines for computer-aided classification, AN/BQQ-5C(V) and other improvements. Block change kits to equip installed systems with new improvements were developed. TBX array development continued, testing of TBX Array Modules was initiated, and fabrication of Engineering Development Model Arrays commenced.

b. (U) FY 1983 Planned Program: System design certification and qualification of AN/BQQ-5C(V) will be initiated in the October - December time frame. The following efforts are planned for January - September: developmental sea test of the TBX array will be conducted; development of the SSN 637 Thin Line Handling System is being initiated; conduct and complete Range Exercise in development of the operational/operability guidelines; High Frequency Transmitter development will be completed and installed for sea testing; planned hull array and operational/operability block change improvements for the AN/BQQ-5C(V) is being initiated; TBX Array Mine Detection and Avoidance System in support of Submarine Advanced Combat System and AN/BQQ-5 system intergration will continue.

Program Element: 64503N

Title: Submarine Sonar Development (Engineering)

c. (U) FY 1984 Planned Program: System Initial Operating Capability, completion of Technical Evaluation/Operational Evaluation of AN/BQQ-5C(V) is planned. Completion of the AN/BQQ-5C(V) operational guidelines is planned. Continue development and integration of TBX Array Mine Detection and Avoidance System. The first production award for the TBX array is planned. Completion of TBX Array Technical Evaluation/Operational Evaluation planned. Continue the design and development of the TBX Array Handling System from SSN 637 Class submarine, conduct immersion test, and commence sea testing. Complete the sea test of High Frequency Transmitter Unit concurrent with Submarine Active Detection System/Mine Detection and Avoidance System. Continue development of the FY 1985 Block Change to the AN/BQQ-5C(V).

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

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64504N
DoD Mission Area: 352 - Air Warfare

Title: Air Control (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	13,658	9,251	25,221	28,774	Continuing	Continuing
X0718	Marine Air Traffic Control and Landing System	6,392	2,183	5,537	5,603	Continuing	Continuing
X0993	AN/SPN-42B Automatic Carrier Landing System	4,566	3,047	13,295	9,026	Continuing	Continuing
X1412	Air Control (Fiber Optic Cable)	0	0	0	2,929	Continuing	Continuing
X1579	LPH/LHA Air Traffic Control	0	1,491	4,925	1,446	0	7,862
X1657	ATC Improvement	0	2,530	0	0	0	2,530
				(2)			DT&E
W1680	Multi-Mode Receiver	2,700	0*	1,464	7,322	8,307	19,793
X1749	Tactical Electronic Reconnaissance Processing and Evaluation System	0	0	0	2,448	8,337	10,785

* Funded from X0718 Marine Air Traffic Control and Landing System in FY 1983.

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for projects X0718, X0993 an X1412 and through completion for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides for the development, integration, and testing of hardware and software necessary for replacing aging landing control and air traffic control equipments at Marine tactical/expeditionary airfields and landing control central equipment on aircraft carriers, aircraft compatible ships, and at Naval Air Stations. The new systems will provide more reliable all-weather landing capabilities and an automated air traffic control capability resulting in improved operational capabilities and safety-of-flight at these aircraft landing sites. Provides for development of a Multi-Mode Receiver for use in Navy/Marine Corps aircraft, to insure compatibility with future Federal Aviation Administration National Microwave Landing System, United States Air Force instrument landing systems, and the Marine Remote Area Approach and Landing System. Provides for compatibility of Tactical Electronic Reconnaissance Processing and Evaluation System software with the new Navy standard computer, and with new capabilities of electronic warfare intelligence gathering aircraft. Provides for the development of an independent Landing Guidance System for LHA/LPH ships built around the Marine Remote Area Approach and Landing System transmitter.

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 X1718, Marine Air Traffic Control and Landing System: Decreases of 156 in FY 1982 and 123 in FY 1984 because of budgetary adjustments.

(U) Project X0993, AN/SPN-42B, Automatic Carrier Landing System: Increase of 1523 in FY 1982 and 605 in FY 1984 are due to program restructuring and Radar Pre-Planned Product Improvement (P^{3}I) which commences in FY 1984.

(U) Project X1412, Air Control (Fiber Optic Cable): A decrease of 779 in FY 1984 as a result of a decision to delay development for one year. The project has been restructured for a new start in FY 1985.

(U) Project X1579, LPH/LHA Air Traffic Control: A decrease of 109 in FY 1984 because of budgetary adjustments.

Program Element: 64504N Title: Air Control (Engineering)

Project X1657, ATC Improvement: No change

Project W1680, Multi-Mode Receiver: An increase of 1,464 in FY 1984 because of the requirement for more units for flight testing. This project will transition in FY 1984 from Project X0718 Marine Air Traffic Control and Landing System to this new project number.

OPN

Project W0718, Marine Air Traffic Control System: An increase of 5,222 in FY 1982. 1385 in FY 1983, and 6001 in FY 1984 because of inflation and a change in scope of the program dictated by the directed decision to use the new standard Navy computer in the system.

SCN

Project X0993, AN/SPN-42B Aircraft Carriers Landing System: An increase of 18,000 in FY 1983 for one system each for CVN-72 and CVN-73.

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	8,066	9,591	9,251	24,163	Continuing	Continuing
X0718	Marine Air Traffic Control and Landing System	2,849	6,548	2,183	5,660	Continuing	Continuing
X0993	AN/SPN-42B Automatic Carrier Landing System Quantity	5,217	3,043	3,047 (2)	12,690	Continuing	Continuing
X1412	Air Control (Fiber Optic Cable)	0	0	0	779	Continuing	Continuing
X1579	LPH/LHA Air Traffic Control	0	0	1,491	5,034	Continuing	Continuing
X1657	ATC Improvement	0	0	2,530	0	0	2,530

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							
332815	Marine Air Traffic Control and Landing System	26,598	21,888	26,983	32,922	Continuing	Continuing
332828	Tactical Electronic Reconnaissance	1,400	1,601	1,764	2,239	Continuing	Continuing
SCN							
X0993	AN/SPN-42B Automatic Carrier Landing System Procurement Quantity (one each for CVN-72 and 73)	0	18,000	0	0	0	18,000

F. (U) RELATED ACTIVITIES: Development in both the Marine Air Traffic Control and Landing System and the AN/SPN-42B Automatic Carrier Landing System projects has been coordinated with the Joint Tactical Microwave Landing System project under PE 63511N, and the National Microwave Landing System.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Engineering Activity, St. Inigoes, MD (lead laboratory); Naval Electronic Systems Engineering Center, Vallejo, CA; Marine Corps Development and Education Command, Marine Corps Base, Quantico,

Program Element: 64504N Title: Air Control (Engineering)

VA; Naval Ocean Systems Center, San Diego, CA; Naval Air Test Center, Patuxent River, MD; Naval Avionics Center, Indianapolis, IN; Naval Weapons Support Center, Crane, IN; Federal Aviation Agency, Jacksonville, FL; Pacific Missile Test Center, Point Mugu, CA. CONTRACTORS: ITT Gilfillan, Van Nuys, CA; Westinghouse, Baltimore, MD; Sperry UNIVAC, Minneapolis, MI; Bell Aerospace Inc., Buffalo, NY; Sperry Gyroscope, Great Neck NY; CDC, Minneapolis, MN; Singer-Kearfott, Little Falls, NJ; Telephonics, Long Island, NY; ACLS Corporation, Silver Spring, MD, Sperry UNIVAC, St. Paul, MN.

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

(U) Project X0718, Marine Air Traffic Control and Landing System: The effectiveness of Marine expeditionary operations is dependent upon continuous close air support. However, weather and visibility conditions sometimes preclude launch and recovery of aircraft. The Marine Air Traffic Control and Landing System is an integrated, automated landing and terminal Air Traffic Control System which will provide the capability for all-weather operations at Marine Expeditionary Airfields, and will significantly increase air traffic control capacity and the safe landing rate at these airfields. It will also provide the capability to control the landing of any aircraft through the fully automated Instrument Landing System-type crosspointer, and/or Ground Controlled Approach "talkdown" guidance. The Marine Air Traffic Control and Landing System will be compatible with military and civil air traffic control facilities and associated data links, and with the proposed National Microwave Landing System. The Marine Air Traffic Control and Landing System will replace the operationally inadequate and technologically obsolete obsolete AN/TSQ-18 Air Traffic Control System with state-of-the-art equipment. The Marine Air Traffic Control System software is being developed in two phases, with Testbed Software being developed for safety-of-flight testing, and the Operational Software being developed for use in the field. This project also provides for the incorporation of 360 degree TACAN and offset capabilities in the Marine Remote Area Approach and Landing System AN/TPN-30, and for the adaptation of the AN/TPN-30 for use on LHA and LPH class ships as an independent landing guidance system.

(U) In FY 1982, flight testing of the Testbed software continued, design specifications for the Operational Software were completed, and Operational Software development commenced.

(U) In FY 1983, Operational Software development will continue, and software integration will commence. Engineering Development models of the upgraded AN/TPN-30 and AN/TPN-30 Shipboard configuration will be acquired.

(U) In FY 1984, it is planned to complete Operational Software integration and contractor testing, system integration and testing, and combined Development/Operational Test and Evaluation. It is planned to test the AN/TPN-30 shipboard configuration at sea.

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

(U) Project X1579, LPH/LHA Air Traffic Control: Tactical Air Control Centers aboard LPH/LHA are responsible for making the most effective use of aircraft to support the amphibious force by controlling aircraft within the amphibious objective area. The Tactical Air Control Center provides the coordination to insure an integrated defense for ships and troops. An integral part of the Tactical Air Control Center is the Helicopter Direction Center to coordinate all helicopter/Vertical Takeoff and Landing operations. This project is to provide the following Tactical Air Control Center/Helicopter Direction Center/Direct Altitude Identify Readout capability: (a) Simultaneous display of up to 200 targets with Direct Altitude Identity Readout information, (b) provide five identify filter channels on each console, (c) discriminate between two targets spaced as closely as 1/8 nautical mile, and (d) establish selectable altitude layers at discretion of the operator. All friendly aircraft within 50 nautical miles of the mother ship shall be under positive Tactical Control Center control.

(U) In FY 1983, this project is a new start. A contract will be awarded for design fabrication of an Engineering Development Model for testing.

(U) In FY 1984, continue fabrication and in-plant testing of an Engineering Development Model.

(U) Project W1680, Multi-Mode Receiver: This project provides for development and testing of an airborne landing system Multi-Mode Receiver to provide an aircraft capabilty for inter-operation with the ground-based elements of either the existing

Navy/Marine Corps Pulse Code Scanning Beam Landing Guidance System (AN/SPN-41, AN/TRN-28, AN/TRN-30); the existing international standard Instrument Landing System; or the new common civilian/military Time Reference Scanning Beam Microwave Landing System which becomes the international standard after 1995. The Multi-Mode Receiver will replace the AN/ARA-63 single-mode Pulse Code Scanning Beam receiver presently used in Navy/Marine Corps fixed-wing aircraft, and will be the airborne receiver in helos for use with the Marine Remote Area Approach and Landing System. The Multi-Mode Receiver multi-mode capability will permit pilot selection of a mode for interoperability with any of the different ground equipment provided for low visibility landing guidance worldwide during the expected long period of transition to the new international standard common civilian/military Microwave Landing System.

(U) In FY 1982, fabrication of development models will be continued.

(U) The FY 1983 program consists of:

- o Completion of development models.
- o Begin Technical Evaluation.

(U) In 1984 it is planned to:

- o Acquire additional preproduction models to begin flight testing in various candidate aircraft.

(U) Program to Completion: Complete Technical Evaluation and Operational Evaluation. Obtain Approval for Service Use.

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

1. (U) DESCRIPTION: AN/SPN-42B Automatic Carrier Landing System, X0993: In July 1980, a contract was awarded to develop the Automatic Carrier Landing System. The Automatic Carrier Landing System is required to automatically land carrier based Navy aircraft in severe sea states and weather conditions. The Automatic Carrier Landing System RDT&E program is structured in accordance with the pre-planned product improvement approach. The first developmental phase provides for the basic AN/SPN-42B by utilizing Navy standard computers and stabilization equipments, computer programs developed in standard Navy language, air traffic control displays and new indicators with an existing modifier radar. The second phase (P^3I) completes the long-term Automatic Carrier Landing System development effort by providing a Frequency Agile Radar which will meet all aircraft acquisition/control requirements and eliminates the existing requirements for aircraft augmentation (radar beacon/corner reflector).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Development of the hardware and software system design of the basic AN/SPN-42B continued.

b. (U) FY 1983 Program: Development of the initial system design will be completed and the AN/SPN-42B Engineering Development Unit will be delivered in September 1983 to commence contractor environmental tests.

c. (U) FY 1984 Planned Program: The AN/SPN-42B Engineering Development Model will be delivered for Navy Development Test and Evaluation. Fabrication of the Service Test Model to be used for the Technical/Operational Evaluation will commence. Design and Development of the Frequency Agile Radar (P^3I) will commence.

d. (U) Program to Completion: A Technical/Operational Evaluation of the AN/SPN-42B will be conducted on the USS KENNEDY in FY 1985 and 1986. The development and testing of the Frequency Agile Radar will continue through FY 1987. A Technical/Operational Evaluation of the Frequency Agile Radar will be conducted in FY 1988. Modifications resulting from the Technical/Operational Evaluations will be developed and retrofitted into the AN/SPN-42B and Frequency Agile Radar. Approvals for limited production and full service use will be separately obtained for the AN/SPN-42B and Frequency Agile Radar for the transition from RDT&E to production.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64506N
Title: BR/CW Countermeasures
DoD Mission Area: 276 - Defensive Chemical and Biological 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	7,740	8,357	8,216	7,573	Continuing	Continuing
S0410	BR/CW Countermeasures	7,740	8,357	8,216	7,573	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.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED:

This program is required to develop shipboard advance warning and automatic point detection capabilities in defense of a chemical attack. The advance warning system, a remote sensor, will alert the ship to an attack upon that ship or other ship in company; the automatic point detector will alert ship personnel of chemical agents in the immediate area. This program will also develop shipboard collective protection systems appropriate for U.S. Navy application. The program will pursue detector, decontaminant and protective clothing selection while improving the present MK 5 mask pending further development of a satisfactory XM 30 mask. These equipments are required to protect personnel from chemical attack.

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: -182 in FY 1984 due to inflation adjustment and more accurate cost estimate.

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	3,710	7,740	8,357	8,398	Continuing	Continuing
S0410	BR/CW Countermeasures	3,710	7,740	8,357	8,398	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		1,889	9,896	14,012	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Infrared Search and Track, Program Element 64607N; Ionization Detector, Air Force and Army Project No. AD 27-01; Ship Survivability, Program Element 63514N; CBR Defense Technology, Program Element 62764N.

Program Element: 64506N Title: BR/CW Countermeasures

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Laboratory is the Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA. OTHERS: Naval Research Laboratory, Washington, D.C.; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; U.S. Naval Shipyard Puget Sound, Bremerton, WA; U.S. Naval Shipyard, Long Beach, Long Beach, CA; CONTRACTORS: Texas Instruments, Dallas, TX; Honeywell, Inc., St. Petersburg, FL; SPAR Aerospace, Toronto, Canada; Ingalls Shipbuilding, Pascagoula, MS.

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

(U) Project 90410, BR/CW Countermeasures: This project provides for development of Chemical, Biological and Radiological defensive equipment and systems as necessary to prepare U.S. Navy units to operate in Chemical, Biological and Radiological Warfare environments.

(U) The FY 1982 program consisted of, development of a manually-operated long range chemical detector ; Approval for Production was obtained. Continued development of an automatic, 360o long range detector and of a chemical agent point detector for shipboard use. Continued development of improved personnel protective clothing and masks, and initiation of development of a shipboard collective protection system for use on amphibious ships.

(U) The FY 1983 program consists of:

- o Completing Technical and Operational Evaluation of the Chemical Agent Point Detector System for shipboard use.
- o Completing design, fabrication and installation of a prototype full-time Collective Protection System on USS BELLEAU WOOD (LHA-3); conduct Technical Evaluation.
- o Conducting Land-Based Test and Evaluation of subsystems in support of Shipboard Collective Protection System development.
- o Continuing development of Automatic 3600 Chemical Detector.
- o Evaluating operability/suitability of U.S. Army XM 30 Mask for limited Navy use and developing improved operability features for standard Navy MK 5 Mask.

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

- o Complete Test and Evaluation of prototype Shipboard Collective Protection System on LHA-3.
- o Conduct Test and Evaluation of Portable Collective Protection System suitable for part time use on ships without full time systems.
- o Continue development of Automatic 3600 Chemical Detector.
- o Continue development of improved subsystems for Shipboard Collective Protection Systems (fans, filters, seals, controls and damage control features).

(U) Program to Completion will consist of completing development of automatic 3600 detector, developing Portable and Modular Collective Protection Systems to supplement full time systems, developing improved low heat stress chemical clothing and personnel protective equipment, and developing improved shipboard compatible decontamination materials and associated equipments.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64507N
DoD Mission Area: 237 - Naval Warfare Surveillance and Reconnaissance

Title: Enhanced Modular Signal Processor
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	12,972	22,359	28,962	TBD	TBD
S1440	Enhanced Modular Signal Processor	0	12,972	22,359	28,962	TBD	TBD
	- Functional Development Models (Quantity)	-	-	-	-	-	(3)

As this is a continuing program, 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: Meet near term and far term (1990's and later) signal processing requirements for a broad range of mission/platform applications. The AN/UYS-2 Enhanced Modular Signal Processor will provide a Navy Standard Signal Processor exceeding the throughput capability of the AN/UYS-1 Advanced Signal Processor. Basic Enhanced Modular Signal Processor architecture will incorporate a high degree of flexibility for multiple applications and will include provision for technology-limited growth. The Enhanced Modular Signal Processor will form the basic building block of the Submarine Advanced Combat System, and a number of other acoustic and non-acoustic sensor-based 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: In 1983, a decrease of 1,525 due to Congressional reductions and budgetary constraints. The increase in FY 1984 of 7,102 resulted from correcting early year deficiencies, contract definition (selection of prime contractor vice Navy estimate), and growth of work associated with the program; total estimated cost change is from filling in of continuing 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	0	0	14,497	15,257	Continuing	Continuing
S1440	Enhanced Modular Signal Processor (Quantities)	0 1/	0 1/	14,497	15,257	Continuing	Continuing
	- Functional Development Models	-	(3)	-	-	(0)	(3)
	- Engineering Development Models	-	(12)	-	-	(0)	(12)

1/ Refer to Descriptive Summary for Program Element 63524N, Project S1346 (Submarine Advanced Combat System) in FY 1981 and Project S1440 (Enhanced Modular signal Processor) in FY 1982.

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

F. (U) RELATED ACTIVITIES: Enhanced Modular Signal Processor configurations will form the basic building block of a number of ASW sensor systems of which the earliest requirement is identified with the Combat Control/Acoustic subsystem of the Submarine

122

Advanced Combat System (Project S1346 of Program Element 63524N and Project S1347 of Program Element 64524N). The common operating software support being developed for the AN/UYS-1 Advanced Signal Processor (Program Element 64266N, Project W0490) will be transportable to the Enhanced Modular Signal Processor.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London, CT; Naval Weapons Support Center, Crane, IN; Naval Research Laboratory, Washington, D.C.; Naval Air Development Center, Warminster, PA; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: Western Electric, Greensboro, NC; Sperry Univac, St. Paul, MN; TRW, McLean, VA; ADI, McLean, VA; Cost Engineering Research, Inc., Arlington, VA.

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

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

Project S1440, Enhanced Modular Signal Processor

1. (U) DESCRIPTION: The AN/UYS-2 Enhanced Modular Signal Processor is a special purpose modular digital computer available in a number of configurations to meet the signal processing needs of the user. It will increase the capabilities provided by AN/UYS-1 (Advanced Signal Processor) by an order of magnitude without increase in cost, power, or space requirements. It is designed to meet the Signal Processing needs of the Navy through the 1990's. It is designed to accept new technology (e.g. Very High Speed Integrated Circuits) as feasible to extend its capabilities. Five standard size/cooling configurations will be developed for testing. The program will fabricate 12 engineering development models to represent critically stressed user configurations and to meet first user requirements. Three non-military specification functional development models will be fabricated in the near term for software testing. The program will develop 20 additional engineering development models and 40 advanced production engineering units to provide to early users.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: Five contractors (International Business Machines, Manassas, VA; Control Data corporation, Minneapolis, MN; Western electric, Greensboro, NC; Hughes Aircraft Company, Fullerton, CA; and Magnavox, Ft. Wayne, IN) completed the competitive design. The five designs were evaluated and Western Electric was chosen to proceed into full scale development and complete the design of the hardware, software and support programs. The design is under configuration management; the proposed system is ready for full scale development.

b. (U) FY 1983 Planned Program: Achieve Milestone II decision during December 1982/January 1983 and from January through September, initiate full scale development. Actual hardware and software will be produced. The designs will undergo intensive detailed validation and verification. Graphical signal processing procedures will be finalized. The software evaluation facilities (contractor, Navy laboratories and first user) and the In-Service Engineering Activity will be established. The Functional Development Models will be in factory acceptance tests. The Engineering Development Models will begin fabrication.

c. (U) FY 1984 Planned Program: Three Functional Development Models will be delivered and installed in the Software Evaluation Facilities. Intensive hardware, software and systems test and evaluation (including independent validation and verification) will be conducted. Substantive user interfaces will be developed and user software will begin testing on the Functional Development Models. Support programs will be under full development and the In Service Engineering Activity will be on-line to support the Functional Development Models and preparing to support Engineering Development Model units. The cost increase in FY 1984 of $9,387 results from correcting early year deficiencies, contract definition (selection of prime contractor via Navy estimate), and growth of work associated with the program.

Program Element: 64507N Title: Enhanced Modular Signal Processor

d. (U) Program to Completion: The contractor will deliver the first 6 Engineering Development Models and will be in the process of building 6 other units. Engineering Development Models will be delivered to users, beginning with the Submarine Advanced Combat system, and user testing will begin. The remaining eleven Engineering Development Models will be delivered and testing will be completed, including a land based operational appraisal. This will lead to a Milestone III decision in early FY 1986 with limited production beginning shortly thereafter. Software and hardware will be under configuration management and the In-Service Engineering Activity will begin to take full maintenance authority. Full production will begin after operational evaluation of systems using Enhanced Modular Signal Processor.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64508N Title: Radar Surveillance Equipment
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	17,892	10,439	13,662	21,259	Continuing	Continuing
S0166	SPS Improvement Program	14,050	6,558	12,980	21,259	Continuing	Continuing
S0876	Radar Automation	3,842	3,881	682	-	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: Develop improved radar detection systems for various ships' combat systems. Provide Integrated Automatic Detection and Tracking capability. Develop and test operational and reliability improvements to the established standard product line of shipboard surveillance radars (such as Automated Target Detection, solid state technology improvements, standard electronic modules) and associated equipments (displays and switchboards).

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: SPS Improvement Program (Project S0166) increase of $2,508 in FY 1982 was the result of cost growth associated with the New Threat Upgrade Program that affected both the AN/SPS-48E radar and the AN/SPS-49 Automatic Target Detection Modification and also the decision to accelerate the development of the AN/SPS-48 High Availability Solid State Transmitter Modification which would yield a common-design transmitter for both the New Threat Upgrade and AN/SPS-48C backfit programs. The increase of $4,711 in FY 1984 is attributed to the initiation of two programs, namely, 1) development of an Anti-Ship Missile Defense capability that would allow surface ships to defend themselves against small cross section, low flying cruise missiles similar to the Exocet and 2) investigation of the requirements/characteristics of a light weight high performance two dimensional radar that would be considered for installation in new construction ships. The decrease of 49 in FY 1983 in SPS Improvement Program (Project S0166) as well as the Radar Automation (Project S0876) reductions of 25 in FY 1982 and 15 in FY 1984 are due to routine budget and 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	11,036	15,409	10,488	8,966	Continuing	Continuing
S0166	SPS Improvement Program	6,459	11,542	6,607	8,269	Continuing	Continuing
S0876	Radar Automation	4,577	3,867	3,881	697	Continuing	Continuing

Program Element: 64508N Title: Radar Surveillance Equipment

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

OTHER PROCUREMENT, NAVY Equipment P-1 Line Item:	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
AN/SPS-40	5,348	13,773	18,041	19,323	Continuing	Continuing
AN/SPS-48	8,400	86,851	50,614	76,041	Continuing	Continuing
AN/SPS-49	10,499	19,856	17,170	16,658	Continuing	Continuing
AN/SPS-67	4,481	3,078	5,236	10,965	Continuing	Continuing
AN/SYS-( )	2,901	10,002	16,880	22,538	Continuing	Continuing
RADAR SUPPORT	7,204	5,955	11,650	29,463	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Combat Systems Integration, Program Element 63582N; DDGX Combat Systems, Program Element 63589N, Project S1337; Ship Survivability, Program Element 63514N, Project S0384; New Threat Upgrade, Program Element 64372N, Project S0188.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Weapons Center, China, Lake, CA; Naval Sea Systems Command Detachment, Norfolk, VA; Naval Ship Weapons Systems Engineering Station, Port Hueneme, CA; Naval Surface Weapons Center, Dahlgren, VA; Naval Avionics Center, Indianapolis, IN; Naval Research Laboratory, Washington, DC. CONTRACTORS: Automation Industries Inc., Vitro Laboratories Division, Silver Spring, MD; UNIVAC, St. Paul, MN; Raytheon Co., Wayland, MA; Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; ITT-Gilfillan, Inc., Van Nuys, CA; Technology Services Co., Silver Spring, MD; Condion Electronics, Woodbury, NY; Westinghouse Electric Co., Baltimore, MD; Norden Systems, Norwalk, CT and Melville, NY.

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

(U) Project S0876, Radar Automation: This project provides for the design and development of an Integrated Automatic Detection and Tracking capability for product line surveillance radar sensor suites in approved ship classes. The AN/SYS-( ) Integrated Automatic Detection and Tracking system yields a single, unduplicated, accurate radar picture taking advantage of the mutually supporting aspects of the two dimensional and three dimensional air search radars. Signal processing provides for Constant False Alarm Rate and target return centroiding, computer-generated video selection, sensitivity control, directed Elevation Scan and Logic commands. It interfaces with and provides accurate tracking data to the Tactical Data System and Weapon Direction System for threat assessent and weapon designation to allow rapid reaction time.

(U) In FY 1982, effort was completed to correct AN/SYS-1 (DDG-15 Class) deficiencies uncovered during Operational Evaluation. Development of the AN/SYS-2 Integrated Automatic Detection and Tracking system for New Threat Upgrade ships was completed as well as land based testing and the first phase of at-sea operational testing.

(U) The FY 1983 program consists of:

- Completing operational testing and obtaining production approval for AN/SYS-2 Integrated Automatic Detection and Tracking systems for New Threat Upgrade ships.
- Initiating the effort to correct AN/SYS-2 Operational Evaluation deficiencies.
- Initiating development of an Integrated Automatic Detection and Tracking capability for FFG-7 and CV/CVN ship classes.
- Integrating surface search radars and Identification Friend or Foe equipments into Integrated Automatic Detection and Tracking systems.

Program Element: 64508N Title: Radar Surveillance Equipment

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

- o Complete the effort to correct AN/SYS-2 Operational Evaluation deficiencies.
- o Continue the effort associated with development and testing of Integrated Automatic Detection and Tracking for FFG-7 and CV/CVN ship classes.
- o Continue integration of surface search radars and Identification Friend or Foe into Integrated Automatic Detection and Tracking systems.

(U) Program to completion consists of completing development and testing of Integrated Automatic Detection and Tracking system for FFG-7 and CV/CVN ship classes and the integration of surface search radars and Identification Friend or Foe into Integrated Automatic Detection and Tracking systems. Additional Integrated Automatic Detection and Tracking efforts will be undertaken as dictated by mission requirements and higher level approval.

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

(U) Project S0166, SPS Improvement Program

1. (U) DESCRIPTION (Requirement and Project): Because of insufficient anti-air warfare performance, in which surface ship surveillance radar capability is a major contributing factor, the Navy Anti-Air Warfare Readiness Plan directs the development of search radar improvements to upgrade Fleet anti-air warfare capability. This project provides development and testing of operational and reliability improvements to the radars and associated equipments comprising the existing standard product line in response to that direction.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed development, land based testing and the first phase of at-sea operational testing of the AN/SPS-49 Automatic Target Detection Modification and the AN/SPS-48E Modification for New Threat Upgrade ships. Continued development of the AN/SPS-48 High Availability Solid State Transmitter Modification Kit, AN/SPS-67 Automation Module, Improved Reliability, Maintainability and Availability replacements for existing displays and switchboards, and AN/SPS-40 solid state transmitter. Initiated development of receiver and signal processing improvements required to enhance the performance of the AN/SPS-48C radar. Completed development and testing of the AN/SPS-55 Antenna Pedestal Field Change. Conducted operational testing of selected Class B1 radars to replace many of the existing Type IV surface search radars.

b. (U) FY 1983 Program: Complete operational testing and obtain production approval of the AN/SPS-49 Automatic Target Detection Modification and the AN/SPS-48E radar that will be installed in New Threat Upgrade ships. Complete development and testing of the AN/SPS-48 High Availability Solid State Transmitter Modification Kit and the AN/SPS-40 solid state transmitter. Continue development of the AN/SPS-67 Automation Module and Survivable Antenna, Reliability, Maintainability and Availability replacement displays and switchboards, and AN/SPS-48C Receiver/Processor improvements. Obtain Approval for Production for the Class B navigation radar. Determine feasibility of incorporating an Anti-Ship Missile Defense mode of operation in the AN/SPS-67 radar to counteract threats similar to those experienced in the South Atlantic.

c. (U) FY 1984 Planned Program: Complete development and testing of AN/SPS-48C Receiver/Processor improvements. Continue development of the AN/SPS-67 Automation Module and Survivable Antenna, and Reliability, Maintainability and Availability replacement displays and switchboards. Initiate development of a solid state transmitter for the AN/SPS-49 radar. Commence full scale development of an Anti-Ship Missile Defense capability in the AN/SPS-67 radar. Start preliminary investigation of the requirements for a light weight high performance two dimensional radar for new construction ship application.

Program Element: 64508N Title: Radar Surveillance Equipment

d. (U) Program to completion: Complete development and testing efforts on the AN/SPS-67 Automation Module and Survivable Antenna, Anti-Ship Missile Defense capable radar, Reliability, Maintainability and Availability replacement displays and switchboards, AN/SPS-49 solid state transmitter, light weight high performance two dimensional radar, and militarized Class B radar. Develop and test Electronic Counter-Countermeasure improvements, survivable antennas for selected radar systems, and various Reliability, Maintainability and Availability improvements. Transition, as appropriate, advanced development projects to engineering development. Continue to assess the impact of the program on Fleet efficiency and initiate further development as required. This is a continuing program.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64510N
DoD Mission Area: 343 - Theater Communications

Title: Communications 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	5,513	4,681	4,580	4,114	577	31,983
X0744	Flight Deck Communications	3,323	3,399	196	196	0	17,995
X0960	Compact Very Low Frequency	2,190	1,282	4,384	3,918	577	13,988

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

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element funds research, development, test and evaluation to satisfy varied tactical communications equipment requirements. The Flight Deck Communications (Project X0744) will provide a short range, wire-free, secure voice, flight deck communications system for aircraft capable ships. The Compact Very Low Frequency (Project X0960) will develop a physically compact receiver terminal to increase the reliability of the multichannel very low frequency broadcast in space critical platforms (i.e., submarines).

(U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Flight Deck Communications (X0744): In FY 1982 an increase of 2,335 was a result of reprogramming to fully fund the development contract. In FY 1984, a decrease of 42 is a result of post-operational evaluation being funded in FY 1983 vice FY 1984. Compact Very Low Frequency (X0960): In FY 1983 a decrease of 12 is due to inflation adjustments. In FY 1984, an increase of 4,384 is due to funding of a full scale development contract. Program delays and reprogrammings within Navy to higher priority programs have resulted in program continuation into the FY 1984 - FY 1985 time frame.

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	5,456	3,178	4,693	238	513	25,286
X0744	Flight Deck Communications	1,783	988	3,399	238	513	16,019
X0960	Compact Very Low Frequency	1,147	2,190	1,294	0	0	5,121
X1099	Worldwide Military Command and Control System - Secure Voice/Graphics Conferencing	2,526	0	0	0	0	4,146

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						
333031 (FDCS)	0	0	10,310	8,530	0	18,840
Quantity			14	13	0	27

Program Element: 64510N Title: Communications Systems

F. (U) RELATED ACTIVITIES: Program Element 11402N, Navy Strategic Communcations, relates to the Compact Very Low Frequency, and Program Element 11228N, TRIDENT Integrated Radio Room; and Program Element 3313N, Minimum Essential Emergency Communications Network Message Processing Mode; also relate to Compact Very Low Frequency. Relationship is for interoperability between U.S. Navy, Northeast Asia Treaty Organization, and U.S. Air Force.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic systems Command, Washington, DC; Naval Avionics Center, Indianapolis, IN; Naval Ocean systems Center, San Diego, CA; Naval Electronic Systems Engineering Center, Vallejo, CA; Naval Weapons Center, Crane, IN. CONTRACTORS: GTE, Sylvania, Needham, MA; Booz, Allen, and Hamilton, Inc., Bethesda. MD; Rockwell International, Newport Beach, CA; R.M. Vredenburg, McLean, VA; Electrospace, Inc., Dallas, TX; International Business Machine Corporaton, Manassas, VA; Westinghouse, Baltimore, MD; Eaton Corporation, Deer Park, NY; Rockwell International, Richardson, TX; and MITRE, McLean, VA.

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

(U) Project X0744, Flight Deck Communications: A requirement exists to replace the obsolescent AN/SRC-22 Flight Deck Communications system and Commercial Aviation Maintenance Radio, Aviation Mantenance/Ordnance Radio Systems and Man-on-Move Communications System with a single secure voice system capable of operating in extreme acoustical and radio frequency interference noise environments in support of air operations including aircraft handling, maintenance, fueling, ordnance, and crash and salvage. Additionally, communications are reqired for embarkation and debarkation of troops and materiel for selected ships with an amphibious capability.

(U) In FY 1982 Service Test Models were delivered and installed aboard the USS ENTERPRISE. Technical evaluation was completed. Operational Evaluation was initiated.

(U) The FY 1983 program consists of:

- o Complete Operational Evaluation.
- o Incorporate changes as a result of test and evaluation. Make Milestone III decision concerning full rate production.
- o Sustain the operational evaluation suite aboard the USS ENTERPRISE.

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

- o Operational Evauation suite aboard the USS ENTERPRISE.

(U) Program to Completion: Sustain the operational evaluation suite aboard the USS ENTERPRISE until replaced with a production system.

(U) Project X0960, Compact Very Low Frequency: Compact Very Low Frequency Receiver Terminal is an advanced miniaturized Very Low Frequency digital data receiving and processing set to functionally provide reliable back-up to the Navy's present shipboard Very Low Frequency system (VERDIN). The Compact Very Low Frequency Receivers will support interoperability with NATO/allied submarines.

(U) In FY 1982, awarded competitive R&D contract for concept definition of an Airborne/Shipboard receiver terminal.

(U) The FY 1983 program consists of: Award a competitive Full Scale Development contract.

Program Element: 64510N Title: Communications Systems

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

- o Full scale development and initiate testing of Compact Very Low Frequency receiver terminals for submarine applications.
- o Investigate surface ship noise environment and develop surface ship receiver performance requirements.

(U) Program to Completion:

- o Commence production in FY 1986 for SSN, Airborne and NATO.

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

131

131

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64511N
DoD Mission Area: 323 - TIARA for Naval Warfare
Title: Intelligence 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	2,458	2,478	2,157	3,603	Continuing	Continuing
W0540	Photo Surveillance	2,458	2,478	2,157	3,603	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 and tests all new photographic equipment and other imaging sensors for the Navy, including cameras, films, printers, processors, etc., for aerial, surface and subsurface use. Efforts are being made to advance the Navy's technical capabilities in intelligence collection, image recording devices, pollution abatement, etc., to levels equivalent with current state-of-the-art technology.

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 (-3,051) results from budget constraints during FY 1984 budget development. The minor change in FY 1982 results from refinement of estimate to reflect actual costs.

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	2,262	2,708	2,478	5,208	Continuing	Continuing
W0540	Photo Surveillance	2,262	2,708	2,478	5,208	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	4,900	7,300	3,800	10,400	Continuing	Continuing
OPN (BA 3) (33425o)	2,656	2,527	2,005	2,521	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Developments in this project provide photographic support to Navy reconnaissance and intelligence processing; P-3 photographic collection; strike cameras for attack aircraft; shipboard photo processing, analysis and interpretation; submarine photographic collection and processing; Marine Corps aerial reconnaissance and photo processing; and general reproduction equipment to process various types of intelligence imagery. Representatives on other service coordinating committees assist in coordinating these efforts to eliminate duplication and to exploit the advancement of other services.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Air Rework Facility, San Diego, CA; Naval Air Engineering Center, Lakehurst, NJ; Naval Intelligence Support Center, Suitland, MD. CONTRACTORS: CAI, Barrington, IL; Zeiss, LaJolla, CA; ITEK, Beford, MA; Perkin-Elmer, Norwood, CT; Hydro Products, San Diego, CA; ITT, Ft. Wayne, IN; Bendix, Mishawaka, IN; Aracor, Sunnyvale, CA; Sperry, Charlotteville, VA; Aerodyne, Bedford, MA; Robodyne, Silver Spring, MD.

Program Element: 64511N Title: Intelligence Systems

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

(U) Project WO340, Photo Surveillance: This program provides for development and test of all photographic and other imaging equipment in the Navy; including cameras, printers, processors, etc., for aerial, surface and subsurface use. Technological improvements in cameras, printers, processors, and imaging recording devices along with the use of micro-processors and other miniaturized components have made possible significant improvements in the performance, reliability and maintainability of photo surveillance equipment and its support systems.

(U) In FY 1982, development was completed on the Programmable Automatic Camera Test Set (LM-230A), a suit-case tester capable of organizational, intermediate and depot level test of several aerial cameras for the Navy and Marine Corps. Test and evaluation was completed on the KS-153A very low altitude aerial camera for the RF-4B. It significantly enhances survivability of the RF-4B in the high speed overflight reconnaissance mission. Development was initiated for the underwater zoom lens for use on hand-held underwater cameras by experimental divers in underwater photography of moving ships and torpedoes. Initial development began on the turbid water and hull surveillance camera, which is capable of taking close up underwater photographs of ship's hull and pier damage in turbid water. Initiated development of AS-27A Modular Image Interpretation System Update to permit system to be used to interpret small scale, high resolution imagery from national systems as well as from tactical imagery. System is used aboard aircraft carriers and in Fleet Intelligence Centers.

(U) The FY 1983 program consists of:

- Complete test and evaluation of 24" focal length lens for KS-153A camera for the RF-4B to allow stand-off reconnaissance outside enemy threat envelope. Lens will extend capability of the KS-153A camera currently in production as an 80mm focal length camera.
- Develop software for LM-230A to expand capability to test the 12" focal KS-116B aerial panoramic camera in use in the Marine Corps RF-4B. This will complete the capability of the LM-23A to test all cameras in use in the RF-4B.
- Complete evaluation of TARPS Television Training System for F-14 TARPS to reduce the cost of TARPS training and provide the capability to immediately play back an image of the complete reconnaissance mission.
- Evaluate a new Filter Tilter for the KS-40/81 mobile image processing facility for the Marine Corps.
- Initiate development of a high altitude stand-off panoramic camera to permit reconnaissance aircraft to gather horizon-to-horizon imagery outside an enemy threat envelope.
- Continue development of a passive automatic precision focus device for use in submarine periscope photography. Device will permit rapid focusing independent of the human eye by passively measuring reflected light rather than emitting an active signal.
- Continue development of the turbid water and hull surveillance camera initiated in FY 1982.
- Continue development of AS-27A update initiated in FY 1982.
- Complete evaluation of a solid state data head for aerial camera auxiliary data annotation system. The system automatically prints geographic position and aircraft altitude information on each frame of aerial reconnaissance imagery. The solid state data head is required for high framing rate cameras and is more reliable than existing CRT printing heads.
- Evaluate off-shelf electrostatic printer/processor to print duplicate images without the use of water, chemistry or silver based films. Effort will be conducted in coordination with the Air Force and Defense Intelligence Agency.

- Complete evaluation of fluorescent image enhancement process to enhance insufficiently exposed images. Process will allow the interpretation of images taken at very low light levels and is significantly more rapid and less expensive than the digital enhancement process.

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

- Continue development and testing of the passive automatic precision focus device.
- Continue development and testing of the turbid water and hull surveillance camera initiated in FY 1982.
- Continue development of the AS-27A update commenced in FY 1982.
- Complete evaluation of the electrostatic printer/processor commenced in FY 1983.
- Initiate development of an on line hard copy printer to provide hard copy prints of video images aboard submarines.
- Initiate development of a second generation periscope camera fo submarine periscope photography to provide enhanced performance, reliability and maintainability over the existing 18-year old camera currently in use.
- Initiate development of AR-165B submarine reader/printer. This will be an enhanced version of the AR-165A to allow reading and printing of microfiche as well as the existing capability to read and print 35mm and 70mm imagery.

(U) Program to Completion: For FY 1985, Continue Test and Evaluation and Approval for Service Use of off-the-shelf equipment, turbid water camera, hard copy printer, periscope camera, submarine reader/printer, stand-off camera and electrostatic printer/processor. Complete development of Passive Automatic Precision Focus Control System and AS-27A Enhancement. This is a continuing program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64515N
DoD Mission Area: 324 Tactical Intelligence and Related Activities Capabilities Development

Title: Submarine Support Equipment Program (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	11,592	3,762	7,249	11,723	Continuing	Continuing
X0775	Submarine Support Equipment Program	11,592	3,762	7,249	11,723	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 will develop and provide capabilities which enable attack class submarines to operate covertly in a hostile electromagnetic environment during direct support, surveillance, barrier and general tactical missions including over-the-horizon targeting.

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) FY 1982 increased by 459 due to a minor program revision that restored funds which had been deferred, FY 1983 decreased by 2,688 by the Navy in order to meet higher priority Navy needs. FY 1984 decreased by 1,135 in order to meet higher priority program needs. (OPN) A decrease in FY 1984 of 25,853 due to (1) slippage of the Dark Eyes Procurement to FY 1986, (2) deferral of the BRD-7 buy to FY 1985, and (c) a decrease buy of 9,000 for the BLD-1. FY 1982/1983 decreases were due to adjustments to the development and deliverables schedule.

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	12,739	11,133	6,450	8,384	Continuing	Continuing
X0775	Submarine Support Equipment Program	12,739	11,133	6,450	8,384	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	12,639	9,563	18,206	36,880	Continuing	Continuing
Quantities	VARIOUS	VARIOUS	VARIOUS	VARIOUS	VARIOUS	VARIOUS

F. (U) RELATED ACTIVITIES: Other service requirements and equipment developments are coordinated through meetings and exchange of reports between the various Department of Defense agencies. Engineering Development in this program draws upon advanced development accomplished under the Advanced Submarine Support Equipment Program (Program Element 63522N) and PRAIRIE WAGON (Program Element 31325N), which completed development and PRAIRIE SCHOONER (Program Element 31326N). Near-term Radio Direction

Program Element: 64515N Title: Submarine Support Equipment Program (Engineering)

Finding improvements identified in this Descriptive Summary support long-range cruise missile targeting capabilities for submarines as required by the TOMAHAWK Program (Program Element 64367N, Project X0545).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Electronic Systems Test and Evaluation Detachment, St. Inigoes, MD; Naval Intelligence Support Center, Suitland, MD; Naval Personnel Research and Development Center, San Diego, CA; Naval Research Laboratory, Washington, DC; Naval Electronic Engineering Center, Philadelphia, PA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Underwater Systems Center, Newport, RI. CONTRACTORS: S. T. Research Corporation, Fairfax, VA; General Dynamics, Electric Boat Division, Groton, CT; Electromagnetic Systems Laboratory, Sunnyvale, CA; GTE Sylvania, Inc., Mountain View, CA; Hydrotronics, Falls Church, VA and San Diego, CA; Kollmorgen Corp., North Hampton, MA; Watkins-Johnson Co., Gaithersburg, MD and Sunnyvale, CA; Sanders Associates, Nashua, NH; Bell and Howell, Pasadena, CA; General Research Corp., SWL Division, McLean, VA; Georgia Institute of Technology, Atlanta, GA; Micronetics, San Diego, CA; Systems Consultants, Washington, DC; Hughes Aircraft Co., Culver City, CA.

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

(U) Project X0775, Submarine Support Equipment Program: The Submarine Support Equipment Program was established to develo and provide sensor and support systems to permit attack submarines[ ]operating in a hostil electromagnetic environment during surveillance, barrier, and other tactical missions. The objective of this project is t develop systems that give attack submarines the tactical advantage in electronic warfare.

(U) In FY 1982, the following was accomplished: DARK EYES[ ]- tw service test models were procured[ ]; AN/BLD-1 (Interferometer) provides capability for 688 class SSNs[ ] Testing was completed with the AN/BLD-1 approved fo service use in July 1982. Improved AN/BLD-7 Radio Direction Finding System engineering development model completed at se testing satisfactorily. Completed development of AN/WLR-8(V) 2 Electronic Warfare Suport Measures System. Extended frequenc range[ ]for the AN/BLA-4, Electronic Warfare Support Measures Antenna System. Completed improvements to periscop electronic systems including antenna coverage and sensitivity.

(U) In FY 1983, it is planned to:

- o Conduct and complete DARK EYES operational evaluation tests.
- o Continue the AN/WLR-8(V)2 Upgrade to improve the probability of intercept of electronic signals and provide rap classification.
- o Procure a AN/BRD-7( ) service test model that has a new antenna[ ]
- o Procure power supplies to improve reliability of AN/WLR-8 system.
- o Continue AN/BLD-1 system improvements.

(U) FY 1984 Planned Program includes:

- o An increased requirement over FY 1983 of $3,437 thousand to start two new efforts:
  - Submarine Advanced Combat System Electronic Warfare Support Measures Subsystem.

Program Element: 64515N

Title: Submarine Support Equipment Program (Engineering)

- Upgrade to AN/WLQ-4 E Suite

- o Conduct operational and technical evaluation of the improved AN/BRD-7( ) system
- o Improved submarine
- o Conduct technical evaluation of the AN/WLR-8 ( )2 upgrade

(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: 64516N
DoD Mission Area: 238 - Other Naval Warfare

Title: Ship Survivability
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	-	4,385	5,295	8,423	Continuing	Continuing
S1566	Combat System Prototypes	-	4,228	4,478	4,901	Continuing	Continuing
S1567	Damage Control Prototypes	-	157	348	745	Continuing	Continuing
S1568	Hull Mechanical and Electrical Systems Prototypes	-	0	237	1,295	Continuing	Continuing
S1569	Total Ship System Prototypes	-	0	232	1,482	Continuing	Continuing

As this is a continuing program, the above funding includes outyear 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 Chief of Naval Operations statement of Navy Policy on Combat Systems Survivability of 25 February 1981 quoted Public Law 95-485 which stated the requirements for limiting damage and sustaining combat effectiveness. Battle damage enduring, hull, mechanical and electrical systems/equipments are required to support sustained and uninterrupted combat operations. Emphasis through FY 1986 is on improvement of existing critical subsystems and equipments on designated classes of surface combatants for survival in conventional warfare. This program will fill the vital need for completing engineering development of the improvements generated under the technology and Advanced Development programs and will help insure timely fleet introducton of survivability measures.

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 390 in FY 1983 due to revision of cost estimates including inflation and a net decrease in FY 1984 of 2,514 resulting from Navy decisions during programs and 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	-	-	4,775	7,809	Continuing	Continuing
S1566	Combat System Prototypes	-	-	4,228	5,576	Continuing	Continuing
S1567	Damage Control Prototyped	-	-	157	466	Continuing	Continuing
S1568	Hull Mechanical and Electrical Systems Prototypes	-	-	195	836	Continuing	Continuing
S1569	Total Ship Systems Prototypes	-	-	195	931	Continuing	Continuing

Program Element: 64516N Title: Ship Survivability

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		1,105	780	17,800	TBD	TBD
Quantity						
(HARPOON Canisters)	-	(85)	(60)	(70)	(91)	(306)
(SPS-40 Field Change Kits)	-	-	-	(10)	(26)	(36)
(MK 86 Fire Control Kits)	-	-	-	(8)	(30)	(38)
(ASROC Guides)	-	-	-	(40)	(264)	(304)
(CIWS ORDALTS)	-	-	-	(30)	(56)	(86)
(Search Radar Mods)	-	-	-	(5)	(10)	(15)

F. (U) RELATED ACTIVITIES: Ship Survivability Program Element 63514N; Submarine (Advanced) Program Element 63561N; Shipboard Data Multiplex System Program Element 63509N; BR/CW Countermeasures Program Element 64506N; Ships, Submarines and Boats Technology Program Element 62543N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA is Technical Direction Agent. OTHERS: David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI.; Naval Ship Systems Engineering Station, Philadelphia, PA.; Naval Research Laboratory, Washington, D.C.; U.S. Army Proving Ground, Aberdeen, MD.; Naval Weapons Station, Yorktown, VA. CONTRACTORS: McDonnell Douglas, St. Louis, MO; United Technologies, Norden Systems Division, Melville, N.Y.; Raytheon Company, Equipment Division, Wayland, MA; ITT/Gilfillan, Van Nuys, CA; General Dynamics/Ponoma, CA; Newport News Shipbuilding and Drydock Co., Newport News, VA; New Mexico Mining Institute of Technology, Soroco, New Mexico; Aerospace, Inc., Washington, D.C.

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

(U) Project S1566, Combat System Prototypes: This project provides for engineering development of hardware modifications necessary to improve survivability of surface ship combat system equipment in conventional and nuclear combat environments.

(U) This is a new start in FY 1983.

(U) The FY 1983 program consists of:

- o Continuing development, begun in prior fiscal years under element 63514N, of hardened Anti-Submarine Rocket launcher guide.
- o Completing development of cheap kill hardening modifications for SPS-40 radar.
- o Continuing development of cheap kill hardening modifications for Close-in Weapons System, MK 74 Missile Fire Control and MK 86 Gun Fire Control Systems.
- o Continuing development of hardening modifications for SPS-48 and SPS-49 Radars.

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

- o Complete development of hardening modifications for Anti-Submarine Rocket launcher guide, MK 86 Gun Fire Control System and Close-in Weapon System.

Program Element: 64516N Title: Ship Survivability

- o Continue development of hardening modifications for SPS-48 and SPS-49 Radars and MK 74 Missile Fire Control System.
- o Initiate engineering development of hardened MK 32 Surface Ship Torpedo Tube and of hardened SPS-67 Surface Search Radar.

(U) This is a continuing program.

(U) Project S1567, Damage Control Prototypes: This project will develop prototypes to meet an urgent need to rapidly detect and control battle damage with emphasis on developing Damage Control crisis management capabilities that include compatibility with Chemical/Biological/Radiological defense and related Damage Control/Chemical/Biological/Radiological training.

(U) The FY 1983 program consists of:

- o Initiating the engineering development of a Damage Control/Chemical Biological Radiological Defense Console/trainer, and the prototype model of the shipboard fire detection system.
- o Continue development of the production model of the life raft desalinator for making potable water.

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

- o Continue development of hardware for backfit of the next generation shipboard fire detection systems.
- o Initiate development of specifications for Engineering Development Model of Damage Control/Chemical Biological Radiological Defense Console/Trainer
- o Complete the production model of the lift raft desalination unit.

(U) Program to completion will consist of:

- o Completing development of hardware for backfit and of next generation shipboard fire detection system.
- o Complete Engineering Development Model for wire free communications
- o Complete prototype development of smoke knockdown coupled with fine water mist suppression system.
- o Complete specifications and initiate development of the Damage Control/Chemical Biological Radiological Defense Console/Trainer.
- o Evaluate performance of production life raft desalination system.
- o Complete Damage Control/Chemical Biological Radiological Defense Console/Trainer demonstration.

(U) Project S1568, Hulk, Mechanical and Electrical Systems Prototypes: This project will provide for the design and development of battle damage-enduring hull/mechanical/electrical systems and equipments essential to the combat effectiveness and survivability of surface ships.

(U) This is a new start in FY 1984.

Program Element: 64516N Title: Ship Survivability

(U) The FY 1984 program consists of:

- o Initiating development of a high capacity smoke/toxic/explosive gas ejection system to maintain continuity of operations under combat induced environments.
- o Initiating development of a self-contained, multi-fuel, portable fire pump/dewatering equipment resistant to combat induced damage.

(U) For FY 1985, it is planned to:

- o Continue development of the high capacity smoke/toxic/explosive gas ejection system.
- o Continue development of portable fire pump/dewatering equipment.
- o Initiate development of fire tolerant ventilation fans for Collective Protection Systems.

(U) Program to completion will consist of :

- o Completing development of the gas ejection system and porable fire pump.
- o Development of damage tolerant sensors for post hit casualty assessment.
- o Development of fire tolerant ventilation fans for Collective Protection Systems.
- o Development of an improved auxiliary propulsion unit.
- o Develop improved sealing systems for watertight doors/hatches to minimize progressive flooding and intrusion of chemical/biological agents.

(U) Project S1569, Total Ship System Prototypes: This project continues the full scale prototype development, construction and testing of shipboard hardware and components with increased battle survivability characteristics that have been developed under other programs but principally under the Ship Survivability Project, S0384, 63514N.

(U) The FY 1984 program consists of:

- o Full scale testing of aircraft carrier side protection schemes.

(U) For FY 1985, it is planned to:

- o Continue the full scale testing of aircraft carrier protection schemes.

(U) The program to completion will consist of:

- o Full scale testing of aircraft carrier bottom protection schemes for existing aircraft carrier classes.
- o Full scale testing of side and bottom protection schemes for a new carrier design.
- o Full scale testing of lightweight ballistic protection for new and future design destroyer, frigate and cruiser superstructures.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64518N
DoD Mission Area: 353 - Naval Warfare

Title: Combat Information Center Conversion
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	8,310	18,292	24,907	30,870	Continuing	Continuing
S0250	Escort Command and Control System	2,220	-	-	-	-	2,220
S0251	Data Display System	580	-	-	-	-	580
S1559	CV/CVN CDS/TDS Upgrade	5,510	12,217	10,487	9,470	Continuing	Continuing
S1602	CG/CGN CDS/TDS Upgrade	-	2,895	6,448	8,094	Continuing	Continuing
S1603	FFG 7 Link 11	-	959	685	-	-	1,644
S1604	Navy Tactical Data System Software Improvements	-	2,221	7,287	13,306	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 provides for the development and implementation of advanced automated Tactical Data Systems for surface ships in response to future threats. It has the objective of achieving integrated, coherent ship's command and control systems that will increase operational capabilities, promote standardization, and lower system reaction time and life cycle costs. Included is the modernization and standardization of shipboard tactical displays used for the evaluation of sensor data and for control of aircraft and weapons systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: The FY 1982 total program estimate is 1,110 less than the value shown in the 1983. The overall reduction is the result of an action by the Chief of Naval Operations reducing the effort for Project S0250 Escort Command and Control. The FY 1983 total program estimate is less than the value shown in the FY 1983 Descriptive Summary by 8,722. This overall reduction is the result of an action by the Chief of Naval Operations terminating project S0250(-2,307); minor adjustments in projects S1559(-60), and S1602(+16), and Congressional action decreasing project S1604(-6,339). The FY 1984 total program estimate is more than the value shown in the FY 1983 Descriptive Summary by 1,759. This results from the termination of project S0250(-891); a decrease in project S1559(-223); an increase in project S1602(+3,657) due to efforts to upgrade the Naval Tactical Data Systems in cruiser class ships; an increase in project S1603(+685) to backfit Link 11 capabilities in the FFG-7 class; and a decrease to project S1604(-1,459) due to Congressional action.

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	5,937	9,420	27,014	23,148	Continuing	Continuing
S0250	Escort Command and Control Systems	4,052	3,330	2,307	891	Continuing	Continuing
S0251	Data Display System	1,885	580	-	-	-	28,453
S1559	CV/CVN CDS/TDS Upgrade	-	5,510	12,277	10,720	Continuing	Continuing
S1602	CG/CGN CDS/TDS Upgrade	-	-	2,911	2,791	Continuing	Continuing
S1603	FFG 7 Link 11	-	-	959	-	-	959
S1604	Navy Tactical Data System Software Improvements	-	-	8,560	8,746	Continuing	Continuing

Program Element: 64518N Title: Combat Information Center Conversion

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 (BA-2) (332605)	18,340	24,979	127,573	102,030	370,057	
NTDS/CDS UPGRADE CV/CVN	(5,000)	(10,000)	(69,200)	(34,690)	(135,082)	(253,972)
Procurement Quantity			(2)	(1)	(6)	
NTDS/CDS UPGRADE CG/CGN	-	(9,394)	(53,900)	(43,753)	(118,085)	(225,132)
Procurement Quantity			(4)	(4)	(13)	

F. (U) RELATED ACTIVITIES: Program Element 63228N, CV ASW Module; Program Element 63519N, Advanced Command Data Systems; Program Element 63582N, Combat System Integration.

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; Puget Sound Naval Shipyard, Bremerton, WA. CONTRACTORS: Computer Sciences Corporation, San Diego, CA; Raytheon Services Company, Arlington, VA; SEMCOR, Inc., Arlington, VA; Sperry Univac, St. Paul, MN; Automation Industries, Vitro Laboratories, Silver Spring, MD.

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

(U) Project S1602, CG/CGN CDS/TDS Upgrade: This project is a new start in FY 1983 and provides for upgrading and improving the Navy Tactical Data System active fleet CG 16 Class, CG 27 Class, and CGN 36 Class ships (cruisers), including the efforts required to develop the Combat Direction System operational computer programs for use with the new AN/UYK-7 or AN/UYK-43 computers and AN/UYA-4 dis[illegible] planned to be installed during ship overhauls. This project also designs and develops combat direction system modifications and improvements through block upgrades (e.g., Block 0, Block 1), to correct existing deficiencies, meet new operational requirements, and integrate new combat system capabilities in the existing cruiser class ships. Additional objectives include improving reliability and lowering the life cycle costs of combat direction systems in these ships.

(U) In FY 1982: Not applicable.

(U) The FY 1983, program consists of:

- o Developing Navy Tactical Data System/Combat Direction System operational simulation and test computer program specifications for cruiser Block 0 upgrades and initiating the detailed program design, code and debug, and test planning required to meet Block 0 specification requirements.
- o Determining Integrated Logistic Support areas impacted by Block 0 upgrade, defining required changes, and initiating preparation of integrated logistic support plans.
- o Determining [illegible]ance, operator/team and software training requirements to support cruiser Block 0 upgrade and [illegible]ng p[illegible]on of Navy Training Plan.

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

- o Complete the detailed program design and continue program code and debug of the Block 0 operational, simulation and test computer programs.
- o Prepare test proc[illegible]ures for shore site testing of computer programs and initiate testing.
- o Issue preliminar[illegible]grated Logistic Support Plan and Navy Training Plan.

Program Element: 64518N Title: Combat Information Center Conversion

o Initiate preparation of program specifications for the cruiser Advanced Combat Direction System Block I system.

(U) Program to completion: Will include acceptance testing and certification of Block 0 combat direcion system computer programs and integration of programs with oth combat system elements at shore sites and onboard ships. Shipboard combat direction system operation and maintenance manuals will also be prepared and delivered to ships. Design, code, debug and acceptance testing of cruiser Block 1 computer programs will be completed and programs integrated with other combat system elements at shore sites and onboard Block 1 ships.

(U) Project S1603 FFG 7 Link 11: This project is a new start in FY 1983. It provides for the modification of the FFG 7 Class operational program to implement interfaces with the low cost Link 11 and integrated AN/SLQ-32 Electronic Warfare System. It also backfits the Link 11 communication system capabilities in the FFG 7-34 ships. These must be done prior to the realization of full combat system capabilities with systems such as LAMPS and insures the Tactical Data System interoperability with other ships.

(U) In FY 1982: Not applicable.

(U) The FY 1983 program consists of:

o Developing specifications and designing and commencing code and debug of Link 11 backfit software modifications using existing FFG 7 Class baseline operational programs.

o Preparing test plans and procedures required to verify proper operation of computer program modifications.

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

o Complete code, debug, and function testing.

o Conduct acceptance testing, and deliver program modifications to lead ship for integration with Link 11, AN/SLQ-32, and other existing shipboard combat system elements.

o Prepare and deliver shipboard operation and maintenance manuals.

(U) Project S1604, Navy Tactical Data System Software Improvements: This project is a new Research, Development, Test and Evaluation start in FY 1983. It provides for the design, development, test and delivery of Navy Tactical Data System/Combat Direction System computer program changes required to support the introduction of new Combat Direction System hardware and equipment enhancements such as the SM-2 Missile, UYK-20 computers, and UYA-4 display consoles. This project also covers the transition of the restructured Navy Tactical Data System computer program architecture into Navy Tactical Data System/Combat Direction System ships, to simplify the introduction of system performance and equipment enhancements in these ships. FY 1983 is a transition year for implementing a Chief of Naval Operations/Navy Comptroller decision that these types of significant software changes to the Navy Tactical Data System/Combat Direction System require the use of RDT&E funds and Test and Evaluation before fleet introduction. These efforts were funded in FY 1982 and prior years using Ship Alteration 9050 O&MN funds.

(U) In FY 1982: Not applicable.

(U) The FY 1983, program consists of:

o Completing the code, debug and acceptance testing of CGN 38 SM-2 Combat Direction System operational program modifications required to implement approved Class I performance improvement Engineering Change Proposals and the planned installation of combat Direction System equipment enhancements during FY 1984 Overhaul. The improvements include items such as data display indicator modifications to AN/UYA-4 consoles, new AN/UYK-20 computers, and radar video processor equipment modifications for improved auto tracking capabilities.

Program Element: 64518N Title: Combat Information Center Conversion

- o Continuing the specification and detailed design of the Restructured Navy Tactical Data System computer program for the introduction of Navy Tactical Data System/Combat Direction System enhancements starting in FY 1985/1986.

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

- o Integrating the CGN 38 SM-2 Combat Direction System programs with other ship combat system elements at shore sites and initiate shipboard testing.
- o Preparing shipboard Combat Direction system operation and maintenance manuals for delivery to CGN 38 SM-2 configured ships.
- o Completing detailed design of the Restructured Navy Tactical Data System computer program and accomplishing code and debug of the program based on design.
- o Implementing performance and equipment enhancements to other existing Navy Tactical Data System/Combat Direction System ships as required.

(U) Program to completion: Will cover the completion of shipboard testing of CGN 38 SM-2 Combat Direction System program modifications, the acceptance testing and shore site/shipboard integration of the Restructured Navy Tactical Data System based Navy Tactical Data System computer programs. Will include the continued implementation of performance and equipment enhancements in existing Navy Tactical Data System/Combat Direction System ships.

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

(U) Project 81559, CV/CVN CDS/TDS Upgrade

1. (U) DESCRIPTION (Requirement and Project): This project provides for upgrading and improving Navy Tactical Data System active fleet carriers. It includes the efforts required to develop the Navy Tactical Data system/Combat Direction System operational computer software programs for use with the new AN/UYK-7 or AN/UYK-43 computers and AN/UYQ-21 displays planned to be installed during ship overhauls. This project also designs and develops the Combat Direction System modifications and improvements through block upgrades (e.g., Block 0, Block 1), to correct existing deficiencies, meet new operational requirements and integrate new combat system capabilities. Additional objectives include improving reliability and lowering the life-cycle cost of combat direction systems in these ships.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The detailed functional analysis of carrier Block 0 Combat Direction System upgrade hardware and software required to meet operational requirements and the definition of baseline hardware were completed. The Combat Direction System Block 0 specification was also initiated. This translates the functional analysis results into detailed Combat Direction System functional and physical performance requirements for carriers. The plans for implementing a Combat Direction System Development Site for developing Block 0 and Block 1 computer programs were also completed.

b. (U) FY 1983 Program: Complete the Carrier Block 0 Combat direction System specification, prepare the program performance specifications and initiate the detailed program design of the Carrier Block 0 operational, simulation and test computer programs. Complete Combat Direction System Development Site, Type B specification, and initiate detailed design, site preparation and hardware acquisitions required to establish an operational site ashore in FY 1984. Complete acquisition plans, procurement specifications and award a contract for an Advanced Combat Direction System Block 1 engineering Development Model. This system implements the Advanced Combat Direction System functional concepts developed under Program Element 63519N, project S0245, Advanced Combat Data System.

c. (U) FY 1984 Planned Program: Complete detailed design of the Carrier Block 0 Combat Direction System computer programs and initiate code and debug of the programs. Prepare test plans and procedures to verify proper operation of the

Program Element: 64518N Title: Combat Information Center Conversion

computer programs. Complete detailed design and site preparation of the Combat Direction System Development Site to bring site to full operation for support of program development and testing. Prepare program specifications for the carrier Advanced Combat Direction System Block 1 system and initiate detailed design, code and debug of the Block 1 computer programs.

d. (U) Program to Completion: Acceptance testing of the Carrier Block 0 Combat Direction System computer programs will be completed during FY 1985 and the computer programs integrated with other combat system elements at shore sites and onboard lead ships during FY 1986/1987. Detailed design, code and debug of carrier Advanced Combat Direction System Block 1 computer programs will be completed during FY 1985/1986, acceptance testing of carrier Advanced Combat Direction System Block 1 system will be completed during FY 1986/1987, and shore site integration testing and technical evaluation of carrier Advanced Combat Direction System Block 1 system will be completed during FY 1987/1988. Shipboard integration testing, technical and operational evaluation of carrier Advanced Combat Direction System Block 1 system will be completed during FY 1988/1989.

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64524N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Submarine Advanced Combat System (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	29,674	80,414	98,573	140,956	Continuing	Continuing
S1347	Submarine Advanced Combat System (Engineering)	29,674	78,684	92,560	134,838	TBD	TBD
X1411	Attack Submarine Integrated Communication System	5,672*	1,730	6,013	6,118	Continuing	Continuing
	(Quantity - Engineering Development Models)						
	- (Sensor Interface Unit)						(6)**
	- (Submarine Tactical Data Link System)						(6)**
	- (Secure Switch)						(3)**
	- (Submarine Keyboard Printer)						(3)**

* Funded in Program Element 64505N (Attack Submarine Integrated Communications System) in FY 1982 and prior. FY 1982 costs are non-add. FY 1983 and later estimates are included in the Program Element totals.

** Development/Operational Test and Evaluation. These test items were procured in FY 1981 under Program Element 63520N.

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.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element provides for development of an evolutionary combat system utilizing a top-down approach to deliver effective submarine combat systems to the fleet for the next 20-30 years. It is intended to provide these ships with definite tactical superiority in engagements with improved threat platforms. This program responds to the requirements of the Mission Element Needs Statement S1346. The Submarine Advanced Combat System Top Level Requirements describes the threat and missions. The follow-on development consists of continuing analysis and evaluationary introduction of improvements which meet the needs of attack and strategic submarines of the 1990s. The basic system architecture will be specifically designed to readily accommodate growth capabilities. Analysis and early development will drive the combat system related part of the 1990s platform design. Advanced development of the Submarine Advanced Combat System Program will be performed under Program Element 63524N. X1411, Attack Submarine Integrated Communications Systems: The long term objective of this program is to develop an Integrated Communications System which will provide an improved internal and external information transfer system that is reliable, flexible, and timely, is more conducive to communications at will, contributes to overall attack submarine combat system effectiveness, and interfaces effectively with other command and control subsystems. The near term objective update of existing radio rooms on a continuing basis is essential to maintain a communications capabilty which meets the needs of present and future operational requirements. Currently, the highest priority task in the project is the Data Link Communication System which supports TOMAHAWK Over-the-Horizon Targeting in attack submarines.

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 S1347 - The reduction of 5,523 in FY 1983 is attributable to a Congress-imposed reduction and inflation adjustment. The decrease of 39,322 in FY 1984 was due to reallocation of funds to higher priority Navy programs during budget development. The Submarine Advanced Combat System program was restructured from supporting a FY 1987 ship program, to a Preplanned Product Improvement Program in which the earliest available acoustical enhancements are being introduced into the FY 1983 SSNs. The "To Be Determined" annotation for the additional fund to completion i necessary as these estimates are currently being prepared and will be available subsequent to the planned June 1983 Defense System Acquisition Review Council program review (Milestone II). Project X1411, RDT&E - The

reduction of 138 in FY 1982 was due to budgetary restrictions; in FY 1984 the increase of 380 reflects program restructuring. Other Procurement, Navy - FY 1982 and FY 1983 were reduced 761 and 1,488, respectively, reflecting a restructuring of the program for procurement of initial spares. The decrease of 2,887 in FY 1984 reflects a decision to postpone procurement of the Submarine Tactical Data Link System until 1987.

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	29,674	85,937	137,515	Continuing	Continuing
S1347	Submarine Advanced Combat System (Engineering)	0	29,674	84,207	131,882	1,099,488	1,345,251
	(Quantities) 1/	(0)	(0)	(1/)	(0)	(1/)	(1/)
X1411	Attack Submarine Integrated Communication System	(0)	5,810	1,730	5,633	Continuing	Continuing

1/ The Descriptive Summary for Program Element 63504N, Project S0223, identifies items of the Submarine Active Detection development transitioning to the program in FY 1983.

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 (For Program Element 64524N/S1347) (Quantities)	0	115 (2)	194 (3)		TBD	TBD
OPN (BA 2)(333116)	7,043	6,907	5,497	8,774	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Acoustic systems concepts completing advanced development in Program Element 63504N will, if applicable, be transitioned to full scale engineering development in this program. Full scale engineering development of the MK 117 Fire Control System and development of related software programs is continuing in Program Element 64562N, Submarine Tactical Warfare Systems (Engineering); Project S0236, Attack Submarine Combat Control System Improvement Program. The Submarine Advanced Combat System interfaces with the Vertical Launch System (Program Element 64370N) and provides the capability to deliver the following submarine-launched weapons currently in development: Anti-Submarine Warfare Standoff Weapon (Program Element 63367N), MK 48 Advanced Capabilities Torpedo (Program Elements 63691N and 64675N), TOMAHAWK (Program Element 64367N), and Submarine Launched Mobile Mines (Program Element 64601N). Other related programs include:

Program Element	Program Element
64503N, Submarine Sonar Development (Engineering)	64507N, Enhanced Modular Signal Processor
63504N (All Projects) of Submarine Sonar Development (Advanced)	64514N (All Projects) of Navigation Systems
64515N, Submarine Surveillance Equipment Program	63530N, Project X0798, Over-the-Horizon Targeting
64520N, Project S0198, Wide Aperture Array (Engineering)	63562N, Project S0210, Submarine Acoustic and Torpedo
Countermeasures and (Engineering)	64562N (All Projects) of Submarine Tactical Warfare Systems
Project S1686, Attack Submarine Combat Control Systems Improvement (Advanced)	63590N, Wide Aperture Array (Advanced)

Program Element: 64524N Title: Submarine Advanced Combat System (Engineering)

G. (U) WORK PERFORMED BY: IN-HOUSE: The Naval Sea Systems Command, Washington, DC, has the responsibility for overall program management and for development and procurement of those system elements associated with acoustic and combat control capabilities. The Naval Electronic Systems Command, Washington, DC, has the responsibility for development and procurement of those system elements associated with electronic warfare support measures and communications capabilities. Lead Laboratory for Project S1347, the Naval Underwater Systems Center Laboratory at Newport, RI, is the Technical Direction Agent. OTHERS: Naval Underwater Systems Center, New London, CT; and Naval Weapons Support Center, Crane, IN. For Project X1411 IN-HOUSE: Naval Electronics Systems Command, Washington, DC; Naval Ocean Systems Center, San Diego, CA; Lead Laboratory, Naval Undersea Systems Center, New London, CT; and Fleet Combat Direction Systems Support Activity, San Diego, CA. CONTRACTORS: For Project S1347 - International Business Machines, Federal Systems Division, Manassas, VA, is the prime contractor for Submarine Advanced Combat System Combat Control/Acoustic Subsystem. EG&G Washington Analytical Services Center, Rockville, MD, is the Systems Engineering and Integration contractor. OTHERS: Hughes Aircraft Company, Fullerton, CA, and Raytheon Company, Submarine Signal Division, Portsmouth, RI. For Project X1411: Computer Sciences Corporation, Falls Church, VA; Magnavox, Philadelphia, PA; Amex, Hawthorne, CA; R. M. Vredenberg, McLean, VA; AVW, Inglewood, CA.

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

(U) Project X1411, Attack Submarine Integrated Communications System: New start in FY 1982. Previous work done under Program Element 63520N and Program Element 64505N. This project consists of several projects for improvement of SSN communications. The BRICKBAT priority Data Link Communications Systems uses newly developed and modified existing equipment to provide Over-the-Horizon Detection Classification and Targeting data to and from the SSN Combat Control System for command and control of TOMAHAWK. The Submarine Keyboard Printer replaces obsolete teletypewriters and the Signal Distribution System improves the switching capability. The Integrated Communications System provides an improved communication suite for future attack submarines, designed to respond to project requirements of the 1990 to 2010 time frame. The Integrated Communications System is needed to ensure continued operability as in light of the SSN's larger traffic volume and more rapid response to requirements. Equipment associated with the added mission of Over-the-Horizon-Detection Classification and Targeting, Extremely Low and Extremely High Frequency and other systems will exceed space/weight constraints. The Integrated Communications Systems adds a standard bus architecture to simplify modifications and to enable growth, it will provide a Control, Monitor, Tune, and Test function and will improve message and data processing and distribution. The Integrated Communications System will reduce training requirements and improve availability.

(U) FY 1982 Accomplishments: The Data Link Communications System development effort included work on a training program, the development and procurement of research and development hardware, the preparation of technical and Integrated Logistic Support documentation, and the consolidation of procurement and installation package, the installation of equipment at a land based test and evaluation site. Competitive award of the Submarine Keyboard Printer was made. Procurement of the Signal Detection system was placed under contract.

(U) In FY 1983 will:

- Complete Data Link Communications System factory training program
- Establish interim supply and depot support for system equipments
- Produce and install the Signal Distribution System
- Complete a research and development effort to upgrade the Submarine Keyboard Printer.
- Initiate an in-house demonstration validation for the Integrated Communications System to prepare prime item development specifications.

Program Element: 64524N Title: Submarine Advanced Combat System (Engineering)

(U) FY 1984 it is planned to:

- o Prepare modifications to the Data Link Communications System to satisfy operational evaluator requirements and to meet anticipated changes to communications networks.
- o Continue demonstration and validation effort for the Integrated Communications System.
- o Begin a level of effort program to improve SSN Communications by incremental improvements to existing equipment.
- o Research and development efforts for the Data Link Communications System in the outyears will taper off.
- o Full scale development of the Integrated Communications System will be underway.
- o Maintain active configuration management of attack submarine radio rooms.

(U) This is a continuing program.

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

( ) Project S1347, Submarine Advanced Combat System (Engineering)

1. (U) DESCRIPTION (Requirement and Project): Current SSNs are configured with the AN/BQQ-5 active/passive sonar system and the MK 117 Fire Control System. These systems use late 1960's technology and have been designed to counter [redacted] Soviet submarines. Although the AN/BQQ-5/MK 117 systems are being modified to provide improved performance against an advanced submarine threat, the ship space limitations, coupled with the intrinsic architecture of the systems will not allow performance enhancements of sufficient scope to be made without major system modifications. The Submarine Advanced Combat System program has been initiated to provide a replacement combat system to fully meet the 1990's threat and provide further growth potential. Based on current developments for the SSN 688 submarine program and planned equipment applicable thereto, it is now possible to add the Submarine Advanced Combat System to the FY 1983 SSN and subsequent ships. The Submarine Advanced Combat System program will ultimately include the total submarine combat system. The Submarine Advanced Combat System program will add system functions; while at the same time, reduce the volume requirements of the combat system. This will provide the means for introducing many current developments into our submarines and will provide for future growth. The objective is to modify/improve the present systems by utilizing the latest technology. To this end, the Submarine Advanced Combat System will be developed as an evolutionary, Preplanned Product Improvement program in three configurations: Submarine Advanced Combat System Basic, Submarine Advanced Combat System A, and Submarine Advanced Combat System B. The initial configuration, Submarine Advanced Combat System Basic, consists of Combat Control and Acoustic Subsystems which provide capabilities for vertical launch, under ice operations, and increased passive and active sonar performance. The acoustic enhancements are provided by: Receive Group, including Thin Line Towed Array; Transmit Group, including high-frequency capability for under ice operations; Signal Processing/Data Processing Group; and Display Group. The initial combat control enhancements provide: Weapon Launch Group; Own Ship Data System; Signal Processing/Data Processing Group; and Display Groups. Growth to subsequent Submarine Advanced Combat System configurations, Submarine Advanced Combat System A, and Submarine Advanced Combat System B, is designed through the up-front use of modern high-density standardized electronic components and distributed digital architecture which are in the Submarine Advanced Combat System Basic configuration initially introduced in the Acoustic Subsystem. Space and weight reduction achieved will permit inboard space and layout changes which can accommodate evolving Submarine Advanced Combat System configurations with no substantive ship arrangement changes.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The Submarine Advance Combat System (Engineering) program was a new start in FY 1982. Th program transitioned from Program Element 63524N, Project S1346, Submarine Advanced Combat System (Advanced). The Comba

150

Control/Acoustic Subsystems prime contractor was competitively selected to conduct Concept Development. Transmit and Receive Subsystems underwent Advanced Development Models testing at Lake Seneca, NY. Preliminary Submarine Advanced Combat System Combat Control/Acoustic Subsystem Prime Item Development Specification was issued. Combat System Top Level Requirements was approved. Established a Display Research Facility.

b. (U) FY 1983 Program: October through December - Continue concept development engineering studies and initiate critical item validaton testing for the Combat Control/Acoustic Subsystems. Prepare for DNSARC review. Award Receive Group full scale development contract. January through September - Complete concept development engineering studies and critical item validation testing for these subsystems. Prepare for DSARC review, including logistic audits. All necessary experimental work has been performed and the proposed system is ready for full scale development. Award full scale development contract for Combat Control/Acoustic Subsystems. Begin hardware and software detail design and related logistic support development. Complete Critical Design Preview for Receive and Transmit Groups.

c. (U) FY 1984 Planned Program: Complete critical item testing for initial Combat Control/Acoustic Subsystems configuration. Complete software and hardware designs. Begin software code and module test. Begin hardware fabrication, assembly and unit test for Combat Control/Acoustic. Conduct Logistic Support Analyses. Initiate interim development of Logistic Support elements. Initiate Submarine Advanced Combat System configuration and Plotter and Combat System Display design definitions. Initiate development of Submarine Advanced Combat System operability requirements. A funding increase of $13,876 in FY 1984 is required for the initiation of fabrication of hardware units and development of software code.

d. (U) Program to Completion: Complete the Full Scale Development for Submarine Advanced Combat System Combat Control/Acoustic Subsystems Basic configuration. The Full Scale Development for Submarine Advanced Combat System A and B configurations will be initiated in FY 1986 and FY 1989 respectively. The conduct of the Technical and Operational Evaluation will be on the initial ship installation, planned for the SSN 751. Full rate production is planned for FY 1989. Procurement of limited production of the FYs 1983, 1984, and 1985 ships systems is being requested.

e. (U) Milestones:

Milestone	Date
1. Logistic Audit	March 1983
2. Defense Systems Acquisition Review Council - Milestone I/IIA (February 1983)*	June 1983
3. Award Submarine Advanced Combat System Full Scale Development Contract (March 1983)*	July 1983
4. Limited Production - Submarine Advanced Combat System Basic	November 1984
5. Defense Systems Acquisition Review Council - Milestone IIB	August 1985
6. Defense Systems Acquisition Review Council - Milestone IIC	August 1988
7. Technical Evaluation	September 1988
8. Operational Evaluation	February 1989
9. Approval for Service Use	July 1989

* Date shown in FY 1983 RDT&E Descriptive Summary.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64554N
DoD Mission Area: 371 - Self-Protection

Title: Surface Electronic 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	8,079	6,639	6,260	6,464	Continuing	Continuing
X0669	Jamming and Deception	1,805	1,086	*	-	-	20,653
X0672	Effectiveness of Navy Electronic Warfare Systems	6,274	5,553	6,260	6,464	Continuing	Continuing

* Project X0669 transitions to Program Element 64573N, Shipboard Electronic Warfare Improvements and includes only the AN/SLQ-17 Improvements Program and Improvements in the direction finding accuracy of the AN/WLR-1H (in lieu of AN/WLR-8(V)4).

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 will improve the Electronic Warfare posture of the Fleet by development of simulations for the threat passive and active Electronic Warfare systems and equipments. In particular, flyable missile simulators, laboratory hardware, and computer models are being developed. This program is needed to ensure adequate testing and evaluation (prior to production decisions) of Fleet Electronic Warfare systems and equipments. Particular threats requiring simulation are

Projected threat missiles will be very sophisticated and use state-of-the-art electronics. Project X0672 will develop new simulators including variants to the AN/ALQ-170(XAN-1) Generic Simulator to simulate these evolving threats.

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: Project X0669 is being transferred to Program Element 64573N in FY 1984. Projects X0884 and X1659 have been completed. The project X0672 funding profile was reduced in FY 1982 by 461 and FY 1983 by 34 due to cost refinement. FY 1984 was reduced by 4,985 due to budgetary constraints.

APN: Funds are included for the AN/ALQ-170(XAN-1) Generic Simulator in the FY 1984 RDT&E Descriptive Summary for the Fleet Electronic Warfare Support Group (FEWSG) FY 1984, FY 1985 and out-year procurements. Projects X0671 and X0674 no longer involve procurements related to Program Element 64554N and are not included in the FY 1984 RDT&E Descriptive Summary for Program Element 64554N.

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	11,398	8,540	6,673	11,245	Continuing	Continuing
X0669	Jamming and Deception	668	1,805	1,086	0	0	20,653
X0672	Effectiveness of Navy Electronic Warfare Systems	9,742	6,735	5,587	11,245	Continuing	Continuing
X0884	Ultra-High Frequency Direction Finder	558	0	0	0	0	1,390
X1659	OMEGA Replacement	400	0	0	0	0	400

52

Program Element: 64554N Title: Surface Electronic Warfare

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
X0672	Effectiveness of Navy Electronic Warfare Systems			12,421	16,145	0	28,566
	APN-5 Procurement of Generic Simulator Baseline Quantity ( )			(4)	(6)		(20)
	APN-5 Procurement of Generic Simulator Variants				6,998	23,910	30,908
	Quantity ( )				(2)	(8)	(10)

F. (U) RELATED ACTIVITIES: [redacted] Support is provided to Program Element 64607N (Surface Electo-Optical Systems Advanced), Program Element [redacted] and Program Element 64573N (Shipboard Electronic Warfare Improvements). Specialized support is provided to the Fleet and the Navy Training Community. Simulators and instrumentation systems for the Fleet Electronic Warfare Support Group are provided under the technical direction of this program.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electonic Systems Command, Washington, D.C.; The Lead Laboratory is the Naval Research Laboratory, Washington, DC; OTHERS: Naval Sea Systems Command, Washington, DC; Naval Electronic Systems Engineering Center, Portsmouth, VA; Naval Surface Weapons Center, Dahlgren, VA; Naval Weapons Center, China Lake, CA; Naval Avionics Center, Indianapolis, IN; CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; ARGO Systems, Inc., Sunnyvale, CA; Raytheon Corporation, Bedford, MA; GTE Sylvania, Mountain View, CA; Control Data Corporation, Arlington, VA; SWL, Inc., McLean, VA; LaBarge Electronic Division, Tulsa, OK; E-Systems, Falls Church, VA; Sanders Associates, Inc., Nashua, NH.

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

(U) Project X0669, Jamming and Deception: This program provides for the improvement in [redacted] the AN/WLR-1H Electronic Support System.

(U) In FY 1982, the [redacted] engineering development was continued.

(U) In FY 1983 program consists of:

- o Contractor efforts culminating in a Critical Design Review.

(U) For FY 1984, project transitions to Program Element 64573N Shipboard Electronic Warfare Improvements.

(U) Project X0672, Effectiveness of Navy Electronic Warfare Systems: This program was established in FY 1970 to provide a capability for the Navy to investigate and evaluate the effectiveness of Shipboard Electronic Warfare Systems to counter the Antiship Cruise Missile Threats. This capability for effectiveness evaluation has been accomplished through the development of:

[redacted]

(U) In FY 1982, development continued on the Generic Simulator (baseline configuration). [redacted]

Program Element: 64554N Title: Surface Electronic Warfare

(U) The FY 1983 program consists of:

- o Basic maintenance of threat simulators;
- o Intelligence updates to the simulators, data bases, and simulation modes;
- o Development and testing of the Generic Simulator (baseline configuration);
- o Definition of the [ ] simulation requirements;
- o Development of a [ ] simulator; and
- o Initiate development of a new [ ] simulator.

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

- o Continue basic maintenance of threat simulators;
- o Continue [ ] the simulators, data bases, and simulation models;
- o Initiate development of the [ ] simulator(s); and,
- o Initiate development of [ ]

(U) Program to Completion: During FY 1985 and beyond, [ ]

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64561N
Title: Submarine (Engineering)
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	Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	2,041	1,000	1,958	1,962	Continuing	Continuing
S0411	Submarine Drag Reduction Program	2,041	1,000	1,958	1,962	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 encompasses engineering efforts directed toward enhancing submarine tactical capability by increasing the top speed capability of existing and future submarines without increasing shaft horsepower, by reducing hull and appendage drag characteristics, and by increasing propulsion efficiency. Submarine hull and appendage design features and subsystems will be developed and evaluated to demonstrate drag reduction concepts. Higher speeds may be required to maintain a combat advantage over the ever increasing numbers of high speed submarines entering service in the Soviet fleet.

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 950 in FY 1983 due to Congressional reduction and a decrease of 271 in FY 1984 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	1,699	2,041	1,950	2,229	Continuing	Continuing
S0411	Submarine Drag Reduction Program	1,699	2,041	1,950	2,229	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 63561N, Submarines (Advanced); Project S0207 Advanced Submarine Control Program, is developing advanced and integrated control systems to increase the operational safety and design efficiency of submarines. Development efforts pertaining to the drag and control aspects of control surfaces are coordinated between the two programs. The Submarine Silencing Program, (Program Element 25634N, Project S0218) and the Submarine Propellers Program (Program Element 63561N, Project S1266) are conducting efforts to improve the performance of submarine propellers.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. OTHERS: Naval Sea Systems Command, Washington, DC; Norfolk Naval Shipyard, Portsmouth, VA; Pearl Harbor Naval Shipyard, Pearl Harbor, HI. CONTRACTORS: General Dynamics/Electric Boat Division, Groton, CT; Operations Research, Inc., Silver Spring, MD; Miami Marine Research, Inc., Miami Beach, FL; Applied Research Laboratory, Pennsylvania State University, University Park, PA; Daedalean Associates, Inc., Woodbine, MD, Hydrodynamics Research Associates, Inc., Westfield, NJ; Scientex, Washington, DC; NKF Engineering Associates, Vienna, VA.

155

(155)

Program Element: 64561N Title: Submarine (Engineering)

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

(U) Project S0411, Submarine Drag Reduction Program: The objective of the Submarine Drag Reduction Program is to develop evaluate, and demonstrate low drag hulls and appendages and highly efficient propulsors which will lead to an increase in the top speed capability of existing and future submarines without increasing shaft horsepower. Additionally, these features will permit a submarine to attain a given speed with less power than possible today. In this program the drag and/or loss of speed associated with hull openings, sail, control surfaces, propulsor, hull form, roughness. and fouling and protuberances will be evaluated systematically by means of model tests and analytical studies. Recommended improvements will be evaluated by full scale trials.

(U) In FY 1982: Temporary main ballast tank floodhole covers were installed on an attack submarine and sea trails were conducted to determine speed improvement. Continued study of high performance hull/propeller combinations and developed criteria for hull/propeller design. Continued shipboard evaluation of low drag hull coatings. Developed methods for more accurate prediction of full scale drag using the results of model tests. Evaluated waxing technique to prevent fouling of propellers during ship dockside periods.

(U) The FY 1983 Program will consist of:

- o Continued at-sea evaluation of selected low drag hull coatings.
- o Continued improvement of hull/propeller design criteria for use by ship designers.
- o Investigation of requirements [redacted]

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

- o Complete at-sea evaluation of selected low drag hull coatings.
- o Develop improved hull/propulsor design criteria.
- o Continue laboratory testing of various aspects [redacted]

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64562N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: Submarine Tactical Warfare Systems (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	96,542	32,582	50,960	47,500	Continuing	Continuing
S0235	Submarine Acoustic Warfare Systems	1,978	2,022	5,216	2,205	Continiung	Continuing
S0236	Attack Submarine Combat Control System Improvements (Engineering)	32,072	30,560	45,744	45,295	Continuing	Continuing
S0366	MK 48 Advanced Capabilities (Engineering)	62,492	*	-	-	-	-

* Transferred to Program Element 64675 in FY 1983 and subsequent 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 accomplishes design, engineering development, test and evaluation of submarine tactical warfare systems and weapons. Included in these efforts to counter the current and projected threat are improved acoustic and weapons countermeasures (including acoustic warfare systems), launching systems, target motion analysis and weapon control (fire control) systems, combat system engineering and functional analysis (end-to-end modeling), tactical situation displays, incorporation of communication/data links for attack submarine command and control, and (prior to FY 1983) submarine launched torpedoes. The Attack Submarine Combat Control System Improvement Program is a continuing effort for the development, system engineering, interface design, integration, test, and evaluation of Combat Control System improvements for attack submarines. The objective of the Combat Control Systems Improvement Program is to increase the effectiveness and suitability of the Combat Control System for new construction and in-commission submarines.

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,N Project S0235 - A decrease of 16 FY 1983 due to revision in inflation and and increase of 1,623 in FY 1984 representing full funding of the Acoustic Countermeasure Device MK 3 project engineering development contract (+1,225) and the transitioning of the acoustic intercept receiver display improvements project from advanced development (+398). Project S0236 - Budget increases of 1,300 in FY 1982 and 14,617 in FY 1984 are due to requirements changes and directed scope changes for Over-the-Horizon Targeting and the near simultaneous implementation of Vertical Launch System TOMAHAWK and MK 48 Advanced Capability torpedo into the Combat Control System MK 1. OPN. Project S0235 FY 1982 funding shows a decrease of 25 due to a revision in inflation factors; FY 1983 has a decrease of 294 of which -87 is attributable to revisions in inflation factors and -207 is attributable to Department of Defense/Navy directed funding reductions in contractor support services; FY 1984 has a net decrease of 10,683 due to: cancellation of the General Noise and Tonal System and Countermeasure Set (9,522), Acoustic preproduction launcher modules (-1,100) procurements and associated production support services (-284); (-47) due to revisions to inflation factors; and (+270) representing the inclusion of the Mobile Submarine Simulator equipment procurement.

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

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	33,768	95,242	32,598	34,720	Continuing	Continuing
S0235	Submarine Acoustic Warfare Systems (Sub-Tasks; Quantities) 1/	2,136	1,978	2,038	3,593	Continuing	Continuing
S0236	Attack Submarine Combat Control System Improvement Program (Engineering) (Sub-Tasks; Quantities) 1/	24,832	30,772	30,560	31,127	Continuing	Continuing
S0366	MK 48 Advanced Capabilities (Engineering)	6,800	62,492	(Transfers to Program Element 64675N)			

1/ Sub-tasks and test item quantities are to be determined.

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						
S0235	Submarine Acoustic Warfare Systems	6,970	7,092	5,690	8,308	Continuing	Continuing
S0236	MK 117 Fire Control System - Basic *	56,599	50,524	57,197	34,902	Continuing	Continuing
	(Quantity)	(10)	(5)	(4)	(3)	Continuing	Continuing

* This Other Procurement, Navy funding is for procurement of complete MK 117 Fire Control Systems until FY 1983. In FY 1983 it is combined with Attack Submarine Combat Control Systems Improvement program which provides for various improvements such as increased Display and Conversion for Over-the-Horizon Targeting, TOMAHAWK Fire Control Modifications, Emergency Weapon Firing Capability, Torpedo Room Maintainability Upgrade, Attack Center Interface Unit and Weapons Launch Console, HARPOON and MK 48 Fire Control Upgrades, and Miscellaneous and/or ancillary equipment modifications planned for continuing procurement to upgrade and modernize the base MK 117 Fire Control System. This procurement will support 99 systems.

F. (U) RELATED ACTIVITIES: Advanced development of acoustic warfare concepts is conducted under Program Element 63562N. The Mobile Submarine Simulator development is funded under Program Element 11221N, project S1265 (Ballistic Missile Submarine Unique Countermeasures). The Attack Submarine Combat Control System Improvement (Engineering) Program (project S0236) modifies MK 117 Fire Control System hardware and software to accommodate new and improved submarine launched weapons and launch capabilities including: TOMAHAWK Cruise Missile (Program Element 64367N, project X0545), MK 48 Advanced Capabilities Torpedo (Program Element 63691N, 64575N), Anti-Submarine Warfare Standoff Weapons (Program Element 63367N, project S1669), Submarine Launched Mobile Mines (Program Element 64601N, project S0272), and the SSN 688 Class Vertical Launch System (Program Element 64370N). The program also modifies MK 117 Fire Control System hardware and software to accommodate the following developments in sensor/targeting systems which interface with the Fire Control System: Wide Aperture Array (Advanced) (Program Element 63560N); Over-The-Horizon Targeting (Program Element 63530N, project X0798); Acoustic Performance Prediction (Program Element 63708N, project S0823); Submarine Sonar Improvement (Program Element 64503N, project S0219); Attack Submarine Integrated Communications System (Program Elements 64524N and 64505N, project X1411); and Navigation Systems (Program Element 64514N). In addition, the program coordinates MK 117 Fire Control System improvements with the Submarine Advanced Combat Systems (Engineering) program (Program Element 64524N, project S1347). To avoid duplicative efforts, the Attack Submarine Combat Control System Improvement (Engineering) program maintains liaison with the TRIDENT program (Program Element 11228N, project B0004), which is developing related applications of standard information displays for digital command/fire control systems.

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

G. (U) WORK PERFORMED BY: In-House: Naval Coastal Systems Center, Panama City, FL (lead laboratory, Submarine Acoustic Warfare Systems); Naval Sea Systems Command, Washington, DC; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Underwater Systems Center, Newport, RI (lead laboratory, Attack Submarine Combat Control Systems Improvement Program); Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Silver Spring, MD; Naval Electronics Systems Command, Washington, DC; Naval Weapons Center, China Lake, CA; Naval Undersea Warfare Engineering Station, Keyport, WA (lead laboratory, MK 48 Advanced Capabilities Torpedo); Naval Research Laboratory, Washington, DC. and two others. Contractors: Gould Inc., Cleveland, OH; Sippican, Marion, MA; Sperry Gyroscope, Great Neck, NY; Sperry-Rand-Univac, Minneapolis, MN; Hughes Aircraft, Fullerton, CA (prime contractor MK 48 Advanced Capabilities Torpedo); Singer-Librascope Division, Glendale, CA; Raytheon, Portsmouth, RI; Lockheed Missiles and Space Corporation, Sunnyvale, CA; Rocketdyne Division, Rockwell International, Canoga Park, CA; Electric Boat Divison, General Dynamics Corporation, Groton, CT; Bolt, Beranek & Newman, Inc., Cambridge, MA; Applied Research Laboratory, Pennsylvania State University, State College, PA; Applied Research Laboratory, University of Texas, Austin, TX; Bunker-Ramo Corp., Westlake, CA.

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

(U) Project S0235, Submarine Acoustic Warfare System: This project provides engineering design and development of acoustic warfare capabilities (detection, localization, classification, command and control countermeasure devices and launchers) transitioning from advanced development under project S0210. The project consists of: improved acoustic warfare sensors, processors, and command and control items; advanced sonar and torpedo countermeasure devices and advanced countermeasure launchers which provide submarines with an increased capability to survive the threat through the year 2000.

(U) In FY 1982 development continued on: the Countermeasures Set, Acoustic, MK 2 (external, six-inch) launching system; the Acoustic Device, countermeasure, MK 5 (six-inch, multi-frequency sonar countermeasure device); and the Acoustic Device, Countermeasure, MK 3 (six-inch torpedo countermeasure device).

(U) The FY 1983 program consists of:

o Conducting technical and operational testing of the strategic submarine countermeasures launching system.

o Conducting technical and operational testing of the multi-frequency sonar countermeasure device.

o Completing engineering development model fabrication and testing of the torpedo countermeasure device.

(U) In FY 1984 it is planned to:

o Obtain production authorization for the strategic submarine launching system and multi-frequency sonar countermeasure device.

o Fabricate and install the tactical submarine countermeasures launching system.

o Fabricate Service Test Models of the torpedo countermeasure device.

o Commence engineering development of the acoustic warfare display improvements transitioning from advanced development under project S0210.

(U) Program to completion:

o This is a continuing program.

159

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

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

(U) Project SO236, Attack Submarine Combat Control System Improvement Program (Engineering)

1. (U) DESCRIPTION: The Combat Control Systems Improvement Program formerly the Submarine Integrated Attack Center Program, is the primary development, system engineering, test and evaluation effort for attack submarine combat system design, subsystem interfaces, and the attack submarine combat control system. This program considers the total attack submarine combat system and accounts for the interrelationships of both platform and combat subsystems such as sonar, electronic warfare support measures, weapons, navigation, and communications. The principal objective of the program is to increase combat system effectiveness by developing improvements to the attack submarine combat system overall architecture and to those subsystems which directly support the command management function. These developments are designed to provide a mechanism for incorporating improved sonar and other sensor capabilities into the Command/Fire Control subsystem of the Combat System and are adaptable to both current new construction and in-service attack submarines (through a back-fit program). The initial efforts of the Combat Control Systems Improvement Program were commenced in FY 1973 to support development of the digital MK 117 Fire Control system and the computer programs which are being installed in SSN 688 Class submarines (front-fit) commencing with SSN 700 and SSN 594/637 Class submarines and SSNs 688-699 (backfit). With the completion of the MK 117 Fire Conrol System operational evaluation and approval for service use in 1980, the project focused on efforts to upgrade atack submarine combat Control systems as required to increase capability and effectively respond to the changing threat. The program also develops, integrates, and certifies attack submarine command fire control and data processing subsystem improvements (Combat Control System MK 1) for installation in follow-on SSN 688 Class submarines and for backfitting into existing attack submarine platforms where appropriate. The most significant of these improvements include incorporation and utilization of target information and data from multi-sensors; e.g. data links towed array and hull mounted acoustic sensors and off-board/third party sensors. Specific efforts include development of Command System Displays (Operating Summary, Search Planning, Avoidance, Detection), target motion analysis and weapon control modules, torpedo telemetry communication, and incorporation of new weapon capabilities; and data processing system improvements required to utilize these sensor/data management improvements. Software coding for Program C, Revision 1 (conventional TOMAHAWK, Over-the-Horizon Targeting) and Program C, Revision 3 (Electrically Suspended Gyro Navigation Capability, nuclear TOMAHAWK, improved cartographics, and Submarine Launched Mobile Mine) commenced in June 1981. System testing for program C, Revision 0 (improved MK 117 Fire Control System software) commenced in July 1981. Combat Control System MK 1 is designated for fleet installaion on the SSN 688 Class submarines beginning with SSN 712. Combat Control System MK 1 will upgrade the Fire Control System MK 117 Mod 0 on SSN 700-715; will be installed during construction on SSN 716-725, 750; and will replace Fire Control System MK 113 Mod 10 on SSN 688-699. Combat Control System MK 1 will also upgrade the Fire Conrol System MK 117 Mods 2 and 3 on SSN 637 Class submarines.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982 Program: Continued follow-on operational testing and development of combat system equipment and tactical programs. Program C, Revision 0 validation and certification testing completed in the Combat Control Systems Test Facility. Interim tactical Program B, Revision 4C to support early TOMAHAWK deployment was successfully tested at the combat control systems Test Facility and at-sea aboard USS GUITARRO (SSN 665). Developed, awarded contract, and commenced production of fire control and data processing equipment to support incorporation of sensor data provided by the data links and off-board third party sensors. Established combat control system architecture and specifications to support implementation of MK 48 Advanced Capabilities Torpedoes, SSN 688 Vertical Launch, and fleet recommended improvements. Initiated development of the functional components to support this architecture. Awarded major contract in June 1982 to Singer/Librascope Division for the development and prototype producion of SSN 688 Vertical Launch combat control equipment.

b. (U) FY 1983 Program: From October through December, this program will continue follow-on operational testing and development of combat system equipment and tactical programs. Continue development of universal tactical Program C Revision 3 (Electrically Suspended Gyro Navigator, TOMAHAWK-nuclear capability, Over-the-Horizon Targeting and tactical data link improvements, Submarine Launched Mobile Mine). From January through September, this program will commence full scale development of Vertical Launch equipment and deliver prototype vertical launch hardware and AN/UYK-44(V) supporting weapons computer to Combat

160

Control Systems Test Facility for continued development of Program C Revision 4 (SSN 688 Vertical Launch System and MK 48 Advanced Capability torpedo). Complete operational evaluation testing of Program C Revision 0 to provide a formal asessment to the Chief of Naval Operations for the determination of suitability for fleet use. Complete development and certification of Program C Revision 1.

c. (U) FY 1984 Planned Program: Continue follow-on operational testing and development of combat system equipment and tactical programs. Conduct program C Revision 1 operational evaluation. Complete system certification and operational evaluation of universal Program C Revision 3 for use aboard submarines of the SSN 594/637/688 Classes. Commence coding, system testing, and integration of Program C Revision 4. Commence integration and testing of SSN 688 Vertical Launch System prototype hardware in the development lab at the Combat Control System Test Facility. Establish first SSN 688 Vertical Launch System trainer site at Naval Submarine School, New London, CT, and deliver preproduction hardware and software in late FY 1984. Continue system design and installation efforts on SSN 688 Vertical Launch System integration lab at Combat Control System Test Facility to support software check out of Program C Revision 4 and development of universal follow-on Program C Revision 5 for use aboard ships of the SSN 594/637/688 Classes. Continue development of Combat Control System equipment and software functional improvements and design and performance evaluation. The $15,184M increase from FY 1983 request is attributed to the increased number of Combat Control System MK 1 computer program operational tests, anticipated Over-the-Horizon Targeting changes, and the concurrent development of the SSN 688 Vertical Launch Sytem MK 48 Advanced Capabilities integration laboratory to support software check out.

d. (U) Program to Completion: This is a continuing program to evolve and support existing fire control systems on SSN 594, 637, and 688 classes and to provide inputs to the Submarine Advanced Combat System program for future combat systems. The program continues to support the Combat Control Sytems Test Facility. The program will contnue operational testing, incorporate fleet recommended improvements, develop attack submarine command fire control data processing techniques, and complete development and delivery of required Tactical Program updates to deploy new weapon and sensor capabilities. The Combat Control Systems Test Facility will continue to be utilized to develop, test and evaluate attack submarine combat system improvements required to ensure effective systems are available to respond to the changing threat. Additionally, the Combat Systems' Architecture and Development Plan will be maintained current by continuing analyses of the threat and effectiveness evaluation of combat system developments.

e. (U) Milestones

Milestone		Date	
a.	(U) MK 117 Fire Control System approved for service use		July 1980
b.	(U) Awarded SSN 688 Vertical Launch Combat system hardware development and prototype contract		June 1982
c.	(U) Approved SSN 688 Vertical Launch Combat System Laboratory Development Plan		August 1982
d.	(U) Certify MK 117 Fire Control System tactical Program C Revision 0	March 1982*	October 1982
e.	(U) Complete incorporation of TOMAHAWK into Program B Revision 4G	June 1982*	October 1982
f.	(U) Deliver Combat Control System MK 1 tactical program to SSN 713	[redacted]	[redacted]
g.	(U) Award tactical Program C4/5 development contract		
h.	(U) Complete incorporation of Submarine Tactical Data Link/Over-the-Horizon Targeting into Program C Revision 1		
i.	(U) Complete incorporation of TOMAHAWK into Program C Revision 1		
j.	(U) Certify and deliver the Over-the-Horizon Targeting Block Update Improvement		
k.	(U) SSN 688 Vertical Launch Combat System hardware delivery to SSN 720		
l.	(U) Complete development of tactical Program C Revision 4 to incorporate MK 48 Advanced Capabilities and SSN 688 Vertical Launch		
m.	(U) Complete operational testing of programs which incorporate MK 48 Advanced Capabilities and SSN 638 Vertical Launch		

*Date shown in FY 1983 Descriptive Summary

161

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

3. (U) PROGRAM DOCUMENTATION:

Fire Control System MK 117	APPROVAL FOR SERVICE USE (ASU) OF THE MK 117 FIRE CONTROL SYSTEM (U)	31 Jul 1980
Fire Control System MK 117	TEST AND EVALUATION MASTER PLAN NO. 234-1 (REV 2) (U)	September 1982

(SSN Combat Control System Improvement Program

Test and Evaluation Master Plan for Fire Control System MK 117/computer Program C Revision 0)

J. (U) TEST AND EVALUATION DATA:

1. (U) DEVELOPMENT TEST AND EVALUATION

a. (U) The basic MK 117 Fire Control System incorporating digital weapons control is an improved version of the analog-based MK 113 Mod 10 Fire Control System. Design work was started in FY 1973, contracts for development of new fire control equipment and the Attack Submarine Combat Control Systems Test Facility were awarded in FY 1974 and FY 1975, and developmental testing was completed in August 1977. The MK 117 Fire Control System was approved for service use in July 1980. The MK 117 Fire Control System has been modified to provide: improved target motion analysis, weapons improvements including torpedoes MK 48 Mods 3 and 4, and other fleet recommended improvements in hardware and software. Program C Revision 0, a significant software change incorporating these features, completed an at sea demonstration aboard USS WILLIAM H. BATES (SSN 680) in May 1982 and certification testing at the Attack Submarine Combat Control Systems Test facility in August 1982. Program C Revision 0 is scheduled for operational evaluation in early 1983. Further modifications to the MK 117 Fire Control system to provide TOMAHAWK (conventional) weapon order generation, increased display and data handling, and an over-the-horizon targeting capability will complete the conversion of this system to a MK 1 Combat Control System. The software program to support the conversion is interim Program B Revision 4G which has completed certification in the Attack Submarine Combat Control Systems Test Facility and has been demonstrated by the similar B4F program at sea aboard USS GUITARRO (SSN 665) in June 1982. Interim Program B Revision 4G is scheduled for installation and further shipboard testing aboard USS ATLANTA (SSN 712) and USS LA JOLLA (SSN 701) in October 1982. Completion of certification testing of Program C Revision 1, which will support the MK 1 Combat Control System, is scheduled for [ ].

Test Results to Date: B4G - At-sea certification 5 April-30 June 1982, all test phases completed satisfactorily. CO - At-sea demonstration May 1982, all demonstration goals fulfilled.

Summary of Technical Performance: B4G - Missile guidance alignment disturbances during submarine dive/ascent. Corrected through shift of navigation modes. CO - Completed at-sea evaluation. All deficiencies corrected.

b. (U) Follow-on combat system improvements have been identified for development based on operational requirements. These include the incorporation of the Electrically Suspended Gyro Navigator, TOMAHAWK (nuclear), improved cartographics, improved over-the-horizon targeting, Submarine Launched Mobile Mine. Development has commenced on computer Program C Revision 3 to incorporate these improvements into a universal computer program suitable for installation aboard SSN 594/637/688 Class submarines. Program certification is scheduled for [ ] with operational evaluation to follow.

2. (U) Service program manager is NAVSEA (PMS-409), lead service laboratory is Naval Underwater Systems Center, Newport, RI. Major contractors are Raytheon, Portsmouth, RI; Sperry Univac, St. Paul, MN; Hughes Aircraft, Fullerton, CA; and Singer/Librascope, Glendale, CA.

974 162

062

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

(U) OPERATIONAL TEST AND EVALUATION

1. (U) The basic MK 117 Fire Control System underwent operational evaluation aboard USS GUITARRO (SSN 665) and USS SILVERSIDES (SSN 679) in June 1978. Additional testing to verify that system deficiencies [ ] were corrected. Extensive land-based and at-sea testing was conducted to verify correction of deficiencies noted. Approval for service use was granted in July 1980.

2. (U) MK 117 Fire Control System improved computer Program C Revision 0 is scheduled for operational evaluation in [ ]

3. (U) MK 1 Combat Control System computer Program B Revision 4G has satisfactorily completed certification testing and due to its interim nature will not undergo operational evaluation.

4. (U) MK 1 Combat Control System computer Program C Revision 1 are tentatively scheduled for operational evaluation in [ ]

5. (U) All hardware and software operational evaluations are the responsibility of Commander, Operational Test and Evaluation Force, Norfolk, Virginia. All combat control equipment and supporting equipment are operated and maintained by the assigned military complement.

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

(U) SYSTEM CHARACTERISTICS

1. (U) Technical

Characteristic	Threshold	Demonstrated	Source (Note 9)
System Reliability (Mean Time Between Failures	500 hrs.	673 hrs.	Development/Operational Test III A(234-1)
System Maintainability (Mean Time to Repair)	3.4 hrs.	2.5 hrs.	Development Test II (234-1)
Correlate Sensor Data, Localize and Track Targets			
Number of Targets, Normal Mode			Development Test III A(234-1)
Number of Targets Degraded Mode			Delopment/Operational Test II A(234-1)
Target Motion Analysis Solution Time			Development/Operational Test II (234-1)
Target Motion Analysis Solution Accuracy			Operational Test II (234-1)
Computer-Aided Correlation of Environment			Development/Operational Test II (234-1)
Characteristic			Source
Develop Orders, Set and Control			
Torpedo MK 37			Development Test II (234-1)
Torpedo MK 48			Development Test II (234-1)
Missile, HARPOON			Development Test II (234-1)
Missile, Submarine Rocket			Development Test II (234-1)
Missile, TOMAHAWK			Operational test III (234-1)
2. (U) Operational			
Fire Control Solution, Speed and Accuracy	Better than MK 113 6/8/10 Fire Control System	Yes (note 6)	Operational Test II (234-1)
Target Motion Analysis Solution for Weapon Acquisition	(note 3)	0.81 (note 4) 0.30 (note 5)	Operational Test II (234-1)
Snapshot Weapon Firing Response Time	Better than MK 113 6/8/10 Fire Control System	(note 7)	Development Test II (234-1)

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

(U) SYSTEM CHARACTERISTICS (Cont'd)

1. (U) Technical (Cont'd)

Characteristic	Threshold	Demonstrated	Source
Operational Availability			
MK 117 Fire Control System	96%	98.4%	Operational Test III A(234-1)
MK 1 Combat Control System	96% (w/o OTH-T)	TBD	Operational Test II (234-3)
	94% (w/OTH-T)	TBD	Operational Test II (234-3)
Operational Reliability (note 8)			
MK 117 Fire Control System	80%	65%-89%	Operational Test III A(234-1)
MK 1 Combat Control System	80% (MK 48, HARPOON)	TBD	Operational Test II (234-3)
	70% (TOMAHAWK w/o OTH-T)	TBD	Operational Test II (234-3)
	65% (TOMAHAWK w/OTH-T)	TBD	Operational Test II (234-3)

NOTES:

1. (U) Time required to obtain solution is a factor of sensor data quality and tactics.

2. (U) Manual Adaptive Mode provides improved Target Motion Analysis solutions. [

3. (U) Solution quality required is a function of weapon characteristics.

4. (U) Probability of achieving solution[ ]based on MK 48 Torpedo acoustic capabilities.

5. (U) Probability of achieving a solution[ ]based on MK 37 Torpedo acoustic capabilities.

6. (U) Current recommended settings need to be updated to match fleet operational directives.

7. (U) Development/testing has demonstrated[ ]

8. (U) Specification is for a system reliability of at least a 0.8 probability for completing a 24 hour mission at a 90% Program confidence level.

9. (U) Test phases in which demonstrated/will be demonstrated are as indicated with the parenthetical remark indicating whether conducted as part of the MK 117 Combat Control system program (234-1) or the Fire control system MK 1 Program (234-3).

Program Element: 64562N Title: Submarine Tactical Warfare Systems (Engineering)

(U) PROGRAM DOCUMENTATION

Fire Control System MK 117

CNO ltr Ser 401/C732938 of 31 Jul 1980

(U) APPROVAL FOR SERVICE USE (ASU) OF THE MK 117 FIRE CONTROL SYSTEM

Fire Control System MK 117

(U) TEST AND EVALUATION MASTER PLAN NO. 234-1 (Rev 2) September 1982

SSN Combat Control system Improvement Program TEMP

for Fire Conrol MK 117/Computer Program C Revision 0

Combat Control System MK 1

(U) Test and Evaluation Master Plan No. 234-3 of (to be issued) SSN Combat Control System Improvement Program TEMP for Combat Control System MK 1 computer Program C Revision 1.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64563N
DoD Mission Area: 235 - Naval Warfare Suppport

Title: Shipboard Physical Security (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	0	0	2,477	2,493	Continuing	Continuing
S1769	Nuclear Weapons Security (Engineering)	0	0	2,477	2,493	Continuing	Continuing
	Quantity (Development/Operational Test and Evaluation)						(3)

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: Within the U.S. Navy a need exists for development and procurement of a Physical Security System capable of detecting, classifying and providing a response to threats targeting a 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 supports the transition to engineering development of the effort commenced under Program Element 63571N/S0812, Nuclear Weapons Security. This element funds the engineering development, operational testing and approval for production for Shipboard Nuclear Weapons Security systems. These systems include detectors, controls, alarms and all supporting procedures, training and documentation.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) This is a new start in FY 1984.

D. (U) FUNDING AS REFLECTED IN THE FY 1983 DESCRIPTIVE SUMMARY: This is a new start in FY 1984.

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

F. (U) RELATED ACTIVITIES: This project supports the transition from advanced development under Program Element 63571N/S0812, Nuclear Weapons Security, to engineering development. More advanced and higher capability systems to counter the post 1990's security threats are being developed in Program Element 63571N. Effort is coordinated with the 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 Office for Physical Security Equipment, Defense Nuclear Agency, and related Navy work coordinated through the Office of the Chief of Naval Operations (OP-403, Physical Security Branch).

G. (U) WORK PERFORMED BY: To be determined.

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

(U) S1769, Nuclear Weapons Security: (NEW START) The nuclear weapons security program is directly related to the [redacted] In addition, the [redacted] While it is expected that these devices can [redacted] 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.

Program Element: 64563N Title: Shipboard Physical Security (Engineering)

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

- o Fabricate components of the first level system. The design of these detectors, alarms, and controls is based upon the usage of previously developed components as modified for the rigors of the shipboard environment.
- o Commence laboratory survivability tests on components of the first level system. The survivability tests are identical to those required of comparable shipboard electrical systems.

(U) The program to completion involves:

- o Progressing first level system through Technical Evaluation and Operational Evaluation during FYs 1986 and 1987; and introduction into the fleet in FYs 1987 and 1988.
- o Transition of intermediate level system into engineering development in FY 1986, and into the fleet in FY 1990.
- o Transition of final system into engineering development in FY 1990, and into the fleet in FY 1994.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64567N
DoD Mission Area: 238 - Other Naval Warfare

Title: Ship Subsystem Development/Land Based Test Site
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	65,094	121,387	110,217	97,441	Continuing	Continuing
S0857	Ship Subsystem Development/Land Based Test Site	65,094	24,187	29,245	36,924	Continuing	Continuing
S1803	Ship Contract Design	0	97,200	80,972	60,517	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: Carry out Contract Design phase for ships in the Navy's Shipbuilding Program. Conduct Engineering Developent phase of selected systems/subsystems for these ships. Support land based test sites for systems to be incorporated in designs 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 decrease 1,300 due to reprogramming for Swimmer Delivery Vehicle development. In FY 1983 in Project S0857 is decreased by 243 as the result of revision of cost; FY 1984 increased 603 as a result of revision of cost estimates due to the transfer of certain Guided Missile Destroyer DDG-51 planned funding and efforts from the SCN to the RDT&E,N appropriation. In FY 1983 and subsequent years Project S1803 is reactivated as the result of Congressional action transferring Ship Contract Design from SCN to R&D.

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	45,717	66,394	24,430	28,642	Continuing	Continuing
S0857	Ship Subsystem Development/Land Based Test Site	45,717	66,394	24,430	28,642	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Ship Development (Advanced), Program Element 63564N; Ship Propulsion Systems (Advanced), PE 63508N; DDG-51, PE 63589N.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Systems Engineering Station, Philadelphia, PA; Naval Surface Weapons System Engineering Station, Port Hueneme, CA; Long Beach Naval Shipyard, Long Beach, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; and others. CONTRACTORS: Gibbs and Cox, New York, NY; M. Rosenblatt and Son, Incorporated, New York, NY; General Electric, Schenectady, NY; Lockheed Shipbuilding and Construction Co., Seattle, WA; Detroit Diesel Allison, Indianapolis, IN; General Dynamics, New London, CT; J.J. Henry Co., Inc., New York, NY; and others.

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

Program Element: 64567M Title: Ship Subsystem Development/Land Based Test Site

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

(U) Project S0857, Ship Subsystem Development/Land Based Test Site

1. (U) DESCRIPTION (Requirement and Project): The project supports the engineering development of specific selected ship systems or subsystems which are required for the effective design of ships in the Navy's Shipbuilding Program. If Land Based Test Sites are required in the engineering development of these systems or subsystems, this program element also provides funds for the planning and operation of the test sites. Prior to FY 1983, this program element also provided the funds required to carry out the Contract Design Phase of nonstrategic ships in the Navy's Shipbuilding Program.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program:

- o Completed FY 1982 Fleet Oiler (T-AO), Salvage Ship (ARS), Guided-Missile Cruiser (CG-47), Landing Craft Air Cushion and Mine Countermeasures Ship contract design phases.
- o Continued Landing Ship Dock (LSD-41) propulsion systems engineering development.
- o Continued Aircraft Carrier Service Life Extension Program contract design phase for first follow ship.
- o Continued design and engineering work required for activation of battleships NEW JERSEY and IOWA.
- o Commenced FY 1986 Ammunition Ship (AE), FY 1983 Hospital Ship (T-AHX), FY 1986 Fast Combat Support Ship (AOE), FY 1983 Aircraft Carrier (CVN), and FY 1988 Destroyer (DD-963) contract design phases.
- o Continued FY 1985 Surveying Ship (T-AGS) conversion design.
- o Performed Cruiser reactivation study.
- o Continued landing, combatant and service craft contract design development.
- o Continued update of Attack Submarine (SSN 688 Class) contract design to incorporate class improvements.

b. (U) FY 1983 Program:

- o Initiate design and construction of Guided-Missile Destroyer (DDG-51) propulsion system Land Based Test Site and at-sea test platform preparation for reverse reduction gear.
- o Support development of 501-K34 engine and LM-2500 engine upgrades.
- o Complete endurance testing and evaluation of non-magnetic and high-shock features of MTU diesel engine and continue endurance testing of Waukesha engines for possible application as Mine Countermeasures Ship propulsion engines.
- o Continue subsystem development and testing of attack submarines (SSN-688 Class) improvements including: procurement and testing of spherical air flask, shock testing of equipment and evaluation of depth control capabilities using bow planes (in lieu of sail planes) using submarine simulation program.
- o Complete construction of Landing Ship Dock (LSD-41) propulsion system Land Based Test Site and conduct development test, operational test, and maintainability demonstration of the propulsion system.

- o Develop plans for construction, equipment installation, and operation of the Amphibious Assault Ship LHD-1 Combat System Land Based Test Site/Assembly and Checkout Facility.

c. (U) FY 1984 Planned Program:

- o Continue Guided-Missile Destroyer DDG-51 Land Based Test Site design and development and support of at-sea testing of reverse reduction gear.
- o Complete LM-2500 engine upgrade.
- o For Mine Countermeasure Ship propulsion system, complete endurance testing of Waukesha and high-shock configured MTU engines.
- o Continue engineering development of Attack Submarines (SSN-688 Class) improvements including: structural design, ship control, weight reduction, shock resistance, and weapons handling and launch.
- o Conduct testing of Landing Ship Dock (LSD-41) propulsion system at Land Based Test Site for reliability, maintainability, and operability of corrections for deficiencies identified during FY 1983 testing.
- o Install equipment in Amphibious Assault Ship LHD-1 Combat System Land Based Test Site/Assembly and Checkout Facility and design and develop new subsystem components.
- o For destroyer DD-963, identify and resolve interface incompatibilities between new and current equipment, develop test plans, and initiate combat system software modifications.

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

e. (U) Milestones: Not applicable.

(U) Project S1803, Ship Contract Design

1. (U) DESCRIPTION (Requirement and Project): Provide the funding required to carry out the Contract Design phase of the ships in the Navy's Shipbuilding Program. The output of the Contract Design phase is an engineering data package consisting of contract drawings, contract guidance drawings and ship specifications. For an original ship design, the Contract Design phase is preceeded sequentially by the Feasibility and Preliminary Design phases. The ship specifications describe the general design requirement and the essential features, functions, and arrangements of the ship. Together with the contract drawings and contract guidance drawings, they define the ship as to dimensions, structure, arrangements, performance, power, machinery, weaponry, etc. The Contract Design phase is a prerequisite to the development of working drawings from which the ship is constructed.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Efforts funded under Project S0857.

171

b. (U) FY 1983 Program:

- o Complete Contract Design phases for the Hospital Ship (T-AHX), Fleet-Oiler (T-AO), Guided-Missile Cruiser (CG-47), Aircraft Carrier (CVN), Landing Craft Air Cushion, Landing Ship/Dock (LSD-41), Mine Countermeasures Ship, and Attack Submarine (SSN).

- o Complete the FY 1983 Battleship design and commence the FY 1985 Battleship reactivation planning and design.

- o Complete the FY 1983 Aircraft Carrier (Service Life Extension Program) (CV(SLEP)) and commence the FY 1985 Aircraft Carrier (Service Life Extension Program) pre-availability planning and design.

- o Continue the Ammunition Ship (AE) and Fast Combat Support Ship (AOE) modified-repeat designs, Surveying Ship (T-AGS) conversion design, and Amphibious Assault Ship (LHD-1) contract design.

- o Commence Range Instrumentation Ship (T-AGM) conversion design, Ocean Surveillance Ship (T-AGOS) contract design update, Cable Ship (T-ARC) modified-repeat design, Guided-Missile Destroyer (DDG-51) contract design, Amphibious Transport Dock (Service Life Extension Program) (LPD (SLEP)) pre-availability planning, Minesweeper Hunter contract design, and TRIDENT submarine contract design modification for D-5 missile installation.

- o Continue landing, service, and combatant craft contract design development.

c. (U) FY 1984 Planned Program:

- o Complete the Fleet Oiler (T-AO) Amphibious Assault Ship (LHD-1), Minesweeper Hunter, Surveying Ship (T-AGS) and TRIDENT contract design phases.

- o Continue Ocean Surveillance Ship (T-AGOS), FY 1985 Battleship Reactivation, Aircraft Carrier (Service Life Extension Program), Guided Missile Destroyer (DDG-51), Cable Ship (T-ARC) modified repeat design, Amphibious Transport Dock (Service Life Extension Program), Ammunition Ship (AE), Fast Combat Support Ship (AOE) modified repeat designs, and Range Instrumentation Ship (T-AGM) contract design phases.

- o Commence the Combat Store Ship (AFS) modified-repeat design.

- o Continue landing, service, and combat craft contract design development.

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

e. (U) Milestones: Not applicable.

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64573N
Title: Shipboard Electronic Warfare (EW) Improvements
DoD Mission Area: 371 - Self-Protection
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	13,917	14,974	12,623	43,148	Continuing	Continuing
X0954	Shipboard Electronic Warfare Improvements	13,917	14,974	12,623	39,226	Continuing	Continuing
S1745	Sea Ferret	0	0	0	3,922	Continuing	Continuing

As this is a continuing program, the above funding pofile 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: Shipboard Electronic Warfare systems historically require five to ten years for development, production, and installation with an expected in-service life of ten to twenty years. During these periods, the threat to ships is constantly evolving in ways that can seriously degrade the effectiveness of even the latest electronic warfare systems. During the in-service period, exploratory and advanced development efforts are continually developing ways to counter the evolving threat as identified by intelligence collection efforts. This project, initiated in FY 1980, provides the engineering development resources to transform specific exploratory and advanced development efforts into hardware modifications which will enable existing electronic warfare systems to maintain parity with the changing threat. Program efforts will address recently identified changes in the anti-ship capable missile threat.

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,N:

Project X0954, Shipboard Electronic Warfare Improvements: A net decrease of $2,000 in FY 1982 is due to more accurate cost data. A decrease of 5,061 in FY 1984 is the result of budgetary constraints.

Project S1745, SEA FERRET: The increase of $3,922 represents a FY 1985 new start.

OPN:

Project X0954, Shipboard Electronic Warfare Improvements: The FY 1983 Descriptive Summary contained no OPN funding. This FY 1984 Descriptive Summary contains OPN funding levels associated with this program element and the Surface EW Impovements Plan. These OPN funds represent a portion of those funds in each EW procurement program, i.e., AN/SLQ-32(V) (Anti-Ship Missile Defense Electronic Warfare Suite), AN/SLQ-17A(V)2 (Anti-Ship Missile Defense Electronic Warfare Suite), MK 36 Mods 1 and 2 Decoy Launching System, TORCH, NATO SEA GNAT, and AN/WLR-1H (Electronic Support Measures Receiver) direction finding improvement.

175

Program Element: 64573N Title: Shipboard Electronic Warfare (EW) Improvements

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	(7,543)	15,917	14,974	17,684	Continuing	Continuing
X0954	Shipboard Electronic Warfare Improvements	(7,543)	15,917	14,974	17,684	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

OPN:

Project No.	Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
X0954	Shipboard Electronic Warfare Improvements						
	SLQ-32 Improvements	-	-	17,700	55,600*	Continuing	Continuing
	(Quantity)			(30)	(30)		
	SLQ-17 Improvements	-	-	-	4,300	Continuing	Continuing
	(Quantity)				(4)		
	NATO SEA GNAT	-	-	-	23,211	Continuing	Continuing
	WLR-1H DF Improvement	-	-	-	-	Continuing	Continuing
	(Quantity)	-	-	-	-		

*Includes $37,000 FY 1985 for SLQ-32(V)2 to (V)3 conversions.

F. (U) RELATED ACTIVITIES: PE 64554N, Surface Electronic Warfare, Engineering Development of AN/SLQ-17A(V)2 and AN/WLR-1H( ) (Electronic Support Measures Receiver - Year 2000); PE 64569N, NATO SEA GNAT.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington, D.C.; Naval Research Laboratory, Washington, D.C.; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Raytheon, Inc., Santa Barbara, CA; Hughes Aircraft Corp., Fullerton, CA; Norden Systems, Inc., Norwalk, CT; SWL, Inc., McLean, VA; and others.

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

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

(U) Project X0954, Shipboard Electronic Warfare Improvements:

1. (U) DESCRIPTION (Requirement and Project): Currently the MK-36 Decoy Launching System, the AN/WLR-1H( ), and both the AN/SLQ-17A(V)2 and the AN/SLQ-32(V)3 threat reactive Electonic Countermeasures systems are under procurement. The AN/SLQ-17 and AN/WRL-1H( ) are being deployed on aircraft carriers, and the AN/SLQ-32 on combatant, auxiliary, and amphibious ships while the MK-36 Decoy Launching System will be be deployed on all combatants. Although these systems incorporate major improvements in electronic warfare capablity over currently deployed systems such as the AN/ULQ-6[ ]and AN/WLR-1, there are advanced state-of-the-art radar guidance techniques, readily implementable in current and future enemy tracking systems

Program Element: 64573N Title: Shipboard Electronic Warfare (EW) Improvements

(such as the anti-ship cruise missile), which make mandatory the requirement for new countermeasures capabilities. There is evidence that [ ]is employed in some anti-ship missile systems now in production. [ ] There is a fleet requirement for long-range threat emitter detection and identification. Major emphasis will be on nullifying threat Electronic Counter Countermeasures which significantly degrade the effectiveness of active electronic countermeasures systems, such as the AN/SLQ-17A(V)2 and the AN/SLQ-32(V)3[ ]type radar tracking systems. All new decoys utilize the MK-36 launcher. [ ]

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Project initiated in FY 1980. Continued AN/SLQ-32(V) Band 1 and 3 sensitivity improvements, Band 1 direction finding improvement and Band 3 [ ]improvement, and initiated operational test planning. Continued AN/SLQ-17A(V)2 improvements, that included; increased number of trackers, digital radio frequency memory unit, a second computer, incorporation of SLQ-32 transmitter/receiver assembly, adaptation of SLQ-32[ ]techniques, and incorporation of SLQ-32[ ] Completed the Advanced Electronic Warfare Systems, Advanced Development Model, chamber test and initiated over water shore based test at the Chesapeake Bay. Initiated cooperative discussions with Australia for the joint development of the Active Electronic Decoy and completed concept definition. Completed laboratory tests of the preliminary integration of the AN/SLQ-32(V) with the MK 36 Decoy Launching System. Initiated the shipboard electronic warfare systems integration.

b. (U) FY 1983 Program: Complete at-sea selected test of the AN/SLQ-32 Electrohic Support Measures improvements (Band 1 and 3 sensitivity, Band 1 direction finding and Band 3 elevation angle) and continue AN/SLQ-32 Electronic Countermeasures development. Conduct the Critical Design Review of the AN/SLQ-17 Improvements. Complete advanced development and initiate engineering development of (CROSSEYE) Advanced Electronic Warfare System technique as a modification to the AN/SLQ-17. Test and evaluate the integration of AN/SLQ-32 with chaff and infrared decoys; initiate integration of AN/SLQ-32(V)3; [ ] Initiate engineering development of Active Electronic Decoy and Counter-ARM Decoy, and transition tube developments from PE 63521N, X0679, Advanced Electronic Countermeasures Tubes.

c. (U) FY 1984 PLANNED PROGRAM: Continue development and test of AN/SLQ-32 improvements. Continue development and initiate test planning for AN/SLQ-17A improvements. Transition the AN/WLR-1H( ) Direction Finding improvement effort from PE 64554N and initiate test planning. [ ]with the AN/SLQ-32. Continue test and evaluation of Active Electronic Decoy and Counter-ARM Decoy, and continue tube developments. Continue development of the Advanced Electronic Warfare System modification to the AN/SLQ-17.

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

e. (U) Milestones: Not applicable.

177

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 645/4N
Title: Tactical Embedded Computer Program
DoD Mission Area: 235 - Navy, Warfare Support
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	29,979	31,704	18,954	6,461	Continuing	Continuing
X0911	Automatic Data Processing Security	934*	1,841	981	588	Continuing	Continuing
Z1353	Tactical Embedded Computer	29,979	29,863*	17,973	5,873	Continuing	Continuing

* Funded in Program Element 63526N Project X0911, ADP Security.

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 MISSION NEED: This program provides advanced state-of-the-art embedded computers for use in tactical communications, command and control, intelligence, and weapons systems. It is a consolidated Navy program in direct support of DoD Directive 5000.29 and in consonance with CNO-approved NAVMAT Master Plan for Embedded Computer Resources, and Assistant Secretary of the Navy (Research, Engineering and Systems) direction. These embedded computers will meet the requirements of a broad spectrum of tactical systems, platforms, and mission areas. Specific tasks include development of Navy standard AN/UYK-43 and AN/UYK-44 embedded computer. Also, provides the capability to reduce the vulnerability of Navy Automatic Data Processing systems including Command and Control, Communications, Intelligence and weapon systems to unauthorized disclosure or modification of data or denial of system services. Specifically, develops and validates techniques and hardware/software prototypes which will increase the effectiveness of Automatic Data Processing security and provide secure multi-level data processing.

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 in FY 1982 of 8,000 and 10,000 in FY 1983 because of reprogramming for AN/UYK-43 computer cost growth; increase of 5,631 in FY 1984 to continue operational test and evaluation of the AN/UYK-4 and AN/UYK-44 to receive approval for limited production for the AN/UYK-43 and authorize full production for the AN/UYK-44.

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	17,313	21,979	21,704	13,323	Continuing	Continuing
Z1353	Tactical Embedded Computer	17,313	21,979	19,863	12,273	Continuing	Continuing
X0911	Automatic Data Processing Security	1,852*	934*	1,841	1,050	Continuing	Continuing

* Funded in Program Element 63526N, Project X0911, Automatic Data Processing Security.

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

Program Element: 64574N Title: Tactical Embedded Computer Program

F. (U) RELATED ACTIVITIES: Command and Control Technology, Program Element 62721N; Advanced Computer Technology, Program Element 63526N; Avionics Development (AN/ATR-14), Program Element 64203N; Advanced Signal Processor, Program Element 64266N; Enhanced Modular Signal Process, Program Element 64507N; Defense Sciences, Program Element 62708E; Consolidated Computer Security Program, Program Element 35167G.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI; Naval Surface Weapons Center, Dahlgren, VA; Naval Research Laboratory, Washington, DC; Naval Weapons Support Center, Crane, IN; Naval Avionics Center, Indianapolis, IN; Fleet Combat Direction System Support Activities, Dam Neck, VA, and San Diego, CA.

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

(U) Project XD911, Automatic Data Processing Security: Performance of the Navy's mission has become increasingly dependent upon automated systems. This project supports the development of technology to protect Navy Automatic Data Processing systems from unauthorized disclosure, destruction, and/or modification of data, and denial of system services. Specific tasks include development of techniques for computer software security verification, a secure computer operating system, a semi-automatic data sanitization program, and a secure data base management system. These developments will allow users and data of differing classification levels to share computer resources and data base without sacrificing security.

(U) In FY 1982, continued the development of semi-automatic data sanitization systems and multi-level hermetized secure operating system. Continued the evaluation of security requirements for two types of Database Management Systems - an Ocean Surveillance and a Message System. Completed the development of the Secure Communications Processor and a trusted Message Flow Modulator.

(U) The FY 1983 program consists of:

- Enhancing the data sanitization systems and a multi-level hermetized secure operating system.
- Developing prototypes of the Trusted Database Management Systems.
- Beginning the development of Risk Modeling techniques and a trusted Ada run-time development.

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

- Enhance the data sanitization systems and a multi-level hermetized secure operating system.
- Test and refine the Trusted Database Management System prototypes.
- Continue the development of Risk Modeling techniques and a trusted Ada run-time environment.
- Begin the development of a real-time Trusted Computing Base for Navy Embedded Computers.

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

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

(U) Project Z1353, TACTICAL EMBEDDED COMPUTER

1. (U) DESCRIPTION (Requirement and Project): The Navy's current shipboard tactical computer inventory consists primarily of the AN/UYK-7 and AN/UYK-20 computers, whose hardware technology is rapidly becoming obsolete and which have limitations

associated with memory addressability, performance, and maintainability. However, the Navy has a significant investment in tactical applications and support software that is not obsolete and should be enhanced and utilized as new computers are employed in tactical systems during development or major upgrade. The AN/AYK-14 computer, which is software compatible with the AN/UYK-20, has now entered production as the Navy standard for airborne applications. This project develops two new shipboard computers to replace the present ones. The AN/UYK-43 Navy Embedded Computer System family of standard computers will replace the AN/UYK-7 and be used in new systems with high and medium performance requirements; it will be software compatible with the AN/UYK-7 computer to allow use of the extensive base of existing support software and to maximize transfer of operational software. The AN/UYK-44 Militarized Reconfigurable Processor and Computer family will be software compatible with the AN/UYK-20 and AN/AYK-14 computers to allow use of the extensive base of existing support hardware and to maximize transfer of operational software. It will provide standard, state-of-the-art processors and computers that can be employed in a wide range of tactical applications with low and medium performance requirements. Both new computers will take advantage of the latest advancements in the field of microelectronics, computer architecture, and software engineering to provide high reliability and significantly reduced maintenance requirements in addition to increased performance and reduced size, power, and cost.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued AN/UYK-43 Engineering Development. Contractors completed construction and began testing initial Engineering Development Models. AN/UYK-44 Advanced Production Equipment delivery; continued benchmark testing and testing for environmental and Standard Electronic Module qualifications.

b. (U) FY 1983 Program: AN/UYK-43 Engineering Development Model delivery; continue testing; select production contractor; initiate Technical and Operational Evaluation. Complete AN/UYK-44 testing and Standard Electronic Module qualifications; commence initial production; initiate Technical and Operational Evaluation of microcomputer.

c. (U) FY 1984 Planned Program: Complete Technical Evaluation and land-based testing of AN/UYK-43; request limited production. Complete Technical and Operational Evaluation of AN/UYK-44 microcomputer; authorize full-scale production.

d. (U) Program to completion: Complete Operational Evaluation of AN/UYK-43; obtain Approval for Production. Obtain Approval for Production of AN/UYK-44 microcomputer. Continue to develop and implement improvements to equipment and associated software to meet operational requirements.

e. (U) Milestones: Not Applicable.

992 180

152

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64575N
DoD Mission Area: 233 - Anti-Submarine Warfare

Title: AN/SQS-53C
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	*18,499	57,575	49,115	61,308	67,372	253,869
S1451	AN/SQS-53C	*18,499	57,575	49,115	61,308	67,372	253,869
	Quantity				(T&E)		(2)

* Funded under Progam Element 63589N, Major Surface Combatant (DDGX)

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: The AN/SQS-53 is the Navy's major active sonar sensor on Battle Group Combatants. This program element is Phase II of the AN/SQS-53 Sonar Improvement Program. This phase of the modernization program utilizes the display and control subsystem and the passive detection capability from the AN/SQS-53B and redesigns the receiver subsystem, the array subsystem and the transmitter subsystem which will increase sonar performance, while reducing space and weight. The improvements are necessary to meet the emerging Soviet submarine threat. This modernization also negates the degradation inherent in the current AN/SQS-53 analog equipment and replaces hardware that is rapidly approaching obsolescence.

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: in FY 1982 Congress authorized and appropriated 14,500 in Program Element 63589N Major Surface Combatant (vice the 40,000 requested) to which an additional 3,999 was later added by reprogramming for a total of 18,499; in FY 1983 21,595 has been added through reprogramming from lower priority acquisition programs to provide the program element's FY 1983 requirement; in FY 1984 the 26,728 increase represents additional program cost growth resulting from program restructuring after the FY 1982 Congressional reduction; and a Total Estimated Cost for the program element has been established.

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	35,980	22,387	TBD	TBD
S1451	Lightweight Sonar	*6,500	*14,500	35,980	22,387	TBD	TBD

* Funded in Program Element 63589N Major Surface Combatant

Program Element: 64575N Title: AN/SQS-53C

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	0	0	0	0	1,787,427	1,787,427
Quantity	(0)	(0)	(0)	(0)	(72)	(72)
SCN	0	0	0	45,133	3,459,491	3,504,624
Quantity	(0)	(0)	(0)	(1)	(75)	(76)

F. (U) RELATED ACTIVITIES: Program Element 25623N, Project S0217, Surface Ship Sonar Modernization Program - Development of Phase I improvements (AN/SQS-53B); Program Element 64518N, Project S0251, CIC Conversion/Data display System - Development of standard surface ship data display consoles; Program Element 64212N, Project W0274, Light Airborne Multi-Purpose System MK III - Development of 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; and Program Element 25620N, Project S0896, Anti-Submarine Warfare Combat System Integration - Development of fully integrated anti-submarine warfare control system for coordinated employment of anti-submarine warfare sensor, fire control, and acoustic warfare systems.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; Naval Underwater Systems Center, New London Laboratory, New London, CT (lead laboratory); Naval Ocean Systems Center, San Diego, CA; Naval Sea Systems Detachment, Norfolk, VA (In-Service Engineering Agent); Naval Air Development Center, Warminister, PA; Naval Surface Weapons Center, Crane, IN; Naval Personnel Research and Development Center, San Diego, CA; Naval Ordnance Center, Keyport, WA. CONTRACTORS: General Electric Company, Syracuse, NY; Hughes Aircraft Company, Fullerton, CA; Sperry-Univac, St. Paul MN; Quest Research Corp., McLean, VA; IBM, Owego, NY; and Control Data Corporation, Minneapolis, MN.

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

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

(U) Project S1451 AN/SQS-53C

1. (U) DESCRIPTION (Requirement and Project): The AN/SQS-53 series sonar is being improved in several phases because it will be the principal anti-submarine warfare sensor for more than 133 of the Navy's most modern surface 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. The current AN/SQS-53A sonar is, however, an AN/SQS-26(CX) sonar with a modified digital fire control interface, and it incorporates outmoded electronic technology dating from the early 1960's. By current standards, the existing AN/SQS-53 sonar system[ ]and is difficult to maintain because of the requirement for numerous, time-consuming, and complex adjustments. The sonar exceeds size and weight 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. Phase I of the AN/SQS-53 improvement Program is the subject of Program Element 25623N, Project S0217, AN/SQS-53B.

(U) Phase II of the AN/SQS-53C improvement program develops major improvements to the AN/SQS-53B sonar and results in a significant increase in all Carrier Battle Group escort active sonar Figures of Merit. The AN/SQS-53C project is required to counter two specific threats:[

Program Element: 64575N Title: AN/SQS-53C

The objectives of the AN/SQS-53C project are to obtain a sonar with these performance capabilities in addition to greater reliability incorporated in a design which facilitates further improvements during its service life; this sonar must be tested and ready for installation in the lead DDG-51. It will be backfit in DD 963, DDG 993 and CG 47 class ships and forward fit into the DDG-51 class.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Planned Program: Completed Prime Item Development Specifications. Completed design definition phase and awarded Full-Scale Development contract in accordance with schedule leading to installation of the first production system in the DDG-51. Conducted competition for transmitter sub-system. Completed plans for participation of major sub-contractors: Hughes Aircraft and Sperry-Univac. Completed procurement of long lead time Government Furnished Equipment critical items.

b. (U) FY 1983 Planned Program: Procure remaining Government Furnished Equipment in October-December 1982 time frame. The following efforts will be completed in January-September time frame: Award major sub-contracts; complete system design; complete computer program specifications. Procure Government Furnished Equipment and material for engineering development models to accomplish Test Assessment Milestone 1 in FY 1984 leading to procurement of the first production model for DDG-51.

c. (U) FY 1984 Planned Program: Complete transducer array and software build test. Complete design and assembly of the system integration and test site. Complete assembly and test of embedded AN/UYK-44 computer cabinet. Complete hardware integration for Engineering Development Model #1. Complete Test Assessment Milestone 1.

d. (U) Program to Completion: Land-Based Testing, Initial Operational Test and Evaluation, and Technical and Operational Evaluations are scheduled for completion in FY 1986 with a production decision expected [redacted]

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64576N
DoD Mission Area: 234 - Mine Warfare
Title: Influence 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	0	1,821	0	4,170	Continuing	Continuing
S0262	Influence Mine Countermeasures	0*	0*	0	4,170	Continuing	Continuing
S1670	Hydrofoil Pressure/Acoustic/Magnetic Sweep System	0*	1,025	0	0	0	1,025
S1677	Explosion Resistant Multi-Influence Sweep System	0*	796	0	0	0	796

* FY 1982 work conducted under Program Element 63502N, Project S0262, Influence Mine Countermeasures (formerly Pressure/Acoustic/Magnetic Minesweeping). FY 1983 work under PE 64576N, Projects S1670, Modular Influence Minesweeping System and S1677, Explosion Resistant Multi-Influence Sweep System.

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 PROGRAM ELEMENT: The United States Navy[ ] The Influence Mine Countermeasures program will develop counters[ ] and in the process, will develop[ ] which will be used to provide[ ] for not only the Patrol Hydrofoil class, but also for the MSH class, the craft of opportunity and the air cushion amphibious landing craft. The modules will make use of airborne mine countermeasure components and technology where applicable and effective. When installed in Patrol Hydrofoils, the[ ] The Hydrofoil/Pressure/Acoustic/Magnetic Sweep System and the Magnetic/Acoustic modules will be available in the mid to late 1980's. The Explosion Resistant Multi-Influence Sweep System is a cooperative development effort under the aegis of NATO Naval Armaments Group, Project Group 14, with design, engineering testing and costs divided equally among five participating nations. This system is a special design, soft-hulled ship capable of withstanding mine explosions which has on-board equipment for generating the acoustic/magnetic influences necessary to detonate influence sea mines. The Explosion Resistant Multi-Influence Sweep System could be fully operational[ ]

C. (U) EXPLANATION OF CANCELLATION OR DEFFERAL: Program development work has been delayed by Navy for one year until FY 1985 due to a reduction in funds. Project S0262 will be funded in FY 1985 and subsequent years until completion and the emphasis will be reoriented[ ] for use with hydrofoil ships and for the MSH, Landing Craft Air Cushion and Craft of Opportunity programs. Further funding of the NATO Explosion Resistant Multi-Influence Sweep System project will depend on an analysis of the results of the explosive test on a full-scale test section of the ship to be conducted in FY 1983.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64578N
Title: Link Birch
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	0	0	5,269	4,003	Continuing	Continuing
R1785	Link Birch	0	0	5,269	4,003	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: 64601N
DoD Mission Area: 234 - Mine Warfare

Title: Mine Development (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	7,496	12,697	15,480	18,092	Continuing	Continuing
S0267	Mine Improvements	(3,041)@	(3,966)@	5,251	7,783	Continuing	Continuing
S0272	QUICKSTRIKE	7,496	9,712	7,298	7,331	Continuing	Continuing
	Quantity (DT&E/OT&E)						(272)
S1667	Submarine Launched Mobile Mine	*	2,985	2,931	2,978	Continuing	Continuing
	Quantity (DT&E/OT&E)						(83)

@ Mine Improvements funded in PE 63601N in FY 1983 and prior years.

* Submarine Launched Mobile Mine development funded under S0272 in FY 1982 and prior years.

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 components and supports systems for the development of bottom mines to counter surface ships and submarines, and the development of other mine warfare related items required to complement the Navy's sea control mission. Projects are included for: systems to counter mine countermeasures efforts; improved mine components such as data-acquisition ranges for mine performance and target characteristics information; development of computer-assisted planning models. The QUICKSTRIKE program consists of the development of four target detecting devices: Target Detecting Devices MK 57/70 and Target Detecting Devices MK 58/71 and a new safe and arming device MK 75. These devices will be used in MK 80 series general purpose bombs and in the newly developed MK 65 Mine which comprise QUICKSTRIKE series mines. The Submarine Launched Mobile Mine, MK 67 uses Torpedo MK 37 components to provide propulsion and guidance for the mine. A new explosive section is added and contains either the Target Detecting Device MK 58 or the in-service Firing Mechanism MK 42.

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 530 in FY 1982 was required for the development of Target Detecting Devices (TDD) MK 70/71 for Project S0272; minor adjustments in FY 1983 are due to a revision of cost estimates including escalation; an increase of 5,016 in FY 1984 is due to transition of Project S0267 into this Program Element (5,251) and revision in cost estimates including inflation (reductions of 168 in Project S0272 and 67 in Project S1667).

Program Element: 64601N Title: Mine Development (Engineering)

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	7,415	6,916	12,712	10,464	Continuing	Continuing
S0272	QUICKSTRIKE	7,415	6,916	9,727	7,466	Continuing	Continuing
S1677	Submarine Launched Mobile Mine	*	*	2,985	2,998	Continuing	Continuing
	QUICKSTRIKE Quantity (Development Test and Evaluation/Operational Test and Evaluation)						(272)
	Submarine Launched Mobile Mine Quantity (Development Test and Evaluation/Operational Test and Evaluation)						(83)

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 335525	20,588	32,236	39,720	49,072	187,617	347,321*
Quantity (QUICKSTRIKE MK 65)	(307)	(579)	(600)	(559)	(2,404)	(4,500)**
(Target Detecting Device MK 57)	(1,536)	(1,595)	(1,758)	(899)	(0)	(8,000)
(Target Detecting Device MK 58)	0	0	(75)	(208)	(2,217)	(2,500)
(Target Detecting Device MK 70 and 71)	0	0	0	(288)	(39,516)	(39,804)
Versatile Exercise Mine System	0	0	0	1,801	TBD	TBD
(Quantities of ship sets, 10 mines per ship set)	0	0	0	(1)	(19)	(20)
Universal Laying Mines	0	0	1,842	2,984	Continuing	Continuing
WPN 303211	11,099	22,300	21,300	22,800	76,900	154,848
Quantity (Submarine Launched Mobile Mine)	(101)	(266)	(242)	(280)	(840)	(1,729)**

*Through FY 1988
**Inventory Objective

F. (U) RELATED ACTIVITIES: Program Element 63601N, Mine Development (Advanced Development).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, White Oak, Silver Spring, MD (lead laboratory); Naval Mine Engineering Facility, Yorktown, VA; Naval Undersea Warfare Engineering Station, Keyport, WA; Naval Underwater Systems Center, Newport, RI; Naval Weapons Handling Laboratory, Earle, NJ. CONTRACTORS: Aerojet General Manufacturing, Fullerton, CA; P.R. Mallory, Tarrytown, NY; Catalyst Research Corporation, Baltimore, MD; Burroughs Corporation, Paoli, PA; Westinghouse Corporation, Baltimore, MD; Dewey Electronics Corporation, Oakland, NJ.

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

(U) Project S0267, Mine Improvements: This continuing project provides for the structured planning and implementation of numerous tasks too small for separate budget retention yet necessary for effecting, in a quick-response manner, improvement to and support of the development of Naval mines, and mine warfare planning models and exercises. Specific task areas include: (1) mine components such as [illegible] (2) data-acquisition ranges for mine operation, sensor development, environmental conditions, and (3) mine warfare planning model development, for use by fleet planners, with applications to both and (4)

Program Element: 64601N Title: Mine Development (Engineering)

(U) In FY 1982: [redacted] the test and evaluation of [redacted] cells with applications to mine power supplies continued; [redacted] improvements to several mine and target characteristics data-acquisition ranges were made; continued improvements to computer-assisted minefield and mine countermeasures planning models were accomplished; the fabrication, test, and evaluation of the 1,000-pound Universal Laying Mine was 90% completed; and hardware development program plans were begun for [redacted]

(U) In FY 1983 it is planned to:

- Begin development of an adapter to permit flight gear MK 12 (developed for 1,000-pound mines) to be used with 2,000-pound Destructor MK 41 and Mine MK 64.
- Begin development of a new safety and arming device MK 75 to permit [redacted] of Destructors and Mines MK 62, 63 and 64.
- Continue the test and evaluation of commercial [redacted] to determine safety and performance envelopes.
- Establish new [redacted] data ranges.
- Continue ongoing data acquisition range improvements.
- Continue to improve computer-assisted mine warfare planning models by incorporation of up-to-date data and theory.
- Complete development of the 1,000-pound Universal Laying Mine and continue development of the 2,000-pound Universal Laying Mine.
- Begin planning for the improvement of the [redacted] and data recorder known as Versatile Exercise Mine System.
- Continue to support international mine warfare cooperative programs.

(U) In FY 1984 it is planned to:

- Begin development of new parachute-type flight gear for 500-pound destructor MK 36 and QUICKSTRIKE Mine MK 62, evaluation of [redacted] sources.
- Begin development of [redacted] at Ft. Lauderdale.
- Continue test and evaluation of [redacted] data range improvements, support of international programs, mine warfare planning model improvements, and development of the safety and arming device MK 75.
- Complete development of the 2,000-pound Universal Laying Mine and evaluation of the Versatile Exercise Mine System.

(U) For FY 1985 and the outyears, this continuing program will complete ongoing development tasks and establish new tasks as needed for quick response improvements to mines, mine warfare planning, data acquisition, and mine simulators; and will continue to evaluate new mine power sources, improve data ranges, and support international mine warfare programs.

Program Element: 64601N Title: Mine Development (Engineering)

(U) Project S0272, QUICKSTRIKE: This project provides for development of shallow water bottom mines to counter surface ships and submarines in support of the Navy's sea control mission. The present stockpile of bottom mines provides some capability against surface ships in water depths to [ ] and against submarines at shorter ranges. However, existing MK 52 and 55 (bottom) Mines have/ Most have inadequate] Maintenance of these mines is becoming progressively more difficult and expensive because of their obsolete technology and reliance on batteries that require refrigerated storage. Additionally, some of the DESTRUCTOR mine designs were compromised during the mining campaign in Vietnam. Quantities of mines now in the stockpile are insufficient to satisfy requirements of existing mining plans and no further procurement of these older mines is planned. QUICKSTRIKE Mines are a family of modern bottom mines that will be simple and inexpensive to maintain, capable of rapid preparation for use and once laid will provide the target response, countermeasures resistance and in-water life required to fulfill existing operational needs. This program involves the development in four Target Detecting Devices for use in the QUICKSTRIKE mines: Target Detecting Devices MK 57/70 will react to [ ] target signatures and Target Detecting Devices MK 58/71 will react to [ ] target signatures. These mechanisms coupled with associated safing and arming devices and flight gear will adapt 500-pound, 1,000-pound, and 2,000-pound MK 80 series bombs to mines and will be the firing mechanism of a new development 2,000-pound MK 65 Mine. These mines will be capable of delivery from a wide variety of aircraft [ ] The Target Detecting Device MK 58 and the in-service DESTRUCTOR Firing Mechanism MK 42 will also be used to convert part of the Navy MK 37 Torpedo stockpile to a stand-off MK 67 Submarine Launched Mobile Mine. The Submarine-Launched Mobile Mine will provide the Navy a clandestine mine delivery capability for high threat areas which does not exist today.

(U) The FY 1982 program completed technical evaluation of the MK 64 Mod 0 Mine. Completed technical evaluation of the Target Detecting Device MK 58 in the Mine MK 65 Mod 1. Continued development of high speed/low altitude safing and arming device. Completed reliability and accuracy tests of MK 67 Mod 0 Submarine-Launched Mobile Mine with Firing Mechanism MK 42; obtained approval for service use. Completed development of MK 67 Submarine-Launched Mobile Mine exercise and training versions.

(U) The FY 1983 program will:

- o Transfer development of Target Detecting Devices MK 70/71 from Program Element 63601N, Mine Development (Advanced).
- o Complete technical/operational evaluation of the QUICKSTRIKE Mine MK 63 Mod 0 including high-speed retardation systems, MK 65 Mod 2 Mine (with Target Detecting Device MK 70) and MK 65 Mod 1 Mine (with Target Detecting Device MK 58); obtain approval for production.
- o Continue development of Mines MK 62, 63 and 64 with Target Detecting Device MK 70, a new safing and arming device and a high-speed, low-altitude system for the MK 65 Mine.
- o Complete technical evaluation of the MK 67 Mod 1 Mine with Target Detecting Device MK 58.
- o Conduct engineering tests of dual warhead configuration for MK 67 and start evaluation of improved navigation system components.

(U) FY 1984 program will:

- o Complete technical evaluation of MK 65 Mine with high-speed, low-altitude retardation system.
- o Complete operational evaluation of MK 65 Mod 2 Mine with Target Detecting Device MK 70.
- o Conduct technical evaluation of Target Detecting Devices MK 70/71 and new safing and arming device in the QUICKSTRIKE Mines MK 62 63, 64 and 65.

Program Element: 64601N Title: Mine Development (Engineering)

- o Obtain Approval for Production with Target Detecting Device MK 58; complete technical evaluation of dual warhead and conduct operational evaluation of MK 67 Submarine Launched Mobile Mine.

The program for the outyears will complete operational evaluation of Target Detecting Devices MK 70/71 and new safing and arming device in QUICKSTRIKE MK 62, 63, 64 and 65 Mines. Complete development of test sets for QUICKSTRIKE Mines and complete procurement and training documentation for all systems. MK 67 Submarine Launched Mobile Mine: Develop and test improvements to update Submarine-Launched Mobile Mine component reliability and navigational accuracy; obtain Approval for Production of dual warhead configuration.

(U) Project S1667, Submarine Launched Mobile Mine: This project provides for the development of a standoff, covert mine which does not exist in the present mine inventory.

(U) In FY 1982, development of the Mine MK 67 Mod 2 (with Firing Mechanism MK 42) was completed. Follow-On Test and Evaluation was completed and Commander, Operational Test and Evaluation Force, recommended Approval for Production.

(U) The FY 1983 program consists of:

- o Development and test of guidance and control components to enhance performance and reliability of Torpedo MK 37 components used in the Mine MK 67.
- o Development and test of the Mine MK 67 Mod 1 using the Target Detecting Device MK 58.

For FY 1984, it is planned to:

- o Complete the development and test of the Mine MK 67 Mod 1.
- o Initiate development of a dual explosive section configuration for the Mine MK 67.

(U) Program to completion will include:

- o Completing development of the dual explosive section configuration.
- o Integration of QUICKSTRIKE Mine Target Detecting Devices MK 70 and MK 71 into Mine MK 67.
- o Development of a longer range mobile mine with improved guidance and control components.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64602N
Title: Naval Gunnery Improvement
DoD Mission Area: 232 - Amphibious, Strike, Anti-Surface 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	2,642	739	6,034	24,701	Continuing	Continuing
S0178	MK 86 Gun Fire Control System	(7,968*)	(8,022*)	0	0	-	-
S0328	MK 68 Improvement	(2,121*)	(1,497*)	0	0	-	-
S0178	Gun Fire Control System Improvements	--	--	4,761	15,196	Continuing	Continuing
S1046	5" Guided Projectile System Integration	2,642	739	0	0	-	-
S1706	Ballistic Gun Ammo Improvements	--	--	1,273	3,623	Continuing	Continuing
S1775	Naval Gunnery Improvements	--	--	--	5,882	Continuing	Continuing

* Projects S0178 and S0328 are funded under PE 64652N through FY 1983. In FY 1984 PE 64652N is completely discontinued; however, funding for the MK 86 and 68 GFCS will continue herein under retitled project S0178. Both projects shown above as non-add entry for clarity.

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: Gun Fire Control System Improvement - MK 86 and MK 68 Gun Fire Control Systems provide high performance, digitally-controlled gun weapon systems which will enable 5"/54 Gun Systems on Destroyers, Guided Missile Destroyers, Nuclear-Powered Guided Missile Cruisers and Amphibious Assault Ships to more effectively engage present and future threats. [

]

(U) Ballistic Ammo Improvement - This project encompasses the engineering development, and Approval for Production of 76mm and 5-inch Low Vulnerability propulsion charges. These charges will increase magazine survivability by minimizing propellant driven fires and explosions caused by spall, fragments, shaped charge jets, etc.

(U) Naval Gunnery Improvement - This project encompasses the engineering development, and Approval for Production of 16-inch and 5-inch Submunition Projectiles and also includes 5"/54 gun system component development to improve reliability, maintainability and availability. The Submunition Projectiles will be more lethal and effective than their in-service counterparts. The 5-inch projectile will have 30 thousand yard range. The 5 inch gun system component improvements will provide increased on-line operational performance, accuracy and survivability.

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: Decreases of 199 in FY 1982 and 16 in FY 1983 are due to inflation and minor program adjustments. A net increase of 4,852 in FY 1984 is due to cancellation of SEAFIRE integration requirements (S1046) plus a new start for Ballistic Gun Ammo Improvements (S1706), and establishment of retitled Project S0178 under this Program Element.

Program Element: 64602N Title: Naval Gunnery Improvement

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	11,545	2,841	755	1,182	Continuing	Continuing
S1005	5" Ammunition Improvement	2,282	0	0	0	Continuing	Continuing
S1046	5" Guided Projectile System Integration	9,263	2,841	755	1,182	15,818	44,631

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 (MK 86)	28,558	34,170	34,170	34,170	TBD	TBD
Quantity	3	3	3	3	TBD	TBD
OPN	35,410	9,608	11,623	41,213	TBD	TBD

F. (U) RELATED ACTIVITIES: PE 62331N, Missile Solid Propulsion Technology: PE 62332N Gun Propulsion Technology: PE 62603A, Propulsion Technology: PE 62181A, Ballistic Technology.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA (Lead Laboratory for S0178 and S1775); Naval Surface Weapon Systems Engineering Station, Port Hueneme, CA; Naval Ordnance Station Indian Head, MD (Lead Laboratory for S1706); OTHERS: Radford Army Ammunition Platoon, Radford, VA. U.S. Army Armament Research and Development Command, Dover, NJ. CONTRACTORS: Lockhead Electronics Co. Inc., Plainfield, NJ, is the prime contractor for S0178.

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

(U) Project S0178, Gun Fire Control Systems Improvements: This program consists of an improved lightweight, high performance, digitally-controlled MK 86 and MK 68 gun weapon system development for new/upgraded ships of Destroyer and larger size. The MK 86 Gunfire Control System uses track-while-scan radar for surface targets and monopulse doppler radar for air targets.

(U) FY 1982 Accomplishment: Continued development of AN/SPG-60 radar acquisition improvements[ ]

(U) The FY 1983 program consists of:

- o Complete AN/SPG-60 radar acquisition ordnance alteration[ ]
- o Install new ordnance alterations and begin integration testing at the Land Base Test Facility at Wallops Island, for guided missile and survivability improvements.
- o Continue integration of ordnance alteration.
- o Initiate threat upgrade and modernization program, including expansion of capabilities for controlling STANDARD Missile 2.

Program Element: 64602N Title: Naval Gunnery Improvement

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

[ ]

- o Threat upgrade and modernization program, including expansion of capabilities for controlling SM-2 missiles.
- o Development of reliability, maintainability and availability, and safety ORDALTS for MK 68 Gunfire Control Systems.

(U) Program to completion will consist of:

- o Complete development of modifications to correct system deficiencies and improve capability, [ ] integration ordnance development and threat upgrade and modernization program improvements.

(U) Project S1706, Ballistic Gun Ammo Improvements: (NEW START) Utilizing current and ongoing Army/Navy technology, develop 76mm and 5"/54 propulsion charges that will increase magazine survivability by minimizing propellant driven fires and explosions caused by spall, fragments, shaped charge jets, etc.; decreased barrel wear by two to four times will be realized over existing 76mm and 5"/54 charges. 5"/54 muzzle flash and blast will be eliminated and reduced. Smooth burning stick propellant technology, for the 5"/54 charge, will increase fuze reliability and decrease ignition system cost. Hi-Frag super charge range will be achieved with the STANDARD 5"/54 propulsion charge.

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

- o Begin engineering development.
- o Establish firm 76mm propulsion charge design.
- o Proceed with establishing 5"/54 propulsion charge design.

(U) Program to completion will consist of:

- o Complete characterization of both propulsion charge designs.
- o Procure hardware for and execute technical evaluation and operational demonstration of completed designs.
- o Acquire Approval for Production.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64603N Title: Unguided Conventional Air Launched Weapons

DoD Mission Area: 223 - Close Air Support and 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	25,931	6,959	16,698	12,203	Continuing	Continuing
W0539	GATOR/GATOR Fuze	1,000	1,700	2,362	1,711	706	21,311
	Quantity	(Development, Test and Evaluation)					(TBD)
W0636	Fuel Air Explosive Weapon II	994	0	0	0	0	46,964
W1051	Bomb Improvements	4,872	3,886	7,637	5,565	Continuing	Continuing
W1278	Air Delivered Depth Bomb	0	0	190	1,913	15,754	17,857
	Quantity						(TBD)
W1341	25mm Gun and Depleted Uranium Round	19,065	1,373	5,183	1,934	1,935	40,099
	Quantity	(Development, Test and Evaluation/Operational Test and Evaluation) (4)					
W1733	Improved 20mm Ammunition	0	0	1,326	1,080	0	2,406
	Quantity						(TBD)

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 program element constitutes the principal Navy effort devoted to maintaining the combat effectiveness of unguided conventional air delivered general purpose munitions usable against a wide spectrum of targets in support of multiple tactical missions. The program element consists of selected full-scale engineering development projects transitioned from advance development programs. Several are joint Service projects with the Navy serving as the Executive Service for development or as a participant in other lead Service programs. The scope of the work accomplished varies with the project, but in general encompasses all acquisition tasks including prototype design and fabrication, contractor and Service laboratory testing, design of production representative end items, developing agency test and evaluation, Service operational test and evaluation, and initial production planning. The projects included in this program element respond to operational requirements which reflect the need to introduce major improvement for existing munitions or develop new armaments when it is found to be technically or fiscally impractical to modify existing munitions to satisfy the Service's combat needs. The program element currently consists of five active engineering development projects, all of which require FY 1984 resources.

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 changes: (1) Reprogramming 1,000 of FY 1982 funds and additions of 1,700 in FY 1983 and 2,362 in FY 1984 to repackage and adapt the Air Force FMU-110/B proximity fuze for use in Navy cluster munitions including GATOR, ROCKEYE, APAM and BIGEYE. (2) In project W1051, Bomb Improvements, an increase of 7,637 in FY 1984 is required to move improvements in MK-83 bomb loading and explosive system into full scale engineering development and to continue MK-83 tail fin and target detector developments. (3) An increase of 4,408 is required in FY 1984 in the 25mm gun program to complete full-scale development, to provide additional depot support equipment, processing data and optimization of ball propellent to reduce firing action time. (4) 1,326 is required in FY 1984 to initiate full-scale development of the 20mm ammunition improvement, project W1733. The GATOR project total increased from 14,232 to 21,311. This increase of 7,079 reflects the cost to repackage/modify, test, qualify and certify the dispenser munition proximity fuze. There was a decrease of 1,134 due to Fuel Air Explosive II termination. Other program element changes include; 2,406 increase for the 20mm ammo improvement, 2,572 to provide additional support equipment for the 25mm program, 15,963 for the full-scale development of the three distinct elements currently reflected in the Bomb Improvements Project (plus 4,000 reprogramming into the project for SKIPPER II development in FY 1982); and a 14,217 increase in Project W1278, Air Delivered Depth Bomb,

comprised of +15,713 for full scale development and -1,496 for Congressional action. This significant increase in the Air Delivered Depth Bomb is due to a complete restructuring and change in 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	15,116	22,249	7,978	1,946	4,909	113,790
W0530	GATOR	1,999	400	-	-	-	14,232
	Quantity (Operational Test and Evaluation)				(32)		
W0636	Fuel Air Explosive Weapon II	2,458	929	1,999			48,098
	Quantity (Operational Test and Evaluation)				(60)		
W1051	Bomb Improvements	50	90	3,906	-	-	5,997
W1278	Air Delivered Depth Bomb	-	-	1,496	1,171	973	3,640
W1341	25mm Gun and Depleted Uranium Round	10,609	20,830	1,377	775	3,936	37,527
	Quantity (Operational Test and Evaluation)				(4)		

*Total estimated cost included FY 1980 and prior year costs $4,296 for Project W0635, Air Inflatable Retarder.

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						
GATOR	-	-	-	24,924	175,733	200,657
(Quantity)	-	-	-	(405)	(5,719)	(6,124)
MK-83 (1000 lb Bomb)	-	17,439	15,794	15,875	23,375	72,483
(Quantity)	-	(10,000)	(8,450)	(8,200)	(7,700)	(34,350)
25mm Ammunition	-	4,122	15,158	41,889	Continuing	Continuing
(Quantity)	-	(116,000)	(280,000)	(1,487,000)		

F. (U) RELATED ACTIVITIES: GATOR - Program Element 64602F, Project 2573, Air Force Lead Activity/Army and Navy participating. Common Bomb Fuze - Program Element 64609N, Navy Lead Activity/Air Force participating. The Program Element was established in FY 1981 with below threshold reprogramming from the Bomb Improvements Project of PE 64603N. The Air Force is participating under Program Element 64602F.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Honeywell Inc., Hopkins, MN; Aeroject Inc., Downey, CA; Motorola, Scottsdale, AZ; Goodyear Aerospace, Akron, OH; General Electric, Burlington, VT; McDonnell Douglas, Saint Louis, MO. OTHERS: Headquarters Air Armament Division, Eglin Air Force Base, FL.

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

(U) Project W0530, GATOR/GATOR FUZE: This is a Joint Service Program with the Air Force as lead service and the Army developing the land mines with Navy/Marine Corps participation. The mine system consists of a mixture of anti-personnel and anti-vehicle/tank mines designed for launch from high speed aircraft. Both the anti-tank and the anti-personnel mines are identical in geometry enabling the use of standardized parts. Target detection and classification is accomplishded by tripline

sensors for personnel and magnetic sensors for the anti-tank mine. Operational Test and Evaluation revealed the need for increased delivery flexibility not achievable with the existing GATOR dispenser mechanical time fuze. The inability to vary preselected fuze settings seriously restricts delivery flexibility of GATOR and other dispenser type weapons in the event weather, defenses or other constraints preclude the execution of preplanned delivery maneuvers. This operational deficiency can be resolved by repackaging and modifying the Air Force FMU-110/B proximity fuze for use with Navy cluster munitions. The repackaged FMU-110 (designated FMU-140/B) represents the least cost and lowest risk approach to achieve the required capability.

(U) In FY 1982, the operational test of the weapon system using the MK-339 mechanical dispenser fuze was completed and a Provisional Approval for Service Use was received allowing initial production with FY 1984 OPN funds.

(U) The FY 1983 program consists of:

- o Completion of GATOR production planning.
- o Initiating full-scale development of the proximity fuze for GATOR, ROCKEYE, APAM and BIGEYE cluster munitions.
- o Complete design development test and initiate development flight test of the fuze.

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

- o Complete operational test and obtain Approval for Limited Production of the proximity fuze.

(U) Program to Completion: Program will complete in FY 1986.

(U) Project W0636, Fuel Air Explosive Weapon II: This project was to provide a special use weapon for targets sensitive to destruction from blast over pressures, such as mine field clearing, personnel in foxholes and wooden structures.

(U) In FY 1982, the Air Force withdrew from the program because of budget priorities. A subsequent Navy review indicated that the weapon was not a cost-effective alternative to other free fall weapons and the program was cancelled.

(U) Project W1051, Bomb Improvements: The bomb improvement program is a "continuing' effort to insure that general purpose bomb systems remain an effective part of the Navy inventory of level-of-effort weapons. It currently consists of three distinct efforts: (1) Modification of the MK-83 (1000 lb bomb) to insure component integrity and provide effective penetration when used against medium hard targets (including a new tail assembly to permit more stable ballistics in both the free fall and retarded release modes); (2) Qualification of the less sensitive PBX explosive for all of the MK-80 series bomb applications will be accomplished concurrent with the MK-83 bomb body improvement; (3) Development of a new Target Detection (proximity) sensor to replace the existing MK-43 Target Detection Device which is unreliable, prone to early function and reaching its design shelf life.

(U) In FY 1982, $4,000 was reprogrammed into the project for the completion of SKIPPER (a powered, laser guided 1,000 pound bomb) development and operational flight testing. Design studies were initiated to select a candidate insensitive explosive fill for the MK 80 series general bomb.

(U) The FY 1983 program consists of:

- o Initiate full-scale development of the new tail assembly for the MK-83 and the new target detection for general purpose bombs.

- o Warhead characterization, arena and sled tests of PBX loaded 1000 pound warheads with fuze/fuze plate retention improvements.

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

- o Complete delivery of prototype MK-83 tail fin assemblies, complete validation tests, and deliver 470 engineering and flight test models and complete development flight tests.
- o Deliver 30 prototype proximity sensors, complete engineering and environmental test and initial development flight tests.
- o Initiate full-scale development of warhead improvements to enhance penetration capability against medium hard targets.

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

(U) Project W1278, Air Delivered Depth Bomb: The Air Delivered Depth Bomb program, as envisioned in preparation of the FY 1983 budget submission, consisted of modifying the M-904 fuze for a delay capability, qualifying the MK-82 with the M-904 on S-3 and P-3 aircraft and developing delivery parameters. The resulting weapon is to be used as a interim solution in a harassment role to drive threat submarines to deeper water where other weapons could be used more effectively. The requirements definition process revealed that a follow-on system is needed to provide a mission abort/kill capability against surfaced and near surface submarines (surface to 150 meters).

(U) During FY 1983, Congressional action removed all funding for FY 1983.

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

- o Continue to refine operational performance requirements.
- o Prepare for competitive selection of contractor(s) for a design definition/hardware demonstration phase.

(U) Program to Completion: Program will complete FY 1988.

(U) Project W1341, 25mm Gun Depleted Uranium Round: Congress directed the initiation of a 25mm Gun and Depleted Uranium Round development program during FY 1980 Defense Appropriation deliberations. Concern over proliferation of gun systems and the desirablity and feasibility of standardizing on one gun system led the Marine Corps to the selection of the 25mm as the optimum system. Congress subsequently authorized continued development.

(U) In FY 1982, development continued with the completion of a Critical Design Review and demonstration firings of an engineering test unit. Fabrication of pre-production gun models was initiated and a contract signed for the first 12 production guns.

(U) The FY 1983 program consists of:

- o Delivery of four (4) preproduction models.
- o Completion of engineering qualification testing.
- o Delivery and testing of two (2) ammunition loaders.

o Installation, ground firing and check-out on the AV-8B.

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

o Complete Board of Inspection Survey and Operational Flight Test (Navy Operational Evaluation).

o Transition into full rate production.

(U) Program to Completion: Program completes in FY 1986.

(U) Project W1773, Improved 20mm Ammunition: The combat effectiveness of guns in the F-14, F/A-18, A-7E, H-1 and GPU-2/A gun pod is severely degraded by the performance of existing 20mm ammunition. The ammunition exhibits high dud rates (70% against surface targets/20% against air targets) and has very little penetration capability against even moderately hard targets. A data rights agreement between the Department of Defense and Raufoss (Norway) will be used to provide the technology base for development of a single, multi-purpose, fuseless 20mm round to correct deficiencies and increase the effectiveness against the broad spectrum of air-to-air and air-to-surface targets.

(U) The FY 1983 program consists of:

o In-house efforts to complete the development specification and prepare the statement of work and procurement package for full-scale development.

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

o Award the full-scale development contract.

o Accomplish a Preliminary Design Review.

o Deliver ammunition for development flight testing.

(U) Program to Completion: Program completes in FY 1985.

I. (U) PROJECT OVER $10 MILLION IN FY 1984. Not Applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64604N
DoD Mission Area: 275 - Retaliatory Chemical Warfare

Title: Chemical Warfare Weapons
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	9,197	8,050	3,414	883	0	35,076
W0637	BIGEYE	9,197	8,050	3,414	883	0	35,076
	Quantity (Safe Separation Test Vehicle)	50	20				(70)
	(Development Test and Evaluation Proto)	24					(24)
	(Operational Test and Evaluation Proto)		30				(60)

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 program constitutes the total Navy effort in acquiring a retaliatory air delivered chemical weapon. BIGEYE satisfies the Navy and Air Force requirements for a chemical weapon that is environmentally safe for storage and handling and can be deployed onboard aircraft carriers and logistic support force ships. Current chemical weapons require special storage facilities or special monitoring and some must be field filled by highly trained personnel wearing special protective suits. None of these current weapons can be deployed aboard aircraft carriers. BIGEYE is a joint Service project with the Navy as the lead Service and the Air Force as a participating Service. The Army is also participating as the developing agency for the chemical reactants used in the BIGEYE weapon.

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 Secretary of Defense directed an accelerated program on 21 December 1981 which lead to the following adjustments: FY 1982 was increased by 1,700 and total estimated cost increased by 1,636. FY 1983 decreased by 16, FY 1984 by 44 and FY 1985 by 4 due to internal budget adjustments. The total estimated cost includes 13,532 for all prior work done on the project since its beginning in the late 1960's, but does not include Air Force funding of 1,707 in FY 1981.

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	7,497	8,066	3,458	887	33,440
W0637	BIGEYE	0	7,497	8,066	3,458	887	33,440

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 3) (334155)	0	0	21,511	29,986	127,237	178,734
Procurement Quantity	0	0	0	1		

Program Element: 64604N Title: Chemical Warfare Weapons

F. (U) RELATED ACTIVITIES: Feasibility of the binary concept was supported by the Navy and conducted by the Army. The Air Force is also participating in this program. The Defense Science Board has concluded that modernization of the deterrent stockpile is essential and Army Military Construction funding has been approved for a binary chemical fill facility.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA. CONTRACTORS: The Marquardt Company, Van Nuys, CA. OTHERS: Chemical Systems Laboratory, Aberdeen Proving Ground, MD; Armament Division, Eglin Air Force Base, FL.

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

(U) Project W0637, BIGEYE: This project is to provide a 500 pound binary spray boat which utilizes two non-lethal chemical reactants to generate a lethal agent. The reactants are shipped and stored separately and assembled unmixed just prior to aircraft launch. The reactants are mixed by signal of the aircrew just prior to weapon release in the target area. Development was recommended as a Joint Service program in 1976 after termination in 1969. A prototype fabrication and redesign contract was awarded in 1977. Component qualification testing was completed. Toxic agent evaluation and testing and dissemination evaluation and testing was initiated. Work commenced on a dissemination simulant. Prototype fabrication of engineering hardware was completed. Toxic evaluation and weapon qualification tests were continued. Aircraft compatibility and safe separation testing and evaluation was done in FY 1981. Based on this evaluation a minor modification of the BIGEYE tail was designed and tested.

(U) In 1982, environmental and safety tests were completed. Agent dissemination tests were successfully conducted. A development contract was awarded for test prototypes and safe separation test vehicles.

(U) The FY 1983 program will:

- o Obtain Approval for Limited Production.
- o Continue toxic agent evaluation and testing and dissemination tests.
- o Fabricate and test shipping container for prototype weapons.
- o Conduct Component and Contractor Test and Evaluation.
- o Conduct functional and physical configuration audits.
- o Fabricate and deliver prototypes for Navy Technical Evaluation and Operational Test and Evaluation. Conduct Navy/Air Force combined Technical Evaluation and Initial Joint Operational Test and Evaluation.

(U) For FY 1984 it is planned to:

- o Make Low Rate Initial Production decision based on results of the Navy Technical Evaluation to be conducted in late FY 1983.
- o Complete toxic agent evaluation and testing.
- o Conduct qualification testing of shipping containers.
- o Conduct ship suitability testing.
- o Conduct Navy Operational Test and Evaluation on which to base a full production decision.

- Document the Technical Data Package for unlimited release-to-production.
- Obtain Approval for Full Production.

(U) Program to completion (FY 1985): Conduct Follow-on Test and Evaluation. Provide development lab technical support. Conduct pre-planned product improvements. Award low rate initial production contract. Transition procurement to Army Single Manager for Conventional Ammunition.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64608M Title: Semi-Active Laser Guided Projectile/Electro-Optics Sensor Development

DoD Mission Area: 231 - Anti-Air 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	3,820	16,000	39,323	24,928	TBD	TBD
S0301	Fire Control Subsystem Electro-Optics (SEAFIRE)	838*	15,000	27,316	0	TBD	TBD
X0665	Infrared Search and Track	3,946*	1,000	12,007	24,928	TBD	TBD
S0305	5-Inch Semi-Active Laser Guided Projectile	3,820	0	0	0	0	121,896

* Previously funded in Program Element 64607, Electro-Optic Sensor Development.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated except for Project S0301 which is to be determined.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element funds the development of an electro-optic sensor system (SEAFIRE) for gunfire control that tracks surface, shore, and air targets, and provides precision target tracking data under all tactical environments including emission control and radio frequency jamming. As a subfunction, an installed laser illuminates surface and shore targets for laser-guided ordnance. In addition, this element provides for the cooperative U.S./Canadian development of an Infrared Search and Track System which is a shipboard, passive surveillance device that detects and tracks and designates missiles and aircraft targets to shipboard combat systems by the infrared signatures of the aerodynamically heated surfaces and exhaust plumes. As a secondary function, the Infrared Search and Track also provides a passive surface surveillance capability for imaging ships and hazards to navigation. The Infrared Search and Track complements surveillance radars.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Project S0301: The 15,000 increase in FY 1983 reflects the resources required for program restart. The FY 1983 Descriptive Summary included no funds in this year, or in the out-years, since the project was terminated in March 1982. The funding in FY 1984 and out-years reflect the resources added to this program element to support SEAFIRE development. Project X0665: In FY 1982 2,945 was reprogrammed from X0665 as a result of delays in achieving project agreement between the U.S. and Canadian governments. In FY 1983, the project was zeroed by Congress but 1,000 for the project was authorized under Program Element 64608M, Joint Army/Navy Semi-Active Laser Guided Projectile. The increase of 1,032 in FY 1984 is necessary in order to ensure timely integration of Infrared Search and Track System (AN/SAR-8) with the test 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	17,035	6,891	10,422	10,975	TBD	TBD
S0301	Fire Control Subsystem Electro-Optics (SEAFIRE)	12,371	0	0	0	TBD	TBD
X0665	Infrared Search and Track	4,664	6,891	10,422	10,975	43,789	85,442*

* Includes cost from prior years.

202

(202)

Program Element: 64606N Title: Semi-Active Laser Guided Projectile/Electro-Optics Sensor Development

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

F. (U) RELATED ACTIVITIES: Program Element 64651N, Project SO17A, MK 86 Gun Fire Control System; Program Element 64652N, Project SO32B, MK 68 Gun Fire Control System Modernization; and Program Element 64602N, Project S1046, 5-Inch Guided Projectile System Integration.

G. (U) WORK PERFORMED BY: Project SO30I (SEAFIRE): CONTRACTORS: Honeywell, Inc., West Covina, CA, is the prime contractor; Northrop, Inc., Anaheim, CA, is a major subcontractor. Contractor for restart: TBD. IN-HOUSE: Naval Surface Weapons Center, Dahlgren Laboratory, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA. Project X0665 (Infrared Search and Track): CONTRACTORS: SPAR Aerospace, Toronto, Ontario, prime contractor, General Electric Company, Syracuse, NY. IN-HOUSE: Naval Surface Weapons Center Dahlgren Laboratory, Dahlgren, VA, is the lead laboratory, Naval Surface Weapons Center, White Oak Laboratory, Silver Spring, MD; Naval Ship Weapons Systems Engineering Station, Port Hueneme, CA; and Naval Research Laboratory, Washington, DC.

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

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

(U) Project SO30I, Fire Control Subsystem Electro-Optics (SEAFIRE)

1. (U) DESCRIPTION (Requirement and Project): Requirements exist to (a) augment existing radars with systems which have the capability to perform search and fire control functions in a totally passive mode and (b) augment radar operation in environments in which radar performance is deficient. Functions which must be performed include search, detection, track, identification, designation, and illumination. A shipboard combat system must include an integrated mix of compatible equipments and equipment types to be effective against the anticipated threats in the expected environments. This fundamental principle has been recognized and requirements have been established for two types of electro-optical systems: a search and track system and a fire control system. Fire Control Subsystem Electro-Optics (SEAFIRE) meets the need for an electro-optic fire control channel for gun fire control systems. It also provides a capability to illuminate targets for the Semi-Active Laser-Guided Projectile.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: The SEAFIRE project was terminated in FY 1982 due to cost considerations.

b. (U) FY 1983 Program: Contracts will be awarded to developers of the major components of SEAFIRE. Source selection will be made of a system integrator for "mod-SEAFIRE". In-house planning will continue for the integration of this system with the DDG-51.

c. (U) FY 1984 Planned Program: All hardware will be delivered to system integrator. System critical design review will be held in early FY 1984 and fabrication of three engineering development models will commence.

d. (U) Program to Completion: Delivery of three engineering development models will be made during second and third quarters of FY 1985. Manufacturing assembly tests will be completed. Performance testing will commence at DDG-51 Combat Systems Engineering Development Site. Performance and integration testing at test sites will be completed in FY 1986. Developmental and operational testing will commence in second quarter FY 1986. Receive approval for production and commence production in FY 1986. Deliver first unit to DDG-51 in FY 1988.

(U) Project X0665, Infrared Search and Track:

Program Element: 64608N Title: Semi-Active Laser Guided Projectile/Electro-Optics Sensor Development

1. (U) DESCRIPTION (Requirement and Project): A requirement exist for a surveillance and tracking sensor that will augment radar. The sensor must provide detection of anti-ship cruise missiles, both high flying and sea skimming, aircraft, and surface ships in a complementary role to radar and perform this role when the radar is silenced. Additionally, the sensor must detect low angle approaching missiles that are not normally detected at tactically useful ranges by radar because of sea return. The AN/SAR-8 program was initiated in FY 1976 as a joint program with Canada for advanced development. Following testing in HMCS ALGONQUIN, at Key West, Florida, and in USS KINKAID, the AN/SAR-8 transitioned to full scale engineering development in FY 1981.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Extensive work was accomplished toward developing and negotiating a project agreement with the Canadian Department of Industry, Trade, and Commerce. The project agreement was negotiated and approved in December 1982. The documentation for the contract award was developed and, in accordance with the project agreement, coordinated with the Canadian officials. In addition, a final integrated logistic plan, a draft test and evaluation master plan, and a draft project management plan have been prepared. Several critical studies have been conducted to reduce risk and allow selection of optimum designs for various key system components.

b. (U) FY 1983 Program: Based upon the availability of funds, the major effort will be toward awarding a prime contract in July 1983 to initiate the actual engineering design work and conduct system trade-off studies. Trade-off studies may include, but not limited to, electric versus hydraulic platform, linear versus focal plane array, all of which impact the eventual design. A secondary effort will be oriented toward Navy laboratory effort which will support the prime contractor's development activities.

c. (U) FY 1984 Planned Program: This is to be the first fully funded year for the AN/SAR-8 prime contract. A preliminary design review will be conducted in January 1984 and a critical design review in July 1984 after which fabrication and engineering testing of three Engineering Development models will commence. In addition, the ordering and delivery of government-furnished equipment will begin as required to support the prime contractor's development work and manufacturer testing. The government's data and technical management will be expanded to meet the contract needs. All necessary experimental work will be performed and the proposed system made ready for full scale development.

d. (U) Program to Completion: The AN/SAR-8 engineering development program will continue through FY 1989 and then transition to production. Three service test models will be completed in FY 1987; one unit to be delivered to the Canadian Department of National Defence for Canadian test and evaluation and two units for U.S. Navy testing and evaluation. At-sea developmental and operational testing of the U.S. Navy units will be accomplished in FY 1988 with approval for procurement granted in FY 1989.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64609N
DoD Mission Area: 223 - Close Air Support and Interdiction

Title: Common Bomb Fuze
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	1,999	1,298	310	5,190	3,909	15,706
W1512	Common Bomb Fuze	1,999 (DT&E)	1,298 (OT&E)	310	5,190	3,909	15,706 (8b0)

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: Several significant deficiencies exist with the MK-80 series general purpose bomb fuzes. These include a high early burst rate and the need for two separate Navy electric fuzes to provide for all tactical delivery conditions. Present fuzes have poor arming time tolerance (up to plus or minus 10%). The Navy was selected as lead service for the Joint Service Common Bomb Fuze development by the Under Secretary of Defense for Research and Engineering memorandum of 11 April 1980. This common bomb fuze (FMU-139/B) will be compatible with the MK-80 series bombs now in inventory, with improved bombs now under development, with Navy fuze function control sets and with Air Force ground selectable arming time requirements.

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 for FYs 1982, 1983 and 1984 of 704 was due to a minor design change in the fuze gag rod, increased material cost and retesting required by the design change and a change in environmental test requirements for the Air Force application. The remaining difference (9,099 in FY 1985 and 1986) is for the design, development, and testing of a change to Navy attack aircraft Fuze Function and Control Sets in order to take advantage of the fuzing selection (arming times and delays) options design into the FMU-139 to provide the aircrew complete flexibility in cockpit selection.

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	1,600	1,597	1,306	-	-	5,903
W1512	Common Bomb Fuze	1,600	1,597	1,306	-	-	5,903

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
OPN (Common Bomb Fuze)	-	-	18,800	49,500	257,500	325,800
Quantity	-	-	(25,000)	(60,000)	(300,000)	(385,000)

*Navy only, refer to PE 64602F for Air Force requirements.

F. (U) RELATED ACTIVITIES: The Air Force is participating in this program under Program Element 64602F.

Program Element: 64609N Title: Common Bomb Fuze

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, CA; CONTRACTOR: Motorola, Tuscon, AZ; OTHERS: Armament Division, Eglin Air Force Base, FL.

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

(U) Project W1512, Common Bomb Fuze: This project provides for the joint Navy/Air Force development of a common electronic bomb fuze as directed by the Under Secretary of Defense for Research and Engineering. The FMU-139 will be compatible with the MK-80 series bombs now in the inventory and improved bombs now under development. The FMU-139 is compatible with the existing Navy attack aircraft fuze function and control sets. The control set, however, does not provide the operational flexibility to take advantage of the pilot cockpit selection of fuze arming and delay times which are designed into the fuze. The FYs 1984 and 1985 request will fund the modification to the cockpit control set required to provide this flexibility.

(U) In FY 1982, development continued with the completion of a Preliminary Design Review and contactor and government laboratory engineering tests. Government development flight testing was initiated during the last quarter of the fiscal year.

(U) The FY 1983 program consists of:

- o Completion of development and operational flight tests (Navy Operational Evaluation).
- o Staffing a Provisional Approval for Service Use request to support low rate initial production in FY 1984.
- o Milestone III review to support full Approval for Service Use and full-rate production in FY 1985.

(U) The FY 1984 program will include:

- o Any follow-on operational tests resulting from the Navy Operational Evaluation.
- o A Physical Configuration Audit of initial production hardware.

(U) Program to Completion: Continue product improvements. Full-scale production of FMU-139 is planned for FY 1985 and will continue until the inventory objective is reached in FY 1989. Transition to the Army Single Manager is planned for the FY 1985 buy.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64610N
Title: Advanced Lightweight Torpedo (Engineering)
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	0	18,000	141,991	133,683	264,374	556,048
80199	Advanced Lightweight Torpedo	0	18,000	141,991	133,683	264,374	558,048
	Quantity	(0)	(DT&E)	(DT&E)	(DT&E)	(D/OT&E)	(95)

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: This program element will develop a new torpedo (designated the Advanced 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 profiles shown in the FY 1983 Descriptive Summary and this Descriptive Summary are as follows: the decrease of 40,365 in FY 1983 is due to a transfer of funds back to advanced development as a result of delay in transition to engineering development; the increase of 806 in FY 1984 reflects a revision of cost estimates; and the net increase in Total Estimated Cost of 1,499 is due in part to the changes in FY 1983 and 1984 already mentioned and adjustments for inflation and cost growth for FY 1985 and the outyears.

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	58,365	141,185	356,999	556,549
80199	Advanced Lightweight Torpedo	0	0	58,365	141,185	356,999	556,549

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
WPN	0	0	0	0	839,000*	3,967,600
Quantity	(0)	(0)	(0)	(0)	(1,059)*	(7,753)

* Through FY 1988.

F. (U) RELATED ACTIVITIES: Program Element 63562N, Submarine Tactical Warfare Systems (Advanced) - Development of improvements to enhance submarine-launched torpedo performance [illegible] to improve torpedo countermeasures

resistance. 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 62633N, Undersea Warfare Weaponry Technology -[ ]

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (technical direction 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; Applied Research Laboratory, University of Texas, Austin, TX; 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: Not applicable

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

(U) Project S0199, Advanced Lightweight Torpedo

1. (U) DESCRIPTION (Requirement and Project): The Advanced Lightweight Torpedo will have superior performance characteristics [ ] The improvements in Soviet submarine performance [ ] necessitate having an advanced anti-submarine warfare torpedo available as a replacement for the lightweight MK 46 torpedo by the mid-to-late 1980s. The program includes some modifications to make the Advanced Lightweight Torpedo more suitable [ ] The lightweight homing torpedo is the only conventional Anti-Submarine Warfare weapon for air and surface platforms. The Advanced Lightweight Torpedo is under consideration for other applications such as in submarines, [ ] The objectives of Advanced Lightweight Torpedo full-scale development are to: (a) verify with full-scale development prototype models that the fleet weapon design will perform effectively in an operational environment; (b) release a Class I drawing package which will be used to build technical and operational torpedoes; (c) conduct technical and operational testing in preparation for approval to commence full-scale production.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded in Program Element 63610N in FY 1982.

b. (U) FY 1983 Program: Commence full scale engineering development upon scheduled completion of Milestone II in August 1983. Subsequent to this, purchase long lead material required for engineering development and commence brassboard fabrication of the engineering development torpedo.

c. (U) FY 1984 Planned Program: Continue brassboard fabrication of the engineering development torpedo. Commence delivery of the brassboard engineering development torpedoes and begin performance validation testing. Commence fabrication of the engineering development torpedo.

d. (U) Program to Completion: Complete full scale development and documentation for Milestone III. The prime contractor will fabricate the engineering development models for Technical Evaluation and Operational Evaluation and other units of a limited production buy prior to full scale production under a leader-follower production philosophy.

Program Element: 64610N Title: Advanced Lightweight Torpedo (Engineering)

e. (U) Milestones:

Milestones		Date
1. Initiated phase I advanced development		February 1975
2. Completed phase I of advanced development		September 1978
3. Initiated phase II of advanced development		August 1979
4. Complete phase II of advanced development	(April 1983)*	August 1983
5. Start technical evaluation		April 1986
6. Start initial operational test and evaluation		January 1987
7. Approval for Production		December 1987
8. Initial Operational Capability		[ ]

*Milestone data as shown in the FY 1983 Descriptive Summary

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 was covered by Program Element 63610N, Advanced Lightweight Torpedo (Advanced). Based upon the evaluation of these 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. Compatibility with launch platforms, test equipment and in-service support equipment, availability, reliability, maintainability, survivability/vulnerability and safety are part of the overall evaluation and readiness certification.

2. (U) Operational Test and Evaluation: Commander, Operational Test and Evaluation Force will conduct early initial operational testing and evaluation by monitoring systems development with the objective of providing an early independent assessment of the potential operational effectiveness and operational suitability of the Advanced Lightweight Torpedo prior to the Milestone II decision. Commander, Operational Test and Evaluation Force will then observe engineering development testing through technical evaluation. The objectives for the engineering development model system are: determine platform, fire control systems and in-service support equipment compatibility; determine performance, acquisition and hit envelopes against various targets; [ ] obtain initial assessment of reliability, maintainability and adequacy of system safety; determine adequacy and required modifications to the Workshop Test and Handling Equipment to support the operational evaluation and validate computer simulation models for use in the operational evaluation. Once successful completion of technical evaluation occurs, Commander, Operational Test and Evaluation Force will conduct the operational evaluation using seventy-seven pre-production torpedoes, including two warshot configurations. The operational evaluation will consist of 165 valid in-water runs against various targets and 2000 computer simulation runs using the Naval Ocean Systems Center Hybrid Simulator. The objectives of operational evaluation are to determine if: the pre-production Advanced Lightweight Torpedo meets the criteria of the operational requirement; the Advanced Lightweight Torpedo can be prepared and maintained by fleet Intermediate Maintenance Activity and depot level personnel using the Advanced Lightweight Torpedo Workshop Test and Handling Equipment and facilities; the Advanced Lightweight Torpedo can be effectively employed by fleet personnel; the computer simulation of the Advanced Lightweight Torpedo and the threat target are adequate to support Follow-on Operational Test and Evaluation as required; the exercise version of the Advanced Lightweight Torpedo is adequate to support fleet training; mobile and other targets for the Advanced Lightweight Torpedo are adequate to support production acceptance testing and evaluation, fleet training, and Follow-On Testing and Evaluation as required; documentation and modifications to fire control and launch systems are adequate to support the Advanced Lightweight Torpedo; [ ]

Additional objectives of operational evaluation include development of initial tactical doctrine, assessment of adequacy of

integrated logistic support and training plans, assessment of operational suitability and readiness for full fleet introduction. Upon completion of operational evaluation, Commander, Operational Test and Evaluation Force will provide an evaluation report detailing the operational effectiveness and operational suitability of the Advanced Lightweight Torpedo and supporting equipment to serve as the basis for the Navy's preparation for a production decision. The follow-on operational test and evaluation will consist of tests to verify correcton of any deficiencies discovered during operational evaluation and to verify operational effectiveness and operational suitability of production Advanced Lightweight Torpedoes and Workshop Test and Handling Equipment; continued tactics development; and conduct a captive carry program. Production torpedoes and associated equipment will be used during this phase of testing.

3. (U) Systems Characteristics:

CHARACTERISTICS	REQUIREMENTS
Diameter	12.75 inches
Length (Maximum)	Less than 114 inches
Weight (Maximum)	Less than 755 pounds
Speed (Maximum)	[redacted]
Endurance Range @ Max. Speed	
On Axis Acquisition	
Maximum Acquisition Depth	
Crush Depth	
Minimum Water Depth for Launch	
Air Launch Envelopes	
Fixed Wing Aircraft	
Speed	
Altitude	
Rotary Wing Aircraft	
Speed	
Altitude	
Buoyancy	Negative

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64654N Title: Joint Service Explosive Ordnance Disposal Development (Engineering)

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	2,477	2,926	3,733	3,977	Continuing	Continuing
S0377	Explosive Ordnance Disposal Procedures	2,477	2,537	2,457	2,587	Continuing	Continuing
S1594	Improvised Nuclear Device Explosive Ordnance Disposal Procedures	0	389	1,276	1,390	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 the explosive ordnance disposal techniques required for all known domestic and foreign ordnance and improvised nuclear devices. These techniques are published for use by explosive ordnance disposal personnel of all services to provide the information necessary to perform their mission of rendering safe (disarming) and disposing of unexploded ordnance, including improvised nuclear devices. Department of Defense Directive 5160.62 of 24 November 1971 assigns development responsibility for explosive ordnance disposal procedures and equipment to the Department of the Navy to support the Joint Services.

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 minor adjustments in 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	2,248	2,477	2,926	3,805	Continuing	Continuing
S0377	Explosive Ordnance Disposal Procedures	2,248	2,477	2,537	2,502	Continuing	Continuing
S1594	Improvised Nuclear Device Explosive Ordnance Disposal Procedures	0	0	389	1,303	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: All ordnance related developments, both domestic and foreign.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD.

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

(U) Project S0377, Explosive Ordnance Disposal Procedures: This project provides for engineering development studies on new domestic and foreign munitions and evaluation of techniques and/or tools for accomplishing render safe procedures. Investigations involve research on the functioning of little known or undocumented munitions. The techniques for unknown foreign munitions often

Program Element: 64634N Title: Joint Service Explosive Ordnance Disposal Development (Engineering)

require development of new technical approaches, tools and equipment to provide countermeasures for sophisticated ordnance such as the terrain denial weapons now appearing in the munition inventories of various nations.

(U) In FY 1983, approximately 100 new joint services explosive ordnance disposal procedures and 50 technical updates of existing procedures were provided for tactical field use.

(U) The FY 1983 program is continuing development of explosive ordnance disposal procedures in response to worldwide increases of new and more sophisticated military ordnance. As new weapon systems enter the domestic and foreign inventories, explosive ordnance disposal techniques, tools and equipment will be developed, validated and produced for use by the operational explosive ordnance disposal teams of all services.

(U) For FY 1984, it is planned to continue previous efforts and initiate development of techniques for new domestic and foreign munitions.

(U) This is a continuing program.

(U) Project S1594, Improvised Nuclear Device Explosive Ordnance Disposal Procedures: This project provides for the implementation of the Department of Defense/Department of Energy/Federal Bureau of Investigation Memorandum of Understanding for response to improvised nuclear devices in accordance with Secretary of Defense direction to Secretary of the Navy.

(U) The FY 1983 program consists of initiating the project to develop diagnostic equipment and associated explosive ordnance procedures to meet the DOD responsibility for its explosive ordnance disposal personnel to gain access to and disable such nuclear devices.

(U) For FY 1984, it is planned to continue previous efforts and incremental build-up of capability to disable improvised nuclear devices.

(U) This is a continuing program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64656M
DoD Mission Area: 211-Direct Fire Combat

Title: Marine Corps Assault Vehicles
Budget Activity: 4 - Tactical Programs

1. (U) RESOURCES (PROJECT LISTING): ($ 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	0,763	925	TBD	TBD	TBD	TBD
C1293	Stratified Charge Rotary Combustion Engine (SCRCE)	*0,763	925	TBD	TBD	TBD	TBD

* FY 1982 funds for this project were contained in Program Element 63611N, Marine Corps Assault Vehicles.

2. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element provides funds to develop a lightweight, high horsepower engine that will have the potential to satisfy a variety of military requirements. In addition to its high horsepower-to-weight ratio, the rotary engine has other important advantages including simplicity in design, multifuel capability, excellent unaided cold weather startability, low emissions, low vibrations and a low magnetic signature.

3. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: The Marine Corps Budget Request for Fiscal Year 1983 included 15,810 for this project. Due to its concern about the complex technology of this engine and the possible negative implications of that technology for future reliability, maintainability, logistics and readiness, the Authorization Bill recommended the Stratified Charge Rotary Combustion Engine be terminated. 14,810 of the authorization requested was denied and the 925 Authorized was directed to be used to restructure the program around suitable low risks, high power-to-weight ratio engine alternatives. Although the Department of Defense Appropriation Bill for FY 1983 increased the project funding by an additional 925, the Marine Corps assessment of the program concluded that the development risk is still "high." A study conducted during FY 1982 demonstrated that suitable diesel engines, with lower risk, exist for the Landing Vehicle Experimental (LVT(X)). Significant (unresolved) problems encountered during Advanced Development Testing, involving end housing fatigue failures, crankshaft fatigue failures and trochoid coating spallings, appear to corroborate the Authorization Committee's concerns and for this reason the program has been deferred pending an In Progress Review of the entire development effort.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64657M
DoD Mission Area: 211-Direct Fire Combat

Title: Marine Corps Ground Combat/Supporting Arms Systems (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 Costs
	TOTAL FOR PROGRAM ELEMENT	17,438	10,353	21,303	16,481	Continuing	Continuing
C0008	8" Laser Homing Ordnance	-	2,220*	3,020	2,251	Continuing	Continuing
C0010	Shoulder-Launched Multipurpose Assault Weapon (SMAW)	10,890	969	4,866	2,441	Continuing	Continuing
C0018	Artillery Computer System (ACS)	**	1,939	**	**	**	**
C0021	Landing Vehicle Tracked (LVT7A1) Program	3,008	3,142	**	**	**	**
C0027	Modular Universal Laser Equipment (MULE)	1,870	-	**	**	**	**
C0080	Mine Warfare (Engineering)***	222	1,855	4,691	2,770	Continuing	Continuing
C1119	Infantry Mortar Programs	419	541	677	577	Continuing	Continuing
C1294	Field Artillery Rocket System	551	1,219*	7,424	6,083	Continuing	Continuing
C1297	Remotely Monitored Battlefield Sensor System	****	****	****	1,075	Continuing	Continuing
C1443	Training Devices and Simulators (Engineering)	479	2,107	625	484	Continuing	Continuing

* Funded in Program Element 63635M, Ground Combat/Supporting Arms Systems (Advanced).
** These projects transition to Program Element 26623M, Ground Combat/Supporting Arms (Operational Systems).
*** In FY 1983 and prior years this project was titled Mine and Booby Trap Countermeasures (Engineering).
**** Funded in Program Element 63730M, Marine Corps Intelligence/Electronic Warfare Systems (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 for the engineering development of Marine Corps equipment and systems for the conduct of close combat and fire 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 Descriptive Summary are as follows: Eight-Inch Laser Homing Ordnance: The decrease of 994 in FY 1982 was due to a reduction in the planned scope of work; decrease of 40 in FY 1984 is due to refinement of program cost (funded in Program Element 63635M in FY 1983). Shoulder-Launched Multipurpose Assault Weapon: FY 1982 decrease of 8,301 is due to the actual contract cost being less than anticipated, the FY 1983 decrease of 26 is due to a reduction in management support contracts, and cost growth in FY 1984 of 423 is for continuing preplanned product improvement in developing a family of warheads. Artillery Computer System, Modular Universal Laser Equipment, and Landing Vehicle Tracked - 7A1 (LVT7A1): Discussed under PE 26623M, Marine Corps Ground Combat/Supporting Arms (Operational Systems); Mine Warfare (Engineering): The FY 1982 increase of 10 is due to cost refinement, the FY 1983 decrease of 133 is due to a reduction in management support contracts and the 2,716 increase in FY 1984 is for testing and evaluation of the Israeli Portable Mine Neutralization System (PONIMS II), modifications to the MK22, Linear Demolition Charge Launching Rocket and evaluation of a Minefield Marking System. Infantry Mortar Programs: Decrease of 132 in FY 1982 and the decrease of 14 in FY 1984 are due to refinements in program cost, including escalation; Field Artillery Rocket System: This program was funded in Program Element 63635M in FY 1983, the increase of 7,424 in FY 1984 is to purchase test expendables. Training Devices and Simulators: The FY 1982 increase of 280 is for test and evaluation of a tank gunnery sight training device. Decrease of 37 in FY 1984 due to development of Simulated Tank Anti-Tank Gunnery System rather than the Universal Infantry Weapon Trainer and refinement in costs.

including escalation. Remotely Monitored Battlefield Sensor System: This program is transitioning from Program Element 63730M Marine Corps Intelligence/Electronic Warfare System (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	18,236	23,397	10,724	16,616**	TBD	TBD
C0010	Shoulder-Launched Multipurpose Assault Weapon (SMAW)	8,633	19,191	995	4,443	TBD	TBD
C0018	Artillery Computer System (ACS)	-	-	1,939	658*	TBD	TBD
C0021	Landing Vehicle Tracked-7A1 (LVT7A1) Program	7,206	2,012	3,154	2,848*	TBD	TBD
C0027	Modular Universal Laser Equipment (MULE)	2,068	662	-	-	-	20,562
C0080	Mine and Booby Trap Countermeasures Engineering	250	212	1,988	1,975	TBD	TBD
C1073	Universal Infantry Weapons Trainer (UIWT)	5	-	-	-	TBD	TBD
C1119	Infantry Mortar Programs	74	551	541	691	Continuing	Continuing
C1443	Training Devices and Simulators (Engineering)	-	198	2,107	662	TBD	TBD

* Funded in Program Element 26623M, Ground Combat/Supporting Arms (Operational Systems)

** Non additive: FY 1984 funds of 3,060 for C0008, eight inch laser homing ordnance; 5,212 in FY 1984 and 551 in FY 1982 for C1294, Field Artillery Rocket System; and 573 in FY 1984 for C1295, Artillery Direct Fire Sight are transitioning from Program Element 63635M, Ground Combat/Supporting Arms Systems (Advanced) where they are funded in FY 1983.

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

Project	Procurement Marine Corps	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
C0010	Shoulder-Launched Multi-Purpose Assault Weapon		2,249	4,679	4,963	12,275	24,166
	(Quantity/Launchers)		(225)	(600)	(600)	(1,325)	(2,750)
C0018	Artillery Computer System			-	13,552	32,186	45,738
	(Quantity)			-	(130)	(295)	(425)
C0021	Landing Vehicle Tracked-7A1 (LVT7) Program (SLEP)	171,268	141,800	162,009	131,389	-	657,190
	(Quantity)	(140)	(307)	(263)	(240)	-	(984)
	(New Procurement)	61,644	141,753	115,324	-	-	330,721
	(Quantity)	(30)	(146)	(153)			(329)
C1119	Infantry Mortar Programs 81mm Mortar Launch Tube		-	-	16,166	18,431	34,597
	(Quantity)				(447)	(480)	(926)
C0027	Modular Universal Laser Equipment	21,192	37,314	43,705	40,948	4,000	147,159
	(Quantity)	(16)	(115)	(134)	(115)	TBD	TBD

F. (U) RELATED ACTIVITIES: Eight-Inch Laser Homing Ordnance: Related to the Army 155mm Cannon-Launched Guided Projectile (PE 63621A) and the Navy Five-Inch Program (PE 64606N). Artillery Computer System: This program is related to the Army Tactical Fire System and to the Marine Integrated Fire and Air Suppport System. Landing Vehicle Tracked (LVT7A1) Program: This vehicle is related to the Landing Vehicle Tracked (Experimental), a Marine Corps planned follow-on assault amphibian vehicle. Modular Universal Laser Equipment: Related to the Army's Ground Laser Locator Designator in technology and in commonality of the

components. Infantry Mortar Program: The Marine Corps is monitoring the Army program for fielding the 1-81 mortar and its ammunition. Mine Warfare (Engineering): Related to the Landing Vehicle Tracked program in that it is intended to provide assault amphibian vehicles with a minefield neutralizing and countermeasures capability. Field Artillery Rocket System: Related to Army Multiple Launch Rocket System, and the Mark 71 5-Inch Zuni Rocket.

G. (U) WORK PERFORMED BY: Eight-Inch Laser Homing Ordnance: In-House: Program Manager, Cannon Artillery Weapons System, USAARRADCOM, Dover, N.J. Shoulder-Launched Multipurpose Assault Weapon: Contractor: McDonnell Douglas Corp, Titusvill, FL. In-House: Naval Surface Weapons Center, Dahlgren, VA. Artillery Computer System: Contractor: Magnavox, Ft Wayne, IN. In-House: PM APATDS, Ft. Monmouth, NJ. Landing Vehicle Tracked: Contractor: FMC Corp., San Jose, CA. In-House: Naval Sea Systems Command, Washington, DC. Modular Universal Laser Equipment: Contractor: Hughes Aircraft, Culver City, CA; Sperry Gyroscope, Great Neck, NY. In-House: Missile Research and Development Command, Redstone Arsenal, AL, and Naval Weapons Center, China Lake, CA. Infantry Mortar Program: Contractor: None. In-House: U.S. Army Armament Research and Development Command, Dover, NJ. Field Artillery Rocket System: In-House: Naval Surface Weapons Center, Dahlgren, VA; Naval Weapons Center, China Lake, CA; Naval Ordnance Station, Indian Head, MD. Training Devices and Simulators: Contractor: None. In-House: Naval Training Equipment Center, Orlando, FL. Mine Warfare (Engineering): Contractor: To be determined. In-House: Naval Coastal Systems Center, Panama City, FL.

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

(U) Project C0008, 8" Laser Homing Ordnance: This program is a joint development effort with the Army to develop an 8" extended range guided projectile. Marine Corps funding is for development of a semi-active laser seeker (SAL) development for use against armor, moving targets and fortified positions out to a range of 40 kilometers.

(U) FY 1982, not applicable.

(U) In FY 1983, it is planned to conduct air-drop testing, gun test firing, and static warhead testing.

(U) In FY 1984, it planned to:

- o Fabricate airframe.
- o Assemble prototypes for Developmental Test I.
- o Conduct all-up-round firings during Developmental Test I.

(U) Project C0010, Shoulder-Launched Multipurpose Assault Weapon: This project is to develop a lightweight, manportable assault weapon capable of breaching or destroying masonry and earth/timber defensive positions and neutralizing personnel. Presently there is no weapon in our inventory to accomplish this task. Increased emphasis on the strategic importance of large population centers indicates the likelihood for combat in built up areas during any major conflict in the future. Military operations in urban terrain will require increased use of this weapon. The weapon will be employed on the battlefield against bunkers or in urban combat against masonry strongpoints.

(U) In FY 1982, the McDonnell Douglas Corporation was selected as the contractor for Full Scale Engineering Development, and developmental tests commenced.

(U) In FY 1983, Engineering Development to merge the Shoulder-Launched Multipurpose Assault Weapon to a fielded reusable launcher propulsion system will be completed. Development Test II and Operational Test II will be conducted prior to the Milestone III scheduled for June 1983.

Program Element: 64657M

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

(U) For FY 1984, it is planned to continue Engineering Development of pre-planned product improvements of warheads (Anti-Tank, smoke, flame) which will be fired from the launcher.

(U) Project C0080, Mine Warfare (Engineering): This program continues Mine and Booby Trap Countermeasures Engineering Development efforts, and provides the Fleet Marine Forces with an amphibious and overland capability to breach minefields.

(U) The FY 1982 program consisted of:

- Completion of development testing of an adaption to use the M58A1 Linear Demolition Charge system to provide launch capability for the Landing Vehicle Tracked 7A1 Assault Amphibian Tractor to breach minefields.
- Adaptation of the M58A1 Linear Demolition Charge System to a trailer for use by various vehicles was evaluated.
- Evaluation of an Israeli track width mine plow system for use within the M60A1 tank.

(U) In FY 1983, it is planned to:

- Approve the Landing Vehicle Tracked 7A1 Minefield Breaching Kit for Service Use.
- Approve the M58A1 Trailer Mounted Line Charge system for Service Use.
- Continue improvements on the MK22 Linear Demolition Charge launching rocket.

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

- Field Landing Vehicle Tracked 7A1 and M58A1 Trailer Mounted Minefield Breaching Kits.
- Field test the Israeli Portable Mine Neutralization System for Marine Corps suitability.
- Test the MK22 Linear Demolition Charge improvements for enhancing its capability in minefield neutralization.
- Test Full Scale Development prototypes of a land mine emplacing system.
- Continue to evaluate in-service linear demolition charge launching systems for enhancements.

(U) Project C1119, Infantry Mortar Programs: This program provides technical and managerial information to the Army's Infantry Mortar Program to reflect specific Marine Corps requirements for the M224 Lightweight Company Mortar System (LWCMS) and 60mm ammunition, the XM252 Improved 81mm Mortar and ammunition, and monitors developments in the U.S. Army Medium Mortar Program.

(U) The FY 1982 program monitored the Army's efforts on the Improved 81mm Mortar and its ammunition.

(U) The FY 1983 program consists of:

- Continuing to monitor Army 81mm Mortar efforts.
- Monitoring further developments in medium mortars.
- Evaluating Israeli 120mm Tampella mortars under the OSD, Foreign Weapons Evaluation Program.

Program Element: 64657M

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

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

- o Continue monitoring 81mm and medium mortar efforts.
- o Continue evaluating the 120mm Tampella mortar.
- o Determine feasibility of attaining a ballistic match of the 81mm High Explosive and Smoke Rounds.

(U) Project C1294, Field Artillery Rocket System: This program will provide a rapidly deployable, medium range, highly mobile, lightweight, ground-to-ground multiple launch rocket system. It is intended for use as an indirect fire, area weapon system to suppress, neutralize or destroy enemy artillery fire support, forward air defenses, Command, Control, Communications Systems, personnel and vehicles.

(U) In FY 1982, this program completed system validation.

(U) The FY 1983 program consists of:

- o Continuing test firings to evaluate prototype launcher and rocket compatability.
- o Beginning Advanced Development Phase.
- o Initiating development of range tables.
- o Continuing fuze design and fuze/warhead compatability testing.
- o Developing Integrated Logistics Support Plan.
- o Conducting Development/Operational Test I.
- o Conducting In Progress Review II.

(U) The FY 1984 planned program consists of:

- o Completing launcher design, range tables and fuse design.
- o Preparing test and evaluation plan.
- o Entering Full Scale Engineering Development.
- o Purchasing test expendables.

(U) Project C1443, Training Devices and Simulators: This is a continuing project for the development of training devices and simulators which were not or cannot be developed in conjunction with a major end item. Simulated Tank Anti-Armor Gunnery System - device for training infantrymen in field firing a variety of infantry anti-tank weapons without the need for ranges, ammunition or weapons. Manual Wargame Based Tactical Training System - a series of training systems to give unit commanders and their staffs an opportunity to practice the tactical decisions they would have to make on a real battlefield.

Program Element: 64657M

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

(U) In FY 1982, this program continued development of the Simulated Tank Anti-Armor Gunnery System Dragon Module. Development on the family of manual wargames continued.
In FY 1983, commence engineering development on the Dragon Module of the Simulated Tank Anti-Armor Gunnery System. Continue manual wargame development.

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

- o Continue Engineering Development and testing of manual wargames.
- o Commence engineering development of the Tube Launched, Optically Tracked, Wire Guided Missile System module of the Simulated Tank Anti-Armor Gunnery System.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64675N
DoD Mission Area: 233 - Anti-Submarine Warfare
Title: MK 48 Advanced Capability (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	62,492*	159,884	182,138	139,412	87,604	638,330
S0366	MK 48 Advanced Capabilities (Engineering)	62,492*	159,884	182,138	139,412	87,604	638,330
	(Quantity - Advanced/Engineering Development Torpedo Modifications)	(16/37)					(16/37)
	(Quantity - Advanced/Engineering Development Model Automated Test Equipment)	(0/4)					(0/4)

* Funded in Program Element 64562N (Submarine Tactical Warfare Systems (Engineering)) in FY 1982 and Prior Years.

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 program element accomplishes design, engineering development, test and evaluation of the submarine-launched MK 48 Advanced Capabilities torpedo to counter the Soviet threat

C. (U) COMPARISION 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 319 in FY 1982 due to revised cost estimates including escalation; a decrease of 6,387 in FY 1983 resulting from a Congressional reduction of 6,905 partially compensated by revised cost estimates including escalation (+518); increase in FY 1984 of 70,655 and 195,602 in FY 1985 and subsequent years as a result of a restructure of the program (Approved by Chairman, House Appropriations Committee, letter of 17 May 1982). The WPN Procurement profile has been revised to provide in

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	90,671	154,414	186,754	111,483	31,414	642,255
S0311	Torpedo Advanced Development	83,871	91,922	20,483	0	0	266,795
S0366	Torpedo Engineering Development	(6,800)	(62,492)	166,271	111,483	31,414	378,460

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
WPN	-	-	80,000	201,400	4,249,800	4,531,200
Procurement Quantity	-	-	-	(66)	(3,287)	(3,353)
WPN (Spares)	-	-	6,200	12,100	105,900	124,200

220

Program Element: 64675N Title: MK 48 Advanced Capability (Engineering)

F. (U) RELATED ACTIVITIES: Concurrent advanced development of the MK 48 Advanced Capabilities Torpedo (Project S0311) began in Program Element 63562N (Submarine Tactical Warfare Systems (Advanced)) and transfers to Program Element 63691N (MK 48 Advanced Capabilities Torpedo) in FY 1983, its final year of funding. This project was funded in Program Element 64562N (Submarine Tactical Warfare Systems (Engineering)) in FY 1981 and FY 1982.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Underwater Systems Center, Newport, RI. OTHERS: Naval Undersea Warfare Engineering Station, Keyport, WA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Ocean Systems Center, San Diego, CA; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: Hughes Aircraft, Fullerton, CA, is prime contractor. OTHERS: Gould Inc., Cleveland, OH; Applied Research Laboratory, Pennsylvania State University, State College, PA; University of Texas, Austin, TX; Applied Physics Laboratory, University of Washington, Seattle, WA; Westinghouse Electric Corporation, Annapolis, MD.

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

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

(U) Project S0366, MK 48 Advanced Capability Torpedo (Engineering)

1. (U) DESCRIPTION (Requirement and Project): Predicted advances in Soviet submarine design and capability will/

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

a. (U) FY 1982: This is an FY 1983 start. This project as previously funded in Program Element 64562N. Under Program Element 63691N, Project S0311, in-water Advanced Development Model Tests began in April 1982. DNSARC Milestone II approval was received on 22 September 1982. Full Scale Engineering contracts were signed in August 1982. The Full Scale Engineering Development phase will provide 37 Engineering Development Models for contractor testing, Navy Technical Evaluation and Operations Evaluation. Initial Operational Capability

b. (U) FY 1983 Program: Project S0311, October - December and January - September: Continue in-water testing of Advanced Capabilities Advanced Development Model Torpedoes and Propulsion Subsystems. Project S0366, October - December: Continue development and validation of lower tier specifications; continue definization of prime and subcontracts under the prime contracts. January - September: Complete the development and validation of lower tier specifications; complete definitization of prime and subcontracts and begin fabrication of the engineering development model torpedoes and modified propulsion units. Start fabrication of the prototype systems automatic test equipment.

c. (U) FY 1984 Planned Program: The design of the engineering development prototype torpedoes will be completed, all subcontractor/vendor material contracts will be awarded, and prototype fabrication activity will be at its peak level. The principal difference between the funding in FY 1983 and FY 1984 ($22,254,000) is due to the level of fabrication to meet the requirement for delivery of 37 units during FY 1985. In addition, engineering assurance, quality and factory testing will be conducted on first article prototype components in preparation for systems assembly and test of the full torpedo in early FY 1985. The design of all support equipment including the fully automated test sets to support technical/operational evaluation will be completed, and fabrication will have begun.

d. (U) Program to Completion: Conduct technical and operational evaluation of engineering development model torpedoes. Obtain approval for service use. Analyze test results and finalize documentation for Milestone III. Begin production and test of

fire control modifications. Prepare specifications for full production of MK 48 Advanced Capability Torpedoes. Complete follow-on test and evaluation of engineering development model torpedoes.

e. (U) Milestones: None.

J. (U) TEST AND EVALUATION DATA:

1. (U) Development Test and Evaluation: Torpedo MK 48 Advanced Capability Engineering Development Test and Evaluation will be conducted commencing with the first quarter, FY 1984. A formal Technical Evaluation will be conducted during FY 1985. In-water runs will include deployment in the presence of countermeasures for both surface ship and submarine. Development Test and Evaluation/Technical Evaluation will continue through the first quarter, FY 1986. Laboratory and simulation tests will continue at Navy laboratories and contractor facilities to further evaluate the Advanced Capabilities concept, design, and packaging. All in-water torpedo runs will be used to develop the data base needed to demonstrate the Test and Evaluation Master Plan specified material reliability and mean turnaround time. All Advanced Capability modified torpedoes used for Engineering Development Phase in-water testing will have the same form and fit factors as those units to be procured in production. Testing is being designed to evaluate all major mission variations with data base expansion through simulation. All major support systems are being evaluated.

2. (U) Operational Test and Evaluation:

a. (U) Commander, Operational Test and Evaluation Force, will provide an independent assessment of operational system aspects throughout all phases of operational testing. The first phase (OT-IA) is currently underway and involves the monitoring of development test and evaluation events. The second phase (OT-IB) will require 15 dedicated operational test and evaluation valid firings of advanced development torpedoes in November 1983. The combined OT-IA and OT-IB test results will support the January 1984 Chief of Naval Operations Executive Board decision on procurement of long-lead material and initiation of long-lead tooling. The next phase, OT-IIA, will involve the monitoring of DT-IIA, extended advanced development model testing, and DT-IIB, Contractor Test and Evaluation test events. Commander, Operational Test and Evaluation Force, will report on the operational aspects of this testing to support the March 1985 Chief of Naval Operations/Secretary of the Navy Program Review decision to initiate pilot production. For OT-IIB, Commander, Operational Test and Evaluation Force, will monitor the Developing Agency's Technical Evaluation and independently plan and conduct the Operational Evaluation. This phase will result in a recommendation on approval for service use. Follow-on Operational Test and Evaluation, OT-III and OT-IV, will proceed after Milestone III. A significant factor affecting the above phases is that there is no single artificial target now available or planned which is capable of testing the Advanced Capability Torpedo to its designed limitations simultaneously. Operational testing will be conducted using different available targets to evaluate different aspects of torpedo performance which may impact the credibility of operational test results.

b. (U) Validation Phase Operational Test and Evaluation (OT-IA, OT-IB): Operational testing to date has been limited to monitoring of development test and evaluation events. These events have demonstrated the [illegible]

The objectives of validation phase operational testing are to estimate operational effectiveness and operational suitability, initiate tactics development, estimate program progress, and identify operational issues for OT-II. Validation phase firings are designed to support a three-phase release of hardware by the Program Manager for full scale development production. These phases will be monitored by Commander, Operational Test and Evaluation Force, for operational data.

c. (U) Full Scale Development Phase Operational Test and Evaluation (OT-IIA, OT-IIB): The objectives of the full scale development phase operational testing are the determination of operational effectiveness and operational suitability, evaluation/continuation of tactics development, and identification of issues for follow-on testing and evaluation. During OT-IIA, Commander, Operational Test and Evaluation Force, will monitor extended advanced development model testing which is designed to further mature the torpedo software and verify/provide any hardware data not previously obtained. Commander, Operational Test and

Evaluation Force, will also monitor contractor test and evaluation firings of engineering development model units during this phase. These engineering development models are very significant because they will be the first units compatible wih a submarine fire control system and they will be very similar to the production weapon. Commander, Operational Test and Evaluation Force, will provide inputs during the planning of these firings to ensure the testing conducted has operational significance. During OT-IIB, Commander, Operational Test and Evaluation Force, will monitor the technical evaluation and plan and conduct the operational evaluation using engineering development models.

d. (U) Follow-on Operational Test and Evaluation (OT-III, OT-IV): The objectives of OT-III include completion of deferred or incomplete operational testing, continuation of tactics development, and verification of correction of deficiencies determined during previous testing. The transition from engineering development models to pilot production units to full production units will also be assessed. OT-IV will answer issues not resolved by OT-III, if required.

3. (U) System Characteristics: The system Development Test and Evaluation performance characteristics are contained in Table I-1. The system Operational Test and Evaluation performance characteristics are contained in Table I-2.

Table I-1

DEVELOPMENT TEST AND EVALUATION PERFORMANCE CHARACTERISTICS

	Validation Phase		Full Scale Development Phase	
	THRESHOLD	DEMONSTRATED	THRESHOLD	DEMONSTRATED
Weapon Performance				
Active Acquisition Range (yards/(meters)) 1/				
Target Strength (decibels) Doppler (knots)	[redacted]		[redacted]	
(U) Passive Acquisition Range (yards/(meters)) 1/				
(U) Countermeasures effectiveness (percent) 2/				
(U) Minimum Effective Firing Range (yards/meters))				
(U) Maximum Preset and Warmup Time (seconds)				
Maximum Torpedo Reactivation Time (minutes)	[redacted] 5		[redacted] 5	
Dual Torpedo Operation	Demonstrate 3/		Demonstrate	
Self Protection	Demonstrate 3/		Demonstrate	
Shallow Water Operation	Demonstrate 3/		Demonstrate	
(U) Speed (knots)	[redacted]		[redacted]	
(U) Depth Range (feet)				
Doppler Range (knots)				

Program Element: 64675N

Title: MK 48 Advanced Capability (Engineering)

	Validation Phase		Full Scale Development Phase	
	THRESHOLD	DEMONSTRATED	THRESHOLD	DEMONSTRATED
(U) Maximum False Alarm Rate				
Active	[redacted]		[redacted]	
Passive				
(U) Volume Search Rate (billions of cubic yards/second) 1/				
Active				
Passive				
(U) Reliability 4/				
Fleet Warshot Torpedo	Not applicable			
Fleet Exercise Torpedo	Not applicable			
Torpedo (less Warhead/IE Section and Wire Coil			Not applicable	
Instrumentation/Exercise Subsystem			Not applicable	
Warhead Exploder			Not applicable	
ATE MTBF	Not applicable		150 hr.	
(U) Maintainability				
Torpedo				
Mean Turnaround Time (hours)	Not applicable			
Maximum Turnaround Time (95%) (hours)	Not applicable			
Mean Corrective Maintenance Time (hours)	Not applicable			
Maximum Corrective Maintenance Time (hours)	Not applicable			
Torpedo Deployed Shelf Life (years)	Not applicable			
ATE				
Mean Corrective Maintenance Time (hours)	Not applicable			
Maximum Corrective Maintenance Time (hours)	Not applicable			
(U) Supportability				
Compatible with Integrated Logistic Support Plan	Not applicable		Demonstrate	
(U) System Safety	Demonstrate		Demonstrate	
(U) Survivability				
Environmental Test (shock, temperature, humidity, etc.)	Not applicable		Demonstrate	
Electromagnetic Vulnerability (hazards of electromagnetic radiation to ordnance)	Not applicable		Demonstrate	

(U) Notes:

1/ Predicted performance in deep isothermal water, [redacted] Simulator demonstrations will be used to predict acquisition ranges for conditions that cannot be established by sea runs.

2/ Based on in-water and simulator demonstration.

3/ During validation phase simulator demonstration may be required.

Program Element: 64675N

Title: MK 48 Advanced Capability (Engineering)

Table I-2

OPERATIONAL TEST AND EVALUATION PERFORMANCE CHARACTERISTICS

PARAMETER	Validation Phase THRESHOLD	Validation Phase DEMONSTRATED	Full Scale Development Phase THRESHOLD	Full Scale Development Phase DEMONSTRATED	Post Milestone III
(U) Operational Effectiveness 1/					
Submarine Threat 2/					
Uncountered (probability of hit)	[redacted]		(To be determined based on Operational Test I results)		
(U) Surface Threat 3/					
Uncountered (probability of hit)			(To be determined based on Operational Test I results)		
(U) Countermeasure Effectiveness			(To be determined based on Operational Test I results)		
Minimum Effective Firing Range			[redacted]		
Reliability					
Fleet Warshot Torpedo	Not applicable				
Fleet Exercise Torpedo	Not applicable				
Torpedo (less Warhead/IR Section and Wire Coil)	[redacted]		Not applicable		
Instrumentation/Exercise Subsystem			Not applicable		
Warhead Exploder			Not applicable		
ATR MTBF	Not applicable		150 hr.		
(U) Maintainability					
Torpedo					
Mean Turnaround Time (hours)			Not applicable		6.5
Maximum Turnaround Time (95) (hours)			Not applicable		10.0
Mean Corrective Maintenance Time (hours)			Not applicable		1.5
Maximum Corrective Maintenance Time (hours)			Not applicable		3.0
Maximum Corrective Maintenance Time (hours)			Not applicable		3.0
Torpedo Deployed Shelf Life (years)			Not applicable		3.0
Mean Corrective Maintenance Time			Not applicable		1.5
Maximum Corrective Maintenance Time			Not applicable		3.0
(U) Availability Torpedo 90 day patrol)			Not applicable		0.90
Compatibility			Range Launch Craft		Attack Submarines 4/
Training/Documentation/Procedures			Support Project Operations		Support Operational Evaluation

(U) Notes:

1/ Values of Operational Effectiveness are based on computer simulation and MK 48 Mod 1/3 in-water testing. Predicted performance in deep isothermal water, [redacted]

2/ [redacted] target strength (random) long and short range firings in deep, isothermal water; short range firings in typical Greenland-Iceland-United Kingdom gap environment sea states [redacted] Speeds from 0 (hovering) to maximum.

3/ Destroyer (1040 Class) speed 5-30 knots.

4/ Compatibility extends to Ballistic Missile Submarines when MK 118 and 113 Fire Control System Ordnance Alterations are installed in FY 1987.

4. (U) Program Documentation: No formal reports have been issued for subphases conducted to date.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64704N
DoD Mission Area: 235 - Naval Warfare Support
Title: Oceanographic Instrumentation 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	-	-	391	489	Continuing	Continuing
R1740	Oceanographic Survey Support	-	-	391	489	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.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Chief of Naval Operations publishes yearly requirements for developing oceanographic instruments suitable for general survey use to collect oceanographic data to meet fleet needs. These are illustrated by the stringent oceanographic data requirements of the present Fleet Ballistic Missile Defense Program and the environmental requirements of both strategic and tactical systems. This program will provide a means by which specialized advanced oceanographic instrumentation, developed in response to these needs, can be transitioned into operational systems through Engineering Development.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Not applicable. This is a FY 1984 new start.

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

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

F. (U) RELATED ACTIVITIES: Certain tasks in Program Element 61153N, Defense Research Sciences (Oceanography) are directed toward applied research in oceanographic sensor and measurement equipment. Likewise tasks in Program Elements 62759N, Ocean and Atmospheric Support Technology and 62711N, Undersea Target Surveillance are directed toward exploratory development studies of specific oceanographic problem areas related to Navy operational needs, remote sensing and mapping, charting and geodesy efforts. Some tasks in Program Element 11224N, SSBN Security Technology Program are directly concerned with measurement of oceanographic parameters necessary for Fleet Ballistic Missile Defense. The Defense Mapping Agency has two specific program elements, 63701B and 64701B, which support general Navy mapping, charting and geodesy efforts. Program Element 63704N, Oceanographic Instrumentation Development develops the instrumentation technology that will transition to this program.

G. (U) WORK PERFORMED BY: Naval Ocean Research and Development Activity, Bay St. Louis, MS; Naval Oceanographic Office, Bay St. Louis, MS; and contractors to be determined.

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

(U) Project R1740, Ocean Instrumentation Systems: (NEW START) This project accepts systems successfully completing advanced development and performs engineering development necessary to produce operationally, useable instruments.

(U) FY 1982, not applicable.

(U) FY 1983, not applicable.

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

o Design, fabricate and test an operational air-expendable shear current profiler.

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

226

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64710N
Title: Navy Energy Program (Engineering)
LOD 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	14,677	15,704	22,547	26,547	Continuing	Continuing
Z0347	Mobility Fuels/Engineering	2,062	3,050	5,751	8,426	Continuing	Continuing
Z0371	Energy Conservation/Engineering	12,615	12,654	16,796	18,121	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 conservation project is directed at qualification of procedures and the development of equipments and facilities with improved energy efficiency characteristics. The mobility fuels project develops capability for Navy power plants (ship and aircraft) to operate on a wider variety of fuels (i.e., fuels with less stringent specifications and/or commercial grade fuels) as well as on fuels derived wholly or in part from synthetic crudes (shale, coal and tar sands). The potential of alternative energy systems technologies being developed by the private sector and other Government agencies is being explored to reduce the dependence of Navy bases on petroleum fuels.

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, 436 from Project S0371 and 871 from Project S0347 were reprogrammed to Program Element 63724N, Project S0829, Energy Conservation (Advanced), to provide long lead funding for Navy participation in a joint Navy/Air Force program to improve the fuel efficiency and power level of the Detroit Diesel Allison T-56 turboprop engine which powers C-130, P-3, and E-2/C-2 aircraft. In FY 1983 Project Z0347 was reduced by 1,000 and Project Z0371 by 2,000 as a result of Navy distribution of the Congressionally directed unspecified reduction. In FY 1984, Project Z0371 was reduced by 2,758 and Project Z0347 by 3,089 as a result of Navy R&D funding constraints and prioritization.

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	11,975	15,984	18,704	28,394	Continuing	Continuing
S0371	Energy Conservation/Engineering	9,401	13,051	14,654	19,554	Continuing	Continuing
S0347	Mobility Fuels/Engineering	1,434	2,933	4,050	8,840	Continuing	Continuing
S0350	Alternative Energy Systems/Engineering	1,140	0	0	0	0	1,900

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

F. (U) RELATED ACTIVITIES: Navy Energy Program (Advanced), Program Element 63724N.

G. (U) WORK PERFORMED BY: IN-HOUSE: David W. Taylor Naval Ship Research and Development Center, Annapolis, MD; Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Weapons Center, China Lake, CA; Naval Air Propulsion Center, Trenton, NJ; Naval Air Development Center, Warminster, PA; Naval Ship Systems Engineering Station, Philadelphia, PA. CONTRACTORS: General Electric, Lynn, MA; EXXON Research and Engineering Co, Linden, NJ; Acurex Corp, Mountain View, CA; Vought Corporation, Dallas, TX; Grumman Aerospace, Bethpage, NY; McDonnell Douglas, St. Louis, MO; United Technologies Corp, West Palm Beach, FL; Detroit Diesel Allison, Indianapolis, IN; Westinghouse Electric Corp, Millville, OH; Combustion Engineering Inc., Windsor, CT.

227

Program Element: 64710N Title: Navy Energy Program (Engineering)

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

(U) Project Z0347, Mobility Fuels Engineering: This project provides for the conduct of performance and endurance tests with full scale equipments to examine the effect of varying fuel properties and quality on the performance and reliability of Navy equipment. These test engines may be stationary mounts or fleet/squadron components. These tests will also validate results generated from laboratory and sub-scale tests during development of an improved fuel qualification procedure which will reduce the cost and time required to qualify new fuels for Navy use.

(U) In FY 1982, 1,000-hour endurance tests were conducted with shale derived Diesel Fuel Marine on ship propulsive and auxiliary diesel engines. Aircraft engine hot section tests were conducted on six Navy aircraft engines with five different representative future fuel types.

(U) The FY 1983 program consists of:

- o Limited endurance tests on two aircraft engines which have been determined to be the ones most sensitive to fuel quality.
- o Baseline fuel testing on stationary ship boilers.

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

- o Limited endurance tests on two additional aircraft engines.
- o Baseline fuel testing on ship diesels and gas turbines.

(U) Program to Completion: Full scale engine testing to validate sub-scale and laboratory tests resulting in an improved, less costly, fuel qualification procedure.

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

(U) Project Z0371, Energy Conservation/Engineering

1. (U) DESCRIPTION (Requirement and Project): This project is designed to improve the energy efficiency of naval systems and to reduce the impact on Navy operations of escalating fuel costs and supply interruptions. This project supports qualification and field testing of energy procedures and equipments to improve the Navy's energy conservation posture in three platform areas: (a) Ship Conservation: The development and use of advanced underwater hull cleaning methods to reduce hull drag caused by fouling will continue to provide over 8 percent savings in ship energy usage. Development and use of improved anti-fouling paints expected by 1985 will reduce the requirement for frequent hull cleaning between overhaul periods and represents an additional energy savings of 10 percent over hull cleaning. Further fuel savings are expected in the machinery area with the use of stack gas analyzer-controlled boilers, improved boiler burners and economizers, improved auxiliary power systems, machinery performance monitoring systems and reduction in fresh water use. (b) Aircraft Conservation: Flight testing of selected equipment modifications and operating technique changes to existing aircraft will be supported under this project. Aircraft types will include P-3, A-7, F-14, A-6 and S-3. Equipment changes will include, cost-effective aerodynamic-drag clean-up modifications, flight management computer aids, and engine efficiency enhancements. Modified operating procedures which will improve refueling practices, pre-flight planning, and flight efficiency will also be tested. (c) Facility Conservation: The major thrust is to meet the Department of Defense goals for reduction in facility energy of 20 percent by 1985, 25 percent by 1990, and 30 percent by 2000 in existing structures, and 45 percent in new structures by 1985. The primary emphasis of the facility program is on building and equipment retrofits which provide the greatest savings and the highest pay-back potential to reduce dependence upon petroleum and to maintain the Navy's status as a customer for new energy technologies. Areas of effort include thermal conservation in buildings, including micro-processor energy monitoring and control systems, electric systems improvements, cogeneration of steam and electricity, and development of Naval systems to utilize non-petroleum, renewable energy resources.

228

Program Element: 64710N Title: Navy Energy Program (Engineering)

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Ship Conservation: Projects which evaluate commercially developed anti-fouling hull and propeller coatings transitioned from Advanced Development (PE 63724N) funding as commercial sources for manufacture of the polymers were developed. Heating, ventilation, air conditioning development and large scale hydrodynamics testing also transitioned from Advanced to Engineering development. Demonstration of improved diesel engine noise isolation techniques continued, which will allow more efficient diesel generators to be used on future combatant ships. Development of a combustion optimizer for steam combatants and propeller pitch control/trailshafting for DD-963 was completed in FY 1982. Machinery optimization studies were extended to aircraft carriers and auxiliary ships. Aircraft Conservation: Conducted fuel conservation experiments with operational P-3 squadrons to document the effectiveness and practicality of operational procedure modification concepts. Initiated and/or continued development of flight performance advisory/management systems for P-3, A-7, A-6, and F-14. Developed fuel efficiency modifications for the J-52 and TF-41 engines which power A-6, TA-4J and A-7 aircraft. Evaluated drooped flaps for A-6 and A-7 and investigated other simple aerodynamic modifications such as pylon removal/modification for the A-7, A-6 and P-3. Initiated flight test of flight performance advisory systems in P-3 aircraft. Facility Conservation: Work continued on the engineering development of technologies and products for high payback retrofit of facilities or for significant reduction in Navy petroleum usage.

b. (U) FY 1983 Program: Ship Conservation: Testing of anti-fouling hull and propeller coatings will continue. Development of high efficiency heating, ventilation, and air conditioning systems continues and development of high efficiency motors/motor controllers transitions from Advanced (PE 63724N) to Engineering development. Steam plant improvement project such as the combustion optimizer and machinery performance monitor transition to fleet implementation. Machinery optimization studies of major auxiliary ships will continue. Large scale testing of advanced hull forms and propulsion systems will commence as promising concepts emerge from Advanced Development. Aircraft Conservation: Accelerate development of flight performance advisory monitoring systems for P-3, A-6, F-14, and A-7. Expand study of applicability of these on-board systems to S-3A, C-9, C-130, E-2/C-2 and other aircraft. Complete evaluation of fuel saving modifications for the P-3 and A-7. Complete development and test and evaluation on the J-52 engine efficiency improvements. Facilities Conservation: Engineering development of high payback projects will continue. This will include cooperative efforts, such as the Federal Photovoltaic Utilization Program and electric vehicle demonstration program. Other areas of development include continuation of the Organic Rankin Cycle Diesel Bottoming System test at Naval Air Station, Bermuda, revised site selection criteria for new and retrofit energy monitoring and control systems, determination of designed versus operational performance of solar heating systems installed in Navy family housing, and completion of the request for technical proposal for cogeneration (electricity and steam) systems at Naval Air Station, Cecil Field and Naval Air Station, Jacksonville.

c. (U) FY 1984 Planned Program: Complete polymer commercialization for anti-fouling paints and conduct fleet technical evaluation. Test and evaluation of energy efficient hydrodynamic modifications for future ship designs accelerates. The standby main feed pump operational evaluation will be completed, thus completing development of equipment modifications for the existing steam fleet. Continued development of auxiliary equipments (e.g., desalinization plants; heating, ventilation and air conditioning; lighting; energy storage; electric motors, etc.) concentrates on needs of existing and future gas turbine ships. Aircraft Conservation: Evaluate fuel savings modifications for S-3A, C-9, C-130, E-2/C-2 and other aircraft in accordance with studies performed in PE 63724N during FY 1983. Continue development of flight performance advisory/management systems for P-3, A-6, A-7, F-14, S-3A and other Naval aircraft. Facility Conservation: Efforts will emphasize conservation and substitution engineering development projects with the greatest navy-wide benefit. Included is work on decentralized cogeneration (electricity and steam), hybrid photovoltaic and wind systems development to power remote test range instrumentation, and continued development of energy monitoring and control systems for Naval facilities.

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

e. (U) Milestones: Not applicable.

229

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64711N
DoD Mission Area: 333 - Naval Warfare

Title: Command and Control Systems (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	10,109	13,734	26,017	25,048	Continuing	Continuing
X0697	Fleet Command Support/Composite Operational Reporting System	677	789	1,157	685	Continuing	Continuing
X0714	Ocean Surveillance Information System	2,281	2,655	3,307	3,491	Continuing	Continuing
X1144	Navy Command and Control System Ashore	7,151	10,290	21,553	20,872	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: Evolutionary upgrades to this continuing command and control and information support system will satisfy requirements stated in the Navy Command and Control Plan and incrementally work toward 100% attainment of validated Navy Command and Control Systems Ashore Required Operational Capabilities. The efforts will improve the capability of Navy commanders to make and promulgate decisions based upon sufficiently accurate and timely information while satisfying the information requirements of National Command Authorities and the Joint Chiefs of Staff and interoperating with NATO and allied Navies where 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 this Descriptive Summary are as follows: Net decreases in FY 1982 of 520 and in FY 1983 of 1,771 and an increase in FY 1984 of 5,836. The FY 1982 decreases in projects X0714 (185) and X1144 (335) are due to Navy reprogramming; the FY 1983 decrease is the result of 1,000 Congressional reduction plus revisions (-771) of cost estimates; and the FY 1984 net increase of (5,836) is due to an increase in the scope of Project X0697 (816) to include Navy Reporting Structure and Report Origination System software development; an increase in cost due to repricing of Project X0714 (870); and re-definition of the requirements and increase in scope for transition to develop architecture and systems interfaces with the World Wide Military Command and Control System Information Network, Project X1144 (4,150).

(U) Procurement changes in FY 1983 and FY 1984 represent a reprofiling of correlation Upgrade (-1700) FY 1983 and (+8700) FY 1984 and transfer of (-100) in FY 1983 and FY 1984 for providing spare parts. Other increases in FY 1984 are due to Program Objectives Memorandum 1984 decisions to upgrade Anti Submarine Warfare Operations Center communications equipment (+1,740), automatic test equipment (+400) and training equipment price index adjustment (+111).

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	9,476	10,629	15,505	20,181	Continuing	Continuing
X0697	Fleet Command Support/Composite Operational Reporting System	764	677	848	341	Continuing	Continuing
X0714	Ocean Surveillance Information System	1,974	2,466	3,927	2,437	Continuing	Continuing
X1144	Navy Command and Control System Ashore	6,738	7,486	10,730	17,403	Continuing	Continuing

Program Element: 64711N Title: Command and Control Systems (Engineering)

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
Communications and Electronic Equipment						
Total Other Procurement, Navy (OPN)	2,294	4,773	11,964	630	Continuing	Continuing
Military Construction, Navy (MCON)	2,900	-	-	-	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Hardware and software upgrades in the Navy Command and Control System Ashore must not only address internal system requirements but must also evolve with changes in the Worldwide Military Command and Control System, Navy Combat Direction System, and National/Naval Intelligence Collection systems. As additional capabilities are incorporated into external sensor systems, the Navy Command and Control System Ashore data bases, information transfer, and display techniques must be upgraded in order to be responsive to the needs of Navy commanders. Interfaces with the following programs are important. PE 63735N, Worldwide Military Command and Control System Architecture Support: the Navy Command and Control System Ashore, Navy Worldwide Military Command and Control System Software Standardization software runs on the Honeywell 6000 hardware and performs Navy functions necessary to support the Chief of Naval Operations, Fleet Commanders and subordinate commands; PE 64219, Airborne ASW Development: ASW Operations Center System supports P-3 crew brief and debrief and provides ASW data and information to the Navy Command and Control System Ashore, while the Navy Command and Control System Ashore permits data base access by the ASW Operations Center; PE 24311N, Undersea Surveillance Systems: the Ocean Surveillance Information System and Navy Command and Control System Ashore utilize the correlated products of this program's Main Evaluation Centers in creating an Ocean Surveillance Product for tactical and intelligence use; PE 63717N, Command and Control Systems (Advanced): this program develops hardware, software and procedures in advanced technology areas for eventual implementation in Navy Command and Control Systems; PE 62721N, Command and Control Technology: this program does exploratory development into technological areas which could support Command and Control requirements of the future; PE 63763N, Integrated Tactical Surveillance Systems: This program provides correlation support to the Ocean Surveillance Information System which in turn provides sensor management data back to related sensor systems.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Commander, Operational Test and Evaluation Force, Norfolk, VA; Naval Shore Electronics Engineering Activity Pacific, Pearl harbor, Hawaii, and Yokosuka, Japan; the Naval Electronics Systems Engineering Centers, Portsmouth, VA and Vallejo, CA; and the Naval Electronic System Command Detachment, Patuxent River, MD. CONTRACTORS: PRC Information Sciences Co., McLean, VA; CTEC, Inc., Falls Church, VA; VITRO Laboratories, Silver Spring, MD.

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

(U) Project X0697, Fleet Command Support/Composite Operational Reporting System: The Composite Operational Reporting System project satisfies a Chief of Naval Operations operational requirement to standardize the Navy Reporting System in order to achieve increased reporting responsiveness, improve accuracy of reporting and reduce man intensive efforts in originating readiness reports. Additionally, the Composite Operational Reporting System satisfies a Navy Command and Control System Ashore requirement to reduce the man hours associated with correcting operational reports in order to maintain data base accuracy. The Composite Operational Reporting System will integrate existing operational reports into one set of standardized reports while reducing current duplicative reporting of the same elements of information in the present system. The Composite Operational Reporting System will provide interoperability with the Joint Chiefs of Staff and NATO reporting requirements where appropriate.

(U) In FY 1982, completed development of reporting instruction for Navy promulgation.

- Defined the redesign of Navy World Wide Military Command and Control System Software Standardization to interface with Navy Status of forces software in order to accept Navy reporting structure reports.

Program Element: 64711N Title: Command and Control Systems (Engineering)

(U) The FY 1983 program consists of:

- o Developing Navy Reporting Structure software.
- o Completing Report Origination System software Functional Description, Type A Specifications and Program Perform Specifications.

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

- o Software development for Navy Reporting Structure software.
- o Commence Report Origination System Software design for implementation on Fleet systems.
- o This is a continuing program and will implement Report Origination System at Fleet and Ashore Units and will de hardware and software to interface with other shipboard systems.
- o The FY 1984 increase of $368 Thousand supports continuing software development and implementation.

(U) Project X0714, Ocean Surveillance Information System: This project is a subsystem of the Navy Command and Control S and produces and/or integrates and disseminates evaluated intelligence and ocean surveillance data in support of Navy comma at all levels.

(U) In FY 1982:

- o Completed development of Baseline software corrections identified from testing and operational use.
- o Requested and evaluated competitive industry proposals for Ocean Surveillance Information System Baseline Up effort.

(U) The FY 1983 program consists of:

- o Completing installations of Baseline corrections.
- o Awarding contract to the successful bidder for the Baseline Upgrade effort.
- o Commencing software design/conversion.

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

- o Software design/conversion.
- o Commence testing of software modules.
- o This is a continuing program which designs, develops, tests and installs approved preplanned incremental hardw software upgrades.

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

(U) Project X1144, Navy Command and Control System Ashore

1. (U) DESCRIPTION (Requirement and Project): The Navy Command and Control System Ashore serves 33 operational sites wide, a training site and an engineering development site, extends from the Worldwide Military Command and Control System

Program Element: 64711N Title: Command and Control Systems (Engineering)

face at theater command centers to the Shipboard Combat Direction Systems Navy Command and Control System Ashore ensures that Nav Commanders are able to make and promulgate decisions based upon sufficiently accurate and timely information. While the subele ments of Navy Command and Control System Ashore are now managed as an integrated system, the respective hardware and software o the subelements still reflect their independent origin. The Navy Command Center/Fleet Command Centers subelement is comprised o four facilities supporting the Chief of Naval Operations and three Fleet Commanders in Chief. The Navy Command Center/Flee Command Centers are the Navy Command and Control System Ashore interface with the Worldwide Military Command and Control Syste The Navy Command and Control System Ashore software (Navy Worldwide Military Command and Control System Software Standardizatio resides on Honeywell 6000 hardware and furnishes automated support for commanders by providing communication switching, messag processing, data base maintenance and reporting capabilities required to assess enemy threat and to monitor own force readines status and deployment. Navy Worldwide Military Command and Control System Software Standardization software allows transferrin this information in a timely fashion to the theater commander, his force commanders and ultimately to his task group commander The Ocean Surveillance Information System subelement is comprised of six all source fusion centers supporting national authoritie and the Chief of Naval Operations, theater commanders, and the deployed numbered fleet commanders. The Anti-Submarine Warfa subelement is comprised of four Force High Level Terminals and fourteen High Level Terminals which provide theater, numbere fleet, task force and task group commanders with ocean surveillance and anti-submarine warfare information originating from Nav maritime patrol aircraft. Force High Level Terminals are based upon UYK-7 hardware while High Level Terminals are based upon CI 901 hardware. Force High Level Terminals and High Level Terminls software support Navy commanders by providing message processi and origination aids, integrated own force and hostile force information, and environmental data. Access to the theater Nav Worldwide Military Command and Control System Software Standardization data base is also provided. Submarine Operating Comma Centers consist of five facilities which support Navy theater commanders and numbered fleet commanders in directing submarine ar operations. Four of these centers are supported by Shore Targeting Terminals. A Navy Command and Control System Ashore Engin ering Development Facility is located in Patuxent River, MD. Portions of this facility presently serve as the Navy Command a Control System Ashore training facility. In FY 1984 the Chief of Naval Education and Training is to assume all responsibility f Navy Command and Control System training.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Navy Command and Control System Ashore upgrades to Navy Worldwide Military Command and Contr System Software Standardization software and the Force High Level Terminal were tested in accordance with the Test and Evaluati Master Plan. Developed and tested the Integrated Information Display system to be installed in FY 1983 in Commander in Chi Pacific Fleet Command Center. The development of system performance specifications and operational concepts for the next gener tion of Navy Command and Control System improvements was initiated.

b. (U) FY 1983 Program: Navy Command and Control System Ashore upgrades to correct deficiencies identified during Pha II testing will continue. Install the Integrated Information Display system in Command in Chief Pacific Fleet Command Cente The Navy Worldwide Military Command and Control System Software Standardization Positional Processing software and the Force Hi Level Terminal fleet issue 2.0 software will complete testing. Hardware procurement will continue and military construction wi be completed for a Navy Command and Control System Ashore training facility to be staffed and managed by Chief of Naval Educati and Training in FY 1984. The transfer of Navy Command and Control System Ashore training will allow the Engineering Developme Facility to devote all resources to engineering development and testing. The development of system specifications for Na Command and Control System Ashore Transition upgrades will be completed and engineering design will be initiated.

c. (U) FY 1984 Planned Program: Design of follow on Transition upgrades will continue and development will be initiate Acquisition of prototype upgrade hardware will be initiated. Develop and test a software enhancement to the Integrated Inform tion Display to support valid operational requirements. Increased funding of $11,263K supports the: increase in scope of t Transition task architecture, development and systems interfaces with the Worldwide Military Command and Control System Inform tion Network. Testing of software maintenance releases for all systems will continue at the Navy Command and Control Syst Ashore Engineering Development Facility.

Program Element: 64711N Title: Command and Control Systems (Engineering)

d. (U) Program to Completion: Continue to upgrade the Navy Command and Control System Ashore while working toward fulfi ling the Navy Command and Control System Ashore Required Operational Capabilities. Evolutionary developments will continue consonance with the Navy Command and Control Plan. Ensure that Navy Command and Control System Ashore upgrades and interfac address the requirements of future Worldwide Military Command and Control System Information System, Navy Combat Direction Syste and National/Navy Intelligence Collection Systems enhancements. This is a continuing project.

234

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64713N
DoD Mission Area: 233 - Anti-Submarine Warfare
Title: 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	17,820	9,773	3,735	0	0	161,098
S0234	Tactical Towed Array Sonar AN/SQR-19	17,820	9,773	3,735	0	0	161,098
	Quantity						(3)

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 will develop the AN/SQR-19 tactical towed array sonar to provide anti-submarine warfare ships with a tactical passive detection, classification and tracking capability against [redacted] in support of the Navy's sea control function. The AN/SQR-19 will be the primary passive acoustic sensor for all battle group and convoy escorts in the 1990's and will be installed in DD-963, DDG-993, FFG-7, and CG-47 class ships. It will, in conjunction with the Light Airborne Multi-Purpose System MK III, provide a weapons delivery capability [redacted]

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 of 1,958 results from reprogramming to cover increased and unbudgeted contractor costs associated with Government Furnished Equipment; the FY 1983 decrease of 109 is due to a revised inflation index; the FY 1984 increase of 883 is for support of engineering development models and for specific engineering effort for new software incidental to the introduction of the production configuration AN/UYS-1(V) Acoustic Signal Processor into the AN/SQR-19 production model; and the resultant is a 2,732 increase in Total Estimated Cost.

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	24,624	15,862	9,882	2,852	0	158,366
S0234	Tactical Towed Array Sensor AN/SQR-19	24,624	15,862	9,882	2,852	0	158,366

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: (Dollars in Thousands)

Title	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
OPN	*9,039	69,190	135,333	125,614	680,130	1,022,924
Quantity	(0)	(5)	(16)	(13)	(64)	**(98)
SCN	0	60,830	31,320	42,440	199,312	333,902
Quantity	(0)	(5)	(3)	(4)	(17)	(29)

* The entire procurement in FY 1982 is for AN/UYQ-21 display sets. These displays are units of the AN/SQR-19 which are shared with the Light Airborne Multi-Purpose System MK III shipboard electronics, when the aircraft is airborne. Procurement of these displays is required to support Light Airborne Multi-Purpose System MK III installations which occur before the availability of the AN/SQR-19.

** Includes seven Operator Trainers and two Maintenance Trainers.

Program Element: 64713N Title: Tactical Towed Array Sonar

F. (U) RELATED ACTIVITIES: Program Element 25620N, Anti-Submarine Warfare Combat System Integration - Development of fully integrated anti-submarine warfare control subsystem for coordinated employment of anti-submarine warfare sensor, fire control and weapon systems; Program Element 25623N, AN/SQS-53B (80217) - Modernization of the surface ship, hull-mounted AN/SQS-53 Sonar; Program Element 25624N, AN/SQR-18 Improvement Program, improve the AN/SQR-18A Tactical Towed Array Sonar; Program Element 64212N, Light Airborne Multi-Purpose System MK III - Development of an anti-submarine warfare helicopter for deployment from surface ships; and Program Element 63553N, Surface Ship Silencing - Reduction of towing ship self and radiated noise.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Underwater Systems Center, New London, CT (lead laboratory). CONTRACTORS: General Electric Company, Syracuse, NY; Chesapeake Instruments Division, Gould Incorporated, Glen Burnie, MD.

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

(U) Project 80234, Tactical Towed Array Sonar AN/SQR-19: This project provides for the full-scale development of the AN/SQR-19 Sonar Receiving Set through design, fabrication, test and installation of three Engineering Development Models; two of which will remain at the contractor's facilities for purposes of training, testing and configuration management, and a third system which has been installed aboard ship for purposes of formal technical and operational evaluation by the Navy prior to approving the system for production and fleet use. The AN/SQR-19 will afford designated ASW ships the ability to effectively counter the threat posed by submarines[redacted] The AN/SQR-19 system will utilize standard Navy signal processors (AN/UYS-1), computers (AN/UYK-20), and display units (AN/UYQ-21), as well as a contractor furnished signal conditioner and receiver which will perform [redacted] functions, which are not feasible in standard hardware. Concurrently with installation in fleet ships, commencing in FY 1985, the AN/SQR-19 will be integrated with the improved AN/SQS-53A Sonar and the Light Airborne Multi-Purpose System MK III by the ASW Combat Systems Integration Program (Program Element 25620N), forming the AN/SQQ-89(V) Anti-Submarine Warfare Combat System Suite.

(U) In FY 1982, the following major milestones were achieved:

- The installation of an Engineering Development Model System aboard the USS MOOSBRUGGER (DD-980) was completed in March 1982.
- The shipboard system underwent six weeks of at-sea testing during the third quarter FY 1982.
- Preproduction tests were initiated at the contractors' facilities.
- Formal configuration, production readiness and reliability reviews were successfully completed.

(U) The FY 1983 program consists of:

- Completing preproduction tests and submitting final reports and recommendations.
- Undergoing formal technical and operational evaluation of the system aboard the MOOSBRUGGER (DD-980) in the September-December 1982 time frame prior to receiving a recommendation for Approval for Production and presenting the AN/SQR-19 in March 1983 for a production approval decision.
- Analyzing and correcting any deficiencies noted during technical and operational evaluations and validating these corrections through Follow-On Test and Evaluation.

- o Continuing contractor technical and logistic support of the shipboard installation.

(U) The following tasks are currently planned for FY 1984:

- o Continuing analysis of system performance data from the shipboard system to identify and define technical problems as they occur and to evaluate possible ways of solving these problems.
- o Continuing the development, testing and installation of those hardware and software modifications required to correct deficiencies in the system noted during on-going tests.
- o The development, documentation, testing and integration of those computer program modifications required to accommodate the changes imposed by usage of the new production configuration of the AN/UYS-1(V) Signal Processor in the system architecture.

(U) All work under this project is scheduled for completion by the end of FY 1984.

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

J. (U) TEST AND EVALUATION DATA:

1. (U) Development and Test and Evaluation: Numerous sea tests with earlier towed array systems such as the AN/SQR-15 Towed Array Surveillance Sonar and AN/SQR-18 Tactical Towed Array Sonar provided the data necessary to test and validate the basic design concepts which were subsequently incorporated in the AN/SQR-19 Tactical Towed Array Sonar system at the start of its Full Scale Engineering Development in 1976. Initial at-sea tests in May 1976 aboard the USS GLOVER (AGFF-1) measured array performance and array self-noise. Superior array self-noise performance was demonstrated in similar tests conducted at sea aboard the USS GARCIA (DD-1040) in March - April 1980. Overall AN/SQR-19 system performance was evaluated in sea trials conducted in May and June 1982 using the developmental system installed aboard the USS MOOSEBRUGGER (DD-980). During FY 1981 and FY 1982, both General Electric Company (Ship-based Electronics Subsystems) and Gould, Incorporated, (Array, Handling Equipment) conducted reliability and maintainability tests, design certification tests, and began preproduction environmental tests for each subsystem. With the exception of several non-critical environmental tests which will be completed by 1 January 1983, all scheduled factory testing has been successfully completed. Both contractors will continue to support Navy Follow-On Test and Evaluation of the AN/SQR-19 with special factory tests on an as-required basis. Technical Evaluation of the AN/SQR-19 was conducted by the Naval Underwater Systems Command, New London, CN aboard the USS MOOSEBRUGGER (DD-980) during a month of sea tests (September-October 1982) using fixed acoustic sources at an undersea acoustics test range.

2. (U) Operational Test and Evaluation: Commander, Operational Test and Evaluation Force conducted an Operational Evaluation of the AN/SQR-19 in November - December 1982 in order to determine the operational effectiveness and operational suitability of the system. The system installed the USS MOOSEBRUGGER (DD-980) was used for this evaluation. The Operational Evaluation Quicklook Report stated that the AN/SQR-19 is operationally effective and operationally suitable and recommended limited fleet production. The Follow-On Test and Evaluation will be conducted aboard the USS MOOSEBRUGGER in the February - June 1983 time frame. Initial operational capability of the AN/SQR-19 is scheduled for

Program Element: 64713N

Title: Tactical Towed Array Sonar

3. (U) System Characteristics:

Parameter	Objective	Demonstrated
Detection Range		
Max. Detection Speed		
Max. Survival Speed		
Array Deployment Time	75 minutes	44 minutes
Array Retrieval Time	75 minutes	57 minutes
Operational Availability		
Mean Time Between Failure Ship Electronics Array		
Mean Time to Repair Ship Electronics Array		

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64714N
DoD Mission Area: 235 - Naval Warfare Support

Title: Air Warfare Training Devices
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	27,889	17,000	11,778	3,158	0	70,462
W1112	SH-60B Trainers	27,889	17,000	11,778	3,158	0	70,462

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 program meets the requirements of the Chief of Naval Operations and Fleet Commanders for development and initial procurement of (a) an Operational Flight Trainer which offers safe flight training, more rapid accomplishment of training, and reduced capital investment in operational aircraft used for training; (b) a weapons tactics trainer for mission training of the Air Tactical Officer and the Sensor Operator; and (c) a full set of maintenance trainers to teach troubleshooting/repair of the aircraft. Funding in FY 1984 is required in order for Trainers to be completed in time to meet the SH-60B Operational requirements. FY 1985 funding is required to incorporate engineering change proposals into the trainers which have been incorporated in the production 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 net decrease of 3,089 in FY 1983 represents a Congressional reduction. The increase of 5,206 in FY 1984 represents the replacement of funds, decremented in previous fiscal years which resulted in the deletion of vital training tasks that are required and now must be retrofitted to the trainers.

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	13,681	27,889	20,089	6,572	Continuing	Continuing
W1110	CH-53E System Trainer	3,044	0	0	0	0	8,661
W1112	SH-60B Trainer	10,637	27,889	20,089	6,572	1,035	66,222

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	44,930	9,656	73,262	8,847	0	136,695
MILCON	12,500	9,000	0	0	0	21,500

F. (U) RELATED ACTIVITIES: Program Elements 62757N, Human Factors and Simulation and 63733N, Training Devices Technology. Some of the technology involved in Project W1112 has been developed under the U.S. Army UH-60 Blackhawk Helicopter Synthetic Flight Trainer System, 64204N.

239

Program Element: 64714N Title: Air Warfare Training Devices

G. (U) WORK PERFORMED BY: IN-HOUSE: OTHERS: N/A CONTRACTORS: IBM Federal Systems Division, Owego, N.Y.; Sikorsky Aircraft Corporation, Stratford, Connecticut; Singer-Link Corporation, Houston, Texas, McDonnell-Douglas Corporation, St. Louis, Missouri, Norden Systems, Norwalk, Connecticut, Cubic Corporation, San Diego, California, Gould Inc., Fort Lauderdale, Florida/Melville, New York.

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

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

(U) Project W1112, SH-60B Trainers

1. (U) DESCRIPTION (Requirement and Project): The objective of this project is to develop: (a) a weapons tactics trainer for weapon system training for aircrew teams to successfully perform Anti-submarine Warfare/Anti-ship Surveillance and Targeting missions (b) an operational flight trainer for training the pilot and copilot in the operation and performance envelope of the SH-60B; and (c) a set of maintenance trainers for organizational level maintenance training.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Contract was awarded under W1112 to fabricate and test the Operational Flight Trainer the Weapons Tactics Trainer, and a set of Naval Aviation Maintenance Trainers. Completed design, production planning, and began fabrication, initiated logistics and development of trainer technical manuals for the Naval Aviation Maintenance Trainers. Completed critical design review for hardware and software; fabrication of hardware; initiated software test; technical manual; and Integrated Logistics Support development for the Operational Flight Trainer and Weapons Tactics Trainer. Completed instructor station fabrication of the Weapons Tactics Trainer.

b. (U) FY 1983 Program: Complete Naval Air Maintenance Trainers fabrication and in-plant testing; provide instructor training on air vehicle trainers; provide and validate technical manuals on air vehicle trainers; ship to trainer site. Complete software development, final hardware assembly, integration, and testing; install and accept on site; complete technical manual development for the Operational Flight Trainer. For the Weapons Tactics Trainer, complete development of software integration and fabrication of the Communications, Sensor Operator, and Air Tactical Officer sub-systems; initiate testing.

c. (U) FY 1984 Planned Program: For the Naval Air Maintenance Trainers complete technical manual validation and site installation of avionics trainer; verify and inspect all trainers onsite; provide engineering services, repair of repairables, installation of repairables, installation of retrofit kits and final checkout. For the Operational Flight Trainer complete on-site acceptance, instructor training; initiate design for trainer update to aircraft configuration. For the Weapons Tactics Trainer complete in-plant tests, site installation, instructor and maintenance training; supply support, and technical manuals; initiate design for trainer update to aircraft configuration.

d. (U) Program to Completion: For the Operational Flight Trainer Install update changes, test and verify system, deliver final technical manuals. For the Weapons Tactics Trainer Install update changes and verify system; deliver final technical manuals.

e. (U) Milestones: Not applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64715N
Title: Surface Warfare Training Devices
DoD Mission Area: 735 - 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	40,716	31,897	28,069	60,243	Continuing	Continuing	
Z1126	Surface TOMAHAWK Trainer	111	97	1,941	1,951	10,400	14,596	*
Z1127	FFG-7 Perry Pierside Combat System Team Trainer	10,314	4,258	469	4,400	29,605	57,481	*
Z1128	MK 86 Fire Control System Operator/Trainer	1,390	0	0	0	0	4,259	*
Z1129	Auto Radar Tracking Trainer	300	0	0	0	0	1,355	
Z1130	Naval Tactical Data System Laboratory	3,346	1,101	196	0	0	9,936	*
Z1131	Device 14E19/14E25/14E25A Modifications	2,121	2,242	821	0	0	5,988	*
Z1132	LAMPS MK III/SQQ-89 Training System	8,295	5,224	6,243	4,381	2,668	33,738	*
Z1134	OUTBOARD Operator/Team Trainer	5,779	779	291	0	14,023	27,900	*
Z1140	Tactical Advanced Combat Direction Electronic Warfare Modifications	3,278	3,531	372	6,342	30,679	48,418	*
Z1268	AN/SQR-18A Sonar Operator/Team Trainer	1,516	1,717	1,658	0	0	5,291	*
Z1270	Universal/SQQ-89 Sonar Maintenance Trainer	0	2,088	5,712	5,756	21,104	34,660	*
Z1273	Tactical Action Officer Trainer	2,368	1,519	0	0	11,806	19,993	*
Z1274	Air Intercept/Anti-Submarine Air Controller Trainer	100	3,276	2,932	2,935	4,456	14,689	*
Z1309	LSD-41 Propulsion Control Trainer	0	0	0	2,346	12,256	14,602	
Z1427	Training Device "14A12" Surface ASW Trainer	0	1,987	3,044	3,396	12,292	20,719	*
Z1430	ASW Tactical Team Trainer	0	0	0	1,892	17,819	19,711	
Z1431	SQQ-30 Mine Navigation Trainer	0	0	0	1,954	15,674	17,628	*
Z1434	Shipboard "Organic" Combat Systems Team Trainer	500	390	955	2,357	34,304	38,506	*
Z1435	Shiphandling Training System	199	568	135	4,304	18,705	24,259	*
Z1436	Surface Warfare Training Analysis	1,101	411	759	575	Continuing	Continuing	
Z1605	TERRIER New Threat Upgrade Team Trainer	0	2,709	2,541	2,948	6,474	14,672	*
Z1713	AN/SQQ-89(V) Onboard Trainer	0	0	0	14,706	10,370	25,076	*

* Quantity 1, prototype

For programs which complete during the outyears, the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated except for Project Z1436 whose funding includes outyear escalation and all work or development phases now planned or anticipated through FY 1985 only. For programs which complete in FY 1983 (Z1273), the above funding includes outyear escalation and encompasses all work or development phases now planned or anticipated through FY 1983 only. For programs which complete in FY 1984 (Z1130, Z1131, Z1134, Z1268), the above funding includes outyear 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: Supports the Chief of Naval Operations Surface Warfare Sponsor (OP-03) mission by improving readiness and training. Satisfies requirements of the Fleet and the Chief of Naval Education and Training for development of prototype surface warfare training devices to provide improved training thereby improving operational readiness, efficiency, and safety, and decreasing training time and cost.

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 changes: A net decrease of 1,030 in FY 1982, a net decrease of 941 in FY 1983 and a net decrease of 18,189 in FY 1984. These decreases were caused by reduction and reprogramming in FY 1982, escalation factors in FY 1983 and by restructuring and budgetary constraints in FY 1984.

Program Element: 64715N Title: Surface Warfare Training Devices

(U) In FY 1982 four projects were cancelled and the remaining FY 1982 dollars were reallocated within the Program Element. The four cancelled projects were: Fire Control/Search Radar Maintenance Trainer (Z1138), AN/SQQ-23/SQR-20A Operator/Team Trainer (Z1428), Dynamic Subsystem Simulation (Z1433), and the Digital Radar Target Generator (Z1454). The results of analysis efforts completed early FY 1982 indicated that the Fire Control/Search Radar maintenance training could be provided through existing systems; that the AN/SQQ-23/SQR-20A training would be incorporated in another ongoing effort; that analysis effort determined a more cost effective training solution for the Dynamic Subsystem Simulation; and that the current Digital Radar Target Generator plan is not cost effective. Also the following projects were reduced and funds reprogrammed within the Program Element as a result of restructuring as follows: Surface TOMAHAWK Trainer (Z1126) -300, MK 86 Operator/Trainer (Z1128) -400, Naval Tactical Data System Laboratory (Z1130) -100, Tactical Advanced Combat Direction Electronic Warfare Modifications (Z1140) -250, and Air Intercept/Anti-Submarine Air Controller Trainer (Z1274) -3,863. Funds were reprogrammed into the following projects as indicated: FFG-7 Perry Pierside Combat System Team Trainer (Z1127) 3,200, LAMPS MK III/SQQ-89 Training System (Z1132) 3,363, Outboard Operator/Team Trainer (Z1134) 900, AN/SQR-18A Sonar Operator/Team Trainer (Z1268) 245, Tactical Action Officer Trainer (Z1273) 1,250, Shipboard "Organic" Combat Systems Team Trainer (Z1434) 200, and Surface Warfare Training Analysis (Z1436) 600. FFG-7 Perry Pierside/Combat System Team Trainer (Z1127) was increased to fund government approved contract rate increases and to provide limited contractor support for the device. Funding for LAMPS MK III/SQQ-89 Training System (Z1132), Tactical Action Officer Trainer (Z1273) and Shipboard "Organic" Combat Systems Team Trainer (Z1434) were increased to accelerate development and acquisition of these systems. Device 14E19/14E25/14E25A Modifications (Z1131), Outboard Operator/Team Trainer (Z1134), AN/SQR-18A Sonar Operator/Team Trainer (Z1268), and Surface Warfare Training Analysis (Z1436) were increased to more effectively fund the requirements encompassed by these projects.

(U) FY 1983 funding reflects decreases for inflation adjustments as follows: FFG-7 Perry Pierside Combat System Team Trainer (Z1127) -200, Tactical Advanced Combat Direction Electronic Warfare Modification (Z1140) -100, Universal/SQQ-89 Sonar Maintenance Trainer (Z1270) -100, and TERRIER New Threat Upgrade Team Trainer (Z1605) -200. The following were a result of budgetary constraints: Shipboard "Organic" Combat Systems Team Trainer, (Z1434), -106, Shiphandling Training System (Z1435) -150, Surface Warfare Training Analysis (Z1436) -85, and TERRIER New Threat Upgrade Team Trainer (Z1605) -200.

(U) In FY 1984 budgetary constraints are the principal reason for program reduction of 18,189. The following projects were restructured resulting in decreased funds as indicated: Tactical Advanced Combat Direction Electronic Warfare Modifications (Z1140) -1,225, Universal/SQQ-89 Sonar Maintenance Trainer (Z1270) -6,917, Training Device "14A12" Surface ASW Trainer (Z1427) -876, Shipboard "Organic" Combat Systems Team Trainer (Z1434) -1,066, Shiphandling Training System (Z1435) -5,123, and TERRIER New Threat Upgrade (Z1605) -327. ASW Tactical Team Trainer (Z1430) was reduced by 478 and rescheduled to commence in FY 1985 Surface Warfare Training Analysis (Z1436) was reduced -18. The following projects' funding was increased as indicated: Surface TOMAHAWK Trainer (Z1126) increase in total estimated cost by 791 for additional Government Furnished Equipment Naval Tactical Data System Laboratory (Z1130) increased by 196 to complete project, Device 14E19/14E25A Modifications (Z1131) increase in total costs by 343 for program growth, LAMPS MK III/SQQ-89 Training System (Z1132) increased by 5,263 to accelerate the SQQ-89 development, Outboard Operator/Team Trainer (Z1134) increased by 4 for escalation, AN/SQR-18A Sonar Operator/Team Trainer (Z1268) increase in total estimated cost 1,331, to accelerate development and Air Intercept/Anti-Submarine Air Controller Trainer (Z1274) increase in total estimated cost by 1,267 to procure additional required operational equipment.

(U) Total increase of 229,238 in Total Estimated Cost in FY 1984 Descriptive Summary as compared to the FY 1983 Descriptive Summary reflects total estimated costs beyond FY 1987 not previously included in the FY 1983 Descriptive Summary (149,274) plus a total of 79,964 for revised estimated project costs resulting from new starts, project changes in scope, restructuring, and delayed delivery dates, with subsequent increased out-year costs resulting from prior year budgetary constraints. Total estimated cost revisions are indicated for each of the following projects as follows: Surface TOMAHAWK Trainer (Z1126) +10,637, FFG-7 Perry Pierside Combat System Team Trainer (Z1127) +37,005, MK 86 Operator/Trainer (Z1128) -400, Naval Tactical Data System Laboratory (Z1130) +296, Device 14E19/14E25/14E25A Modifications (Z1131) +343, LAMPS MK III/SQQ-89 Training System (Z1132) +13,998, Outboard Operator/Team Trainer (Z1134) +14,777, Tactical Advanced Combat Direction Electronic Warfare Modifications (Z1140) +34,337, AN/SQR-18A Sonar Operator/Team Trainer (Z1268) +1,576, Universal/SQQ-89 Sonar Maintenance Trainer (Z1270) +9,556, Tactical Action Officer Trainer (Z1273) +13,056, Air Intercept/Anti-Submarine Air Controller Trainer (Z1274) +4,795, Training Device "14A12" Surface ASW Trainer (Z1427) +12,874, ASW Tactical Team Trainer (Z1430) +8,534, Shipboard "Organic"

Program Element: 64715N Title: Surface Warfare Training Devices

Combat Systems Team Trainer (Z1434) +26,685, Shiphandling Training System (Z1435) +11,022, and TERRIER New Threat Upgrade Team Trainer (Z1605) +504. These increases, which incorporated out-year funding not included in FY 1983 Development Summary, will be addressed under the individual projects in paragraph M.

Project S0791, Advanced Fire Fighting Trainer, originally scheduled to transition into PE 64715N, will remain in PE 64703N.

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	34,428	41,746	32,838	46,258	Continuing	Continuing	
Z1126	Surface Tomahawk Trainer	96	411	97	1,150	190	3,959	*
Z1127	FFG-7 Pierside Combat System Team Trainer	5,825	7,114	4,458	479	0	20,476	*
Z1128	MK 86 Operator/Team Trainer	2,369	1,790	0	0	0	4,659	*
Z1129	Auto Radar Tracking Trainer	1,255	300	0	0	0	1,555	*
Z1130	Naval Tactical Data System - (NTDS) Laboratory	3,795	3,444	1,101	0	0	9,640	*
Z1131	Device 14E19/14E23/14E25A Modifications	404	2,121	2,242	478	0	5,645	*
Z1132	LAMPS MK III/SQQ-89 Acoustic Operator Trainer	6,677	4,932	5,224	980	1,917	19,740	*
Z1134	OUTBOARD Operator/Team Trainer	3,888	4,879	779	287	190	13,123	*
Z1138	Fire Control/Search Radar Maintenance Trainer	7	1,550	0	1,134	0	2,691	*
Z1140	Tactical Advanced Combat Direction System and Electronic Warfare Modifications	3,416	3,528	3,431	1,397	1,409	14,081	*
Z1268	AN/SQR-18A Sonar Operator/Team Trainer	400	1,271	1,717	327	0	3,715	*
Z1270	Universal/SQQ-89 Sonar Maintenance Trainer	0	0	2,188	12,629	10,287	25,104	*
Z1273	Tactical Action Officer Trainer	3,500	1,118	1,519	0	0	6,937	*
Z1274	Air Intercept/Anti-Submarine Air Controller Trainer	990	3,963	3,276	1,665	0	9,894	*
Z1427	Training Device "14A12" Surface ASW Trainer	0	0	1,987	3,920	1,938	7,845	*
Z1428	AN/SQQ-23/SQR-20A Operator/Team Trainer	0	1,909	0	2,649	0	4,558	*
Z1430	ASW Tactical Team Trainer	0	0	0	478	10,699	11,177	*
Z1432	Universal Vertical Launching System Maintenance Trainer	0	0	0	478	9,053	9,531	*
Z1433	Dynamic Subsystem Simulator	242	2,010	0	3,937	0	6,189	*
Z1434	Shipboard "Organic" Combat Systems Team Trainer	0	300	496	2,021	9,003	11,820	*
Z1435	Shiphandling Training System	348	199	718	5,258	6,714	13,237	*
Z1436	Surface Warfare Training Analysis	1,216	501	496	777	Continuing	Continuing	
Z1454	Digital Radar Target Simulator	0	406	0	3,146	1,150	4,695	*
Z1605	Terrier New Threat Upgrade Team Trainer	0	0	2,909	2,868	8,391	14,168	*
S0791	Advanced Firefighting Trainer	(3,373)	** (1,200)	** (1,200)	** (700)	** 0	(6,473)	**

* Quantity 1, prototype
** Planned funding transfer from PE 64703N. Not included in PE 64715N totals.

Program Element: 64715M Title: Surface Warfare Training Devices

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS: All projects - OPN/BA-7.

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
FFG-7 Perry Pierside Combat System Team Trainer		17,720	9,998	10,040	29,787	67,545
Auto Radar Tracking Trainer		1,133	0	0	0	1,133
Device 14R19/14R25/14R25A Modifications			5,437	5,378	0	11,815
LAMPS MK III/SQQ-89 Training System			9,146	19,185	51,827	80,158
OUTBOARD Operator/Team Trainer			8,143	0	0	8,143
AN/SQR-18A Sonar Operator/Team Trainer			4,194	0	0	4,194
SQQ-89 Maintenance Trainers 14G2/3/4/5 (21270) P-1 #358				5,758	53,975	59,733
BSOT/BD (14G1) P-1 #364			6,631	6,377	5,878	18,886
TACDEW MOD (20F15A & B) P-1 #371				4,862	33,748	38,610

F. (U) RELATED ACTIVITIES: Program Elements 62757N (Human Factors and Simulation Technology) and 63733N (Simulation and Training Devices) develop and demonstrate technology for application to this program.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Training Equipment Center, Orlando, Florida. CONTRACTORS: Gould Incorporated, Melville, New York; Cubic Corporation, San Diego, California; Honeywell Incorporated, West Covina, California; Tracor Incorporated, Austin, Texas; Grumman Aircraft Company, Bethpage, New York; Sperry Corporation, Reston, Virginia; Hughes Aircraft Company, Fullerton, California; American Communications Incorporated, Sperry Systems, Great Neck, New York; AAI Corporation, Corkeysville, Maryland; Systems Engineering Labs, Fort Lauderdale, Florida; and Singer Corporation, Silver Spring, Maryland.

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

(U) Project 21126, Surface TOMAHAWK Trainer: This device will stimulate operational TOMAHAWK Common Weapon Control System equipment and consoles to provide individual and team training. To be installed in one Naval Tactical Data System mockup at Tactical Advanced Combat Direction System and Electronic Warfare Pacific and in two Naval Tactical Data System mockups at Tactical Advanced Combat Direction System and Electronic Warfare Atlantic. The trainer will provide individual operator training and team training when integrated with the Tactical Advanced Combat Direction System and Electronic Warfare complex.

(U) In FY 1982, commenced analysis to determine baseline description for the trainer that reflect the specific training requirements.

(U) The FY 1983 program includes:

- o Continuing analysis efforts in the development of a functional baseline.
- o Transition of functional baseline to engineering specifications in preparation for contract award.

(U) For FY 1984, contract preparation will continue.

(U) This program will be completed in FY 1988 (September 1988). Acceptance testing will be conducted in August 1987. Initial Operational Capability is scheduled in October 1987. Contract award for the production units is anticipated in December 1986 after a successful design review of the prototype system. Increase in total estimated costs are the result of delays in operational equipment development, increased projected costs to procure government furnished equipment and inclusion of FY 1988 funding in the FY 1984 Descriptive Summary.

Program Element: 64715M Title: Surface Warfare Training Devices

(U) Project Z1127, FFG-7 Perry Pierside Combat System Team Trainer: This device will provide refresher and replacement crew Anti-Submarine Warfare, Anti-Air Warfare, Surface Warfare and multi-threat team training for FFG-7 class combat system personnel. The device will utilize the ship and installed operational equipment as trainee stations. External environment, target/weapon signals and dynamic scenario generation will be developed within the trailerized (pierside) computational system. Appropriate target signals will be transmitted to the ship for stimulation of on-board operational equipment. Weapon signals and other selected data will be returned to the computer to permit problem evaluation.

(U) In FY 1982, design efforts were completed with a successful design review in April 1982. Fabrication has commenced on the prototype unit. Permission has been granted for the award of a production contract for the follow-on units.

(U) The FY 1983 program, continues fabrication.

(U) For FY 1984, the planned effort is as follows:

- o Complete development test and evaluation in April 1984.
- o Initial Operational Capability scheduled May 1984.

(U) The prototype program will be complete in FY 1985 with Navy Support Date scheduled in April 1985. The increase in Total Estimated Cost includes increasing the capability of the trainer for the FFG-36 and DD-963 class ships, and inclusion of total out-year funding in the FY 1984 Descriptive Summary.

(U) Project Z1130, Naval Tactical Data System Laboratory: The Naval Tactical Data System Laboratory will consist of a complex of simulated Naval Tactical Data System hardware controlled and stimulated by a digital computer and appropriate interface equipment. This Laboratory will support the growing demand for personnel qualified in Naval Tactical Data System console operation plus the rapidly increasing requirement for team, refresher, and transition training.

(U) In FY 1982, fabrication was completed in April 1982, and development test and evaluation was conducted and completed in December 1982.

(U) The FY 1983 program consists of completion of:

- o Developmental test and evaluation
- o Initial operational capability

(U) For FY1984, it is planned to:

- o Complete Training Capability Testing in December 1983.
- o Schedule Navy Support Date for February 1984.

(U) The increase in total estimated costs reflects increased project costs to complete the device in FY 1984.

(U) Project Z1131, Device 14E19/14E25/14E25A Modifications: There are currently eight 14E19's (AN/SQS-26CX sonar simulator) and two 14E25/25A's (AN/SQS-53/53A sonar simulator) in use plus one additional 14E25A under procurement. Numerous discrepancies have been identified between the characteristics of the AN/SQS-26CX sonar and Device 14E19, requiring extensive simulator modifications. In addition, the Quick Reaction Fleet Improvement Program will significantly alter the characteristics of both the SQS-26CX and the SQS-53/53A sonars. This project will respond to the impact of the Quick Reaction Fleet Improvement Program.

(U) In FY 1982, fabrication was continued through to completion in August. The testing program is in preparation.

Program Element: 64715N Title: Surface Warfare Training Devices

(U) The FY 1983 program consists of:

- o Completion of development testing in May 1983.
- o Achievement of Initial Operational Capability in September 1983.

(U) For FY 1984 it is planned to:

- o Conduct Training Capability Testing in March with contractor on-site support.
- o Attain Navy Support Date in September 1984.

(U) The increase in total estimated cost reflects increased costs to develop a Common Ocean Model and inclusion of total out-year funding in the FY 1984 Descriptive Summary.

(U) Project Z1132, LAMPS MK III/SQQ-89 Training System: This trainer will consist of selected components of the shipboard operational SQQ-28, SQR-19, and SQS-53B equipments, simulation/stimulation equipments, a simulation computer and appropriate instructional control capabilities. In the Tactical Advanced Combat Direction and Electronic Warfare installation the trainer will interact with the operational program and Tactical Data System display/control consoles in selected mockups and with the Tactical Advanced Combat Direction and Electronic Warfare environment generation/exercise control systems through a satellite buffer computer. Integrated into the Tactical Advanced Combat Direction and Electronic Warfare complex the trainer will support coordinated combat system team training in applications of the extended range anti-submarine warfare mission of the LAMPS III system and the integrated SQQ-89 system. The training system will support operator training on the individual systems as well as team training when integrated.

(U) In FY 1982, the prototype development contract was awarded to the Singer Company in February. Design development is underway to finalize the required hardware and software.

(U) The FY 1983 consists of:

- o System design review, scheduled for May 1983.
- o Fabrication of prototype.

(U) For FY 1984 planned efforts include:

- o Production contract award for follow-on units in December.
- o Completion of fabrication.
- o Developmental testing during May and July 1984.
- o Attainment of Initial Operational Capability in August.

(U) This program will be completed in FY 1986 with Navy Support Date scheduled in April 1986. Training Capability Testing will be conducted in February. The increase in Total Estimated Cost is the result of accelerated development of the training requirement and accelerated trainer delivery in 1984.

(U) Project Z1134, Outboard Operator/Team Trainer: Selected surface ships will be receiving new systems designated OUTBOARD to assist in the task of detection, identification and tracking of non-radar targets which are a threat to the force. Integrated into the Tactical Advanced Combat Direction and Electronic Warfare complex, this trainer will support team training for the OUTBOARD team operating in a simulated tactical environment with the combat system team. The trainer will include operationally equivalent operator consoles for the following six trainee positions: System Supervisor, Direction Finding Operator, High-Frequency and Very-High Frequency Operators (3), and Caliper Operator.

Program Element: 64715M Title: Surface Warfare Training Devices

(U) In FY 1982, development design continued to completion. Fabrication of the prototype has started.

(U) The FY 1983 program consists of:

- o Fabrication completion in July.
- o Development Testing to be completed in late August.
- o Initial Operational Capability in September.

(U) For FY 1984 it is planned to conduct Trainer Capability Testing in July and August with Navy Acceptance scheduled in September.

(U) The increase in total estimated costs include developing OUTBOARD II (Caliper/Harvester) and inclusion of total out-year funding in the FY 1984 Descriptive Summary.

(U) Project Z1140, Tactical Advanced Combat Direction Electronic Warfare Modifications: The Tactical Advanced Combat Direction System and Electronic Warfare training complexes located at the Fleet Combat Training Centers Atlantic and Pacific provide facilities for integrated combat direction system team training. During the operational life of these complexes numerous add-on capabilities have been incorporated and frequent changes made to the Master Simulation Program to maintain currency with fleet training requirements. The continued expansion of the complexes coupled with obsolescence of processing equipment have resulted in saturation of computer processor time. Therefore, the potential for further growth is negligible in the present configuration. Continuing requirements for integration of new combat system capabilities identified through the Navy Training Plan process mandates a complete system redesign to support initial qualification and/or replacement training in combat system operation, utilization, and applications for personnel assigned to shipboard combat system billets.

(U) In FY 1982, development of the prototype design was completed. A successful Design Review was conducted in February. Fabrication has commenced.

(U) The FY 1983 program consists of continuing fabrication.

(U) For FY 1984 it is planned to continue fabrication.

(U) The increase in Total Program Cost includes restructuring of Tactical Advanced Combat Direction System and Electronic Warfare to include integration of LAMPS MK III capability as well as increasing training capability in command and control, communications, and interaction with operational units. Additionally this cost increase reflects significantly reduced FY 1984 funds resulting in delayed delivery and increased out-year costs.

(U) The planned program to conclusion includes:

- o Development Testing December 1985 through February of 1986.
- o Initial Operational Capability scheduled May 1987.
- o Training Capability Testing to complete April 1988.
- o Achieve final Navy Support/Acceptance in May 1988.

(U) Project Z1268, AN/SQS-18A Sonar Operator/Team Trainer: Develop, for the purpose of training, a device which will generate signals simulating those received at the first unit of the AN/SQS-18A Sonar from targets and ambient noise under a variety of environmental conditions and modes of array operation. The device will be capable of operating independently to provide operator

training or jointly with a 14A2 (Series) Device to provide sonar team and anti-submarine warfare team training.

(U) In FY 1982, the prototype contract was awarded in March and a successful Design Review was completed in August. Fabrication of the prototype has started.

(U) The FY 1983 program consists of:

- o Completion of fabrication in February.
- o Developmental Testing in March and April.
- o Achieve Initial Operational Capability in May.

(U) For FY 1984 it is planned to:

- o Complete Trainer Capability Testing in April 1984.
- o Reach Navy Support/Acceptance date in May 1984.

(U) Increased total estimated cost resulted from increased program costs.

(U) Project Z1270, Universal SQQ-89 Sonar Maintenance Trainer: This project will develop the SQQ-89 Sonar Maintenance Training System to support SQQ-89 sonar maintenance aboard FFG-7 and DD-963/CG-47 class ships. The development will provide all hardware/software/courseware to support the training requirements. The trainer suite will provide basic and advanced diagnostic training for Level I and Level II sonar maintenance personnel. The system will accommodate common equipment basic diagnostic and system specific (SQR-19, SQQ-28, and SQS-53B) training.

(U) The FY 1983 program consists of:

- o Contract award December 1982.
- o Begin design development.

(U) For FY 1984 it is planned to:

- o Complete fabrication efforts on the prototype.

(U) The projected program to completion includes:

- o Development Testing in May and June 1985.
- o Initial Operational Capability achieved in June 1985.
- o Training Capability Testing in December 1986.
- o Final Navy Support Date scheduled in January 1987.

(U) Increased total estimated costs resulted from inclusion of total out-year funding requirements in FY 1984 Descriptive Summary.

(U) Project Z1274, Air Intercept/Anti-Submarine Air Controller Trainer: Develop a trainer to provide training in controlling aircraft performing anti-submarine warfare, anti-air warfare, minelaying, search/rescue and other missions. Trainer will be

integrated with existing Tactical Advanced Combat Development and Electronic Warfare complexes and will include twenty-two (22) student stations, an instructor station, and required stimulation/simulation hardware/software.

(U) In FY 1982, the prototype contract preparation was finalized.

(U) The FY 1983 program consists of:

- o Contract Award, scheduled in April 1983.
- o Begin fabrication

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

(U) The planned program to completion includes:

- o Complete fabrication in September 1985
- o Conduct Development Testing November and December 1985.
- o Initial Operational Capability to be achieved in January 1986.
- o Training Capability Testing to be conducted in October 1987.
- o Final Navy Support Data scheduled in November 1987.

(U) Increased total estimated costs result from:

- o Delay in design of operational equipment causing delays in contract award and device delivery.
- o Increased cost estimates for Government Furnished Equipment.
- o Increased Trainer Requirements to include Air Tactical Officer Training.
- o Inclusion of total out-year funding in FY 1984 Descriptive Summary.

(U) Project Z1427, Training Device "14A12" Surface ASW Trainer: The Surface Anti-Submarine Warfare Trainer, Device 14A12, will provide team procedural and tactical training/evaluation in a multi-threat environment for conventional and tactical data equipped ships. A capability to train fifteen ship classes will be provided. Device 14A12 will replace the obsolete and difficult to maintain Device 14A2s currently used to provide Anti-Submarine Warfare team training on FF-1052 look-alike mockups. To provide ASW team training, Device 14A2 shares various Device 14E (Series) operator trainers; Device 14A12 will be a state-of-the-art hardware/software system which does not interface with older Device 14E (Series) operator trainers. Device 14A12 will consist of (1) Combat Information Center Bridge and Own Ship aviation mockups consisting of reprogrammable General Purpose Consoles which allow the flexibility to provide each Anti-Submarine Warfare ship crew member being trained with the capability to exercise the essential procedures of an Anti-Submarine Warfare engagement in a multi-threat environment; (2) an Underwater Battery Plot mockup which consists of reprogrammable Sonar General Purpose Consoles capable of simulating the ship's acoustic sensor consoles for providing ASW team training in a common ocean; (3) control of the Anti-Submarine Warfare team training problem through software controlled interactive instructor/operator consoles; (4) system network architecture which allows General Purpose Consoles and control hardware additions as fleet training requirements expand to meet changes/additions in sensor suites; and (5) software and data base management program architecture which provides user friendly access to modify system characteristics and to change/add sensor suites.

Program Element: 64715M Title: Surface Warfare Training Devices

(U) The FY 1983 program consists of preparing functional descriptions for transition to engineering specifications in preparation for contract award.

(U) For FY 1984 it is planned to:

- o Award contract in July 1984
- o Begin design development.

(U) The planned program to conclusion includes:

- o Complete fabrication March 1986.
- o Initial Operational Capability September 1986.
- o Full Navy Support achieved September 1987.

(U) Increased total estimated cost resulted from expansion of Trainer requirements to include radar/electronic warfare simulation and increased cost estimates related to trainer development.

(U) Project Z1434, Shipboard "Organic" Combat System Team Trainer: Chief of Naval Operations letter Ser 03/212282 of 12 December 1977 identified the need for both pierside and organic trainers to support the spectrum of combat systems team training. The prototype pierside trainer commenced development in December 1980. Further evolution of the "on-board" concept is necessary to develop the required "organic" combat systems team training capability within surface combatants not yet designed.

(U) In FY 1982, baseline specifications for future organic training capability for new weapon systems were started, and analysis of backfitting organic capability into existing systems was begun.

(U) The FY 1983 program consists of:

- o Complete baseline specification.
- o Continue backfitting analysis for the DD-963 class.

(U) For FY 1984 it is planned to determine the functional baseline and technology requirements for the "Organic" embedded training system.

(U) Upon successful development of a functional description, this effort is planned to proceed as follows:

- o Prototype Contract Award in June 1985.
- o Design Review in October 1986.
- o Complete fabrication and testing by December 1987.
- o Initial Operational Capability of the prototype in March 1988.
- o Final Navy Support Date planned for March 1989.

Program Element: 64715N Title: Surface Warfare Training Devices

(U) The increase in total estimated cost is the result of redefinition of project to address full Assistant Secretary of the Navy capability (SQQ-89) for DD-963 On-Board Trainer and inclusion of Total Out-year Funding Requirements in the FY 1984 Descriptive Summary.

(U) Project Z1435, Shiphandling Training System: This task will develop an integrated shiphandling training system providing appropriate basic, advanced and refresher level training throughout the career cycle of all officers and enlisted personnel involved in shiphandling. Ongoing analysis efforts will identify and define in detail the specific training equipment and associated curriculum needed to provide the required training. Prior training experience, including the Computer Aided Operations Research Facility at Kings Point, and results of the preliminary training analysis indicate that development of a sophisticated shiphandling training device as part of the total training system will be required. The analysis indicates that this device will consist of a generic bridge mockup, a Computer Image Generation visual display (day and night) system, a radar display generation system, a computer system for problem generation and appropriate instructional control equipment. Training scenarios will include as examples coming alongside, maintaining station and departure, underway replenishment, entering and leaving port, piloting in restricted waters, conning in a channel, collision avoidance/rules of the road training, and extremis/emergency shiphandling. The visual generation system will depict multiple contacts, shore line/shore scape and appropriate navigational aids/hazards within a dynamic (real time) environment.

(U) In FY 1982, conducted front-end analysis to determine trainer requirements based on stated training objectives.

(U) The FY 1983 program develops detailed functional description.

(U) For FY 1984 it is planned to develop detailed engineering contract specifications.

(U) The efforts in this program to completion include:

- o Contract Award December 1984.
- o Completion of fabrication in February 1986.
- o Conduct of testing in March and April 1986.
- o Initial Operational Capability in April 1986.
- o Reach final Navy Support Date in April 1987.

(U) The increase in total estimated costs includes additional funding requirements for developing the full bridge simulation device and inclusion of total out-year funding requirements in the FY 1984 Descriptive Summary.

(U) Project Z1436, Surface Warfare Training Analysis: This is a continuing program to conduct front-end analysis of specific training problems to include definition of requirements/shortfalls, training objective(s) and student loading. Identify alternate solutions with related cost/training effectiveness tradeoffs.

(U) In FY 1982, this effort provided training analysis and Instructional System Development support to the Chief of Naval Operations, the Chief of Education and Training and the Surface Warfare Training Group in Surface Warfare planning and programming.

(U) The FY 1983 program continues training analysis and Instructional System Development Support.

(U) For FY 1984 it is planned to continue similar work as in previous years.

Program Element: 64715M Title: Surface Warfare Training Devices

(U) Project Z1605, TERRIER New Threat Upgrade Team Trainer: This trainer, when integrated into the existing Tactical Advanced Combat Direction System and Electronic Warfare complexes, will provide a means for dynamic team training in skills essential for the qualification of enlisted ratings assigned to Combat Information Centers and of Weapons Officers in the operation and operational employment of the TERRIER New Threat Upgrade system in a multi-unit, multi-threat environment. The current Tactical Advanced Combat Direction and Electronic Warfare design cannot support TERRIER New Threat Upgrade Training.

(U) FY 1982, not applicable.

(U) The FY 1983 program begins front-end analysis to determine initial training device requirements.

(U) For FY 1984 it is planned to:

- o Develop functional descriptions and engineering specifications.

(U) The projections for this program to completion are as follows:

- o Contract Award December 1984.
- o Completion of fabrication in June 1987.
- o Developmental Testing in January and February 1988.
- o Initial Operational Capability achieved March 1988.
- o Navy Support Date scheduled March 1989.

(U) The increase in Total Estimated Cost results from increased cost estimates related to procurement of New Threat Upgrade government furnished equipment.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64716N
DoD Mission Area: 233 - Antisubmarine Warfare
Title: Submarine Warfare Training Devices
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	33	0	587	980	148	1,917
81735	Gas Management System Trainer	0	0	587	490	0	1,077
81736	Device 21C7/Four Knots Astern	0	0	0	490	148	638
Z0953	Advanced Submarine Optical Visual Trainer	33	0	0	0	0	202

* Quantity 1, prototype

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

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Supports the CNO Submarine Warfare Sponsor (OP-02) mission by improving readiness and training. Satisfies requirements of the Fleet and the Chief of Naval Education and Training for development of prototype submarine warfare training devices to provide improved training thereby improving operational readiness and efficiency, safety, and decreasing training time and costs.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Advanced Submarine Optical Visual Trainer: The changes between the funding profile show in the FY 1983 Descriptive Summary and that show in this Descriptive Summary result from the following changes: The decrease of 4,520 in FY 1982 was due to Navy reprogramming. FY 1983 funding of 3,226 was deleted by Congress in FY 1983 and this program has now been cancelled. Gas Management System Trainer: The increase of 587 is due to the addition of Project 81735 in FY 1984.

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

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	2,908	4,553	3,226	0	Continuing	Continuing
80884	Submarine Advanced Reactive Tactical Training System	2,739	0	0	0	0	2,739*/**
Z0953	Advanced Visual/Near Visual Electro-Optic Sensor Simulator	169	4,553	3,226	TBD	TBD	TBD*/**

* Quantity 1, prototype
** The total estimated cost includes prior funding appropriated under PE 64703N, Training Devices Prototype Development.

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

F. (U) RELATED ACTIVITIES: None

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Training Equipment Center, Orlando, Florida; Naval Sea Systems Command (Code 56Y14), Washington, D.C. OTHERS: Not applicable. CONTRACTORS: Not applicable.

Program Element: 64716N Title: Submarine Warfare Training Devices

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

(U) Project S1735, Gas Management System Trainer: A Gas Management System is being developed as an element of a new generation of atmosphere control systems for nuclear submarines. The Gas Management System will interface with the atmosphere control equipments currently operational within nuclear submarines. The Gas Management System will interface with the atmosphere control equipments currently operational within the nuclear submarine force. Operator and maintainer training is required to support the Gas Management System. The planned approach is to develop an operator/maintenance trainer to support Gas Management System training requirements. The device would consist of a full size Gas Management System cabinet, a microprocessor, local display panels, keyboard, switches, and indicators located in the same configurations as actual equipment plus an Instructor's Input/Output device. The trainer will provide mechanical and electrical/electronic maintenance training. Most components of the training device will be the same, or replicas of, those used on the actual shipboard equipment including the microprocessor and the bulk of the software.

(U) For FY 1984, it is planned to award the contract for the prototype system in November 1983. Design development will commence and continue through to Design Freeze in June 1984. Fabrication will commence upon completion of a successful Design Review.

- o Award contract for the prototype system.
- o Begin design development through design freeze.
- o Begin fabrication.

(U) Program to Completion: (FY 1985)

- o Perform acceptance testing
- o Accept trainer

(U) Project S1736, Device 21C7/Four Knots Astern: Device 21C7, the Multi-Class Advanced Submerged Ship Control Trainer, is an advanced training system which provides shore-based dynamic training capable of simulating problems peculiar to submerged steering, diving, ballast control and casualty control situations for various classes of submarines. Present training provides for forward motion only. A deficiency exists for training personnel in the procedures of backing down a submarine under emergency conditions with four knots stern way. This effort will incorporate this additional training capability into Device 21C7.

(U) For FY 1984 it is planned to complete analysis efforts and preparations for contract award.

(U) The program to completion includes:

- o Contract Award November 1984.
- o Design Review July 1985.
- o Complete Testing August 1986.
- o Initial Operational Capability September 1986.
- o Full Navy Support September 1987.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64717M
DOD Mission Area: 215-Land Warfare Support

Title: Marine Corps Combat Services 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	3,179	2,933	3,795	4,301	Continuing	Continuing
C0050	Test Equipment Development	410	312	214	407	Continuing	Continuing
C0051	Electronics Maintenance Complex	**	**	**	97	TBD	TBD
C0079	Combat Logistics Support (Engineering)	2,401	1,571	2,594	2,807	Continuing	Continuing
C0081	USMC Expeditionary Shelter System	150	260	484	570	Continuing	Continuing
C0083	Marine Corps Controlled Environment Medical System (MCEMS)	160	100	113	125	Continuing	Continuing
C0939	Marine Corps Container System (MCCS)	58	690	194	99	Continuing	Continuing
C1642	Marine Corps Tactical Motor Transport Vehicles (Engineering)	*	*	196	196	Continuing	Continuing

* This is a new FY 1984 program. Fiscal Year 1981-1983 Advanced Development efforts are conducted under PE 63729M.
** Funded under Program Element 63729M, Marine Corps Combat Services Support (Advanced) in FY 1984 and prior 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 for the Engineering Development of Marine Corps equipment needed for the supply, maintenance, engineer, motor transport, 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: Test Equipment Development: The FY 1982 decrease of 1 and FY 1984 decrease of 2 are due to refinement of cost estimates; Combat Logistics Support: The FY 1982 increase of 289 is to support contract efforts on the Medium Girder Bridge Container Float System, the FY 1983 decrease of 76 is due to a reduction in management support contracts, and increase of 391 in FY 1984 is to support evaluation of assault bridges which can be towed by and emplaced from armored vehicles; USMC Expeditionary Shelter System: The FY 1982 decrease of 145 due to reduction in previously estimated costs, and the FY 1984 increase of 192 is to support test and evaluation of soft shelters to replace current tentage. Marine Corps Controlled Environment System: The FY 1982 decrease of 22 and FY 1984 decrease of 1 are due to refinement in cost estimates. Marine Corps Container System: The FY 1982 decrease of 670 is the result of revised program strategy and resulting postponent of prototype contract award and the FY 1984 decrease of 694 is the result of transition of the Pallet Containers, Quadruple Containers and Insert Bins to production deployment; Marine Corps Tactical Motor Transport Vehicles: The FY 1984 increase of 97 is for body variants of the Logistics Vehicle System.

Program Element: 64717M Title: Marine Corps Combat Services Support (Engineering)

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	2,010	3,728	3,009	3,812	Continuing	Continuing
C0050	Test Equipment Development	591	411	312	216	Continuing	Continuing
C0079	Combat Logistics Support (Engineering)	800	2,112	1,647	2,203	Continuing	Continuing
C0081	USMC Expeditionary Shelter System	218	293	260	292	Continuing	Continuing
C0083	Marine Corps Controlled Environment Medical System (MCEMS)	315	182	100	114	Continuing	Continuing
C0939	Marine Corps Container System (MCCS)	86	728	690	888	Continuing	Continuing
C1642	Marine Corps Tactical Motor Transport Vehicles (Engineering)	*	*	*	99	Continuing	Continuing

* This is a new FY 1984 program. Fiscal Year 1981-1983 Advanced Development efforts are conducted under PE 63729M.

256

Program Element: 64717M

Title: Marine Corps Combat Services Support (Engineering)

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
C0079	Combat Logistics Support (Engineering)						
	Reverse Osmosis/Water Distillation Unit, 600 Gallons (Quantity)	44,483 (329)	16,922 (116)	- -	11,197 (70)	59,143 (284)	130,768 (850)
	Mobile Electric Power Distribution System (Quantity)	2,430 (19)	- -	- -	- -	6,450 (18)	12,829 (69)
	Bath Shower Unit (Quantity)	759 (44)	680 (34)	- -	1,664 (76)	8,321 (340)	11,424 (494)
	Air Compressor, 250 CFM (Quantity)	- -	4,387 (154)	1,052 (33)	- -	- -	5,439 (187)
	Amphibious Assault Fuel System (Quantity)	30,468 (29)	9,173 (8)	4,769 (4)	5,057 (4)	28,281 (20)	77,978 (65)
	Medium Girder Bridge (Quantity)	31,294 (20)	30,478 (44)	10,919 (16)	11,377 (12)	9,191 (12)	93,459 (108)
	Bridge Boats (Quantity)	- -	5,545 (21)	1,355 (5)	- -	682 2	7,582 (28)
	Fuel, Water Storage and Pump Modules (Quantity)	2,248 (24)	2,341 (240)	2,658 (261)	6,604 (609)	27,154 (2,241)	41,015 (3,591)
	Laundry Unit, Skid Mtd (Quantity)	1,184 (55)	489 (16)	- -	1,964 (59)	4,279 (118)	7,916 (249)
	Tactical Airfield Fuel Dispensing System (Quantity)	1,766 (6)	3,044 (10)	1,758 (5)	2,611 (7)	2,212 (5)	11,391 (33)
C0081	Marine Corps Expeditionary Shelter System Shelter Family (Quantity)	16,872 (871)	- -	26,683 (912)	9,465 (367)	116,760 (3,517)	174,047 (5,795)
0050	Test Equipment Development						
	Electronic Test Equipment (TELECOM) (Quantity)	1,680 -	4,531 *	6,381 *	10,080 -	50,024 *	76,969 *
	Electronic Test Equipment (NON-TELECOM) (Quantity)	1,167 -	4,086 *	6,450 *	9,954 -	44,845 *	66,511 *
	Test Calibration Maintenance Support (TELECOM) (Quantity)	583 -	840 *	967 *	1,257 -	5,017 *	9,132 *
	Test Calibration Maintenance Support (NON-TELECOM) (Quantity)	572 -	840 *	967 *	1,257 -	5,017 *	9,098 *
	Calibration Facility (Quantity)	- -	- -	- -	- -	6,277 (9)	6,277 (9)
C0939	Container Systems (Quantity) (Mixed)	3,262 (663)	4,071 (605)	- -	- -	58,546 (6,983)	65,884 (8,251)
C1642	Logistics Vehicle System (Quantity)	1,900 -	28,227 *	30,500 *	75,389 *	245,940 *	381,956 *

* To be determined

257

(257)

Program Element: 64717M Title: Marine Corps Combat Services Support (Engineering)

F. (U) RELATED ACTIVITIES: Combat Service Support for the 1980's as in Marine Corps concept for a Field Logistics System, Program Elements 63729M, 26624M; Naval Civil Engineering Laboratory Amphibious Logistics Support Ashore, PE 62760N.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA; Naval Civil Engineering Laboratory, Port Hueneme, CA; Mobility and Equipment Research and Development Command, Fort Belvoir, VA; Marine Corps Logistics Base, Albany, GA. Contractors: Brunswick Corporation, Marion, VA.

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

(U) Project C0050, Test Equipment Development: This program provides test, measurement and diagnostic equipment for the maintenance and repair of tactical equipment, and selects standards for an electronic calibration facility.

(U) In FY 1982, this program:

- o Continued testing semi-automatic test equipment for the Landing Vehicle Tracked 7.
- o Continued selection of calibration standards for use in the Electronic Calibration Facility.

(U) The FY 1983 program consists of:

- o Installing calibration standards in the Electronic Calibration Facility shelters and testing the integrated equipment.
- o Monitoring Navy Metrology program.
- o Procure commercial test, measurement and diagnostic equipment to determine feasibility of meeting Marine Corps requirements.

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

- o Complete automotive test equipment program.
- o Continue to support other services metrology programs of interest.
- o Complete Full Scale Development and Initial Operational Test and Evaluation of Electronic Calibration Facility.
- o Continue to procure and test feasibility of commercial test, measurement and diagnostic equipment to meet Marine Corps requirements.

(U) Project C0079, Combat Logistics Support (Engineering): This program provides the Fleet Marine Forces with improved 25,000 lb and 40,000 lb helicopter slings; provides safety improved food service equipment, mobile electric power distribution systems; and state-of-the-art bulk fuel storage, handling and transport equipment. It also provides for sanitation/habitability with new improved shower/laundry/head equipments; and evaluates U.S. Army assault bridges for suitability for Fleet Marine Forces. Provides a new, improved floodlight set; and develops wet gap crossing capability for the Medium Girder Bridge and bridge boats. Research, develop, test and evaluate these and like items in the Engineering Development stage.

(U) In FY 1982, this program began Development Test/Operational Test II for the following items:

- o Helicopter sling components.
- o Improved food service equipment.

- o Bulk Fuel equipment.
- o Field Shower units.

(U) The FY 1983 program consists of:

- o Fabrication of prototype wet gap bridging pontoons for the Medium Girder Bridge.
- o Beginning Developmental Testing/Operational Testing of a new field laundry unit, wet gap bridging pontoons system and a light towed armored vehicle bridge.
- o Complete Developmental/Operational testing of expeditionary bulk fuel equipment.

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

- o Complete Development Test/Operational Test II of the laundry unit and wet gap bridge pontoon system.
- o Approve expeditionary bulk fuel equipment for service use.
- o Evaluate Light Assault Bridges and combat engineering vehicles for mechanized forces.

(U) Project C0081, USMC Expeditionary Shelter System: This project entails consolidation and standardization of Marine Corps shelters in accordance with DOD INST 4500.37 and provides the Fleet Marine Forces with appropriate shelters to house tactical, logistics and communications, command, control and computer functions. A family of rigid and knock down shelters is being developed to function both in the field and aboard amphibious shipping. Additionally, larger shelters which will function as semi-permanent warehouses and aircraft maintenance hangars have transitioned to production deployment. The shelters developed under this system conform to the parameters of the Joint Committee on Tactical Shelters.

(U) In FY 1982, this program:

- o Completed standardization of various appointments.
- o Investigated design of complexing kits for better air tightness and heat transfer characteristics.
- o Initiated Nuclear, Biological and Chemical collective protection system integration.

(U) The FY 1983 program consists of:

- o Completing procurement specification packages and certification testing of shelters.
- o Approving the Small Shelters for Service Use.

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

- o Continue testing of shelter configurations.
- o Conduct field tests of functional configurations including Nuclear, Biological and Chemical collective protection equipment.
- o Evaluate prototype soft shelter tent replacements.

Program Element: 64717N Title: Marine Corps Combat Services Support (Engineering)

(U) Project C0083, Marine Corps Controlled Environment Medical System: To provide the Marine Corps medical support comprised of functional modules for surgery, acute postoperative care, laboratory/pharmacy, sterile prep, emergency, X-Ray, and preventive medicine laboratory. Medical materials to be sheltered in DoD standard Marine Corps Expeditionary Shelter System (MCESS).

(U) In FY 1982, the program began work on design configuration of the blood bank, medical lab, dental operatory and functional X-Ray module.

(U) The FY 1983 program consists of:

- o Completing designs of the blood bank, medical lab and dental operatory and developmental testing of the X-Ray module.
- o Approving the system for Service Use.

The planned FY 1984 program will evaluate modifications identified as needed during Operational Test and Evaluation.

(U) Project C0939, Container System: This program is to develop a family of dimensionally standardized tactical containers which will comply with current DoD instructions for container supported distribution systems and which will be compatible with standards for intermodal transportation.

(U) In FY 1982, this program:

- o Completed/validated prototype development and Development Test/Operational Test and Evaluation.
- o Conducted engineering efforts to design and procure suitable latching devices to permit arraying the containers.
- o Corrected design deficiencies to increase utility.

(U) The FY 1983 program consists of:

- o Production of procurement specification and data packages.
- o Approving the system for Service Use.
- o Awarding of production contracts.

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

- o Determine required/desired containerization requirements for the General Supply Account.
- o Examine commercial components for possible adoption as components of the standard container family.

(U) Project C1642, Marine Corps Tactical Motor Transport Vehicles (Engineering): This program provides the optimum mix of tactical motor transport vehicles and support equipment for Fleet Marine Forces 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.

(U) This project did not exist in FY 1982.

(U) In FY 1983, the High Mobility Multipurpose Wheeled Vehicle/Logistics Vehicle System will be Approved for Service Use, and production contract will be awarded.

Program Element: 64717M

Title: Marine Corps Combat Services Support (Engineering)

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

- o Continue interservice coordination.
- o Conduct Development Test/Initial Operational Test and Evaluation of motor transport support item, maintenance shop system, and modernization support items.
- o Evaluate commercial items for suitability as members of the Tactical Vehicle Fleet.
- o Field the Logistics Vehicle System.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64718M
DoD Mission Area: 374 - Multimission Technology and Support

Title: Marine Corps Intelligence/Electronic Warfare Systems (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	2,174	2,667	5,411	6,194	Continuing	Continuing
C0060	Forward Pass	1,014	**	***	***	Continuing	Continuing
C0061	Foliage Penetration Battlefield Surveillance Device (FOLPEN)	605	498	20	20	TBD	TBD
C0068	Expendable Jammers (EXJAM)	519	454	440	500	Continuing	Continuing
C0937	Mobile Electronic Warfare Support System (MEWSS)	**	1,665	1,082	1,124	Continuing	Continuing
C1296	All Source Imagery Processor (ASIP)	**	**	3,816	4,494	Continuing	Continuing
C1463	Technical Surveillance Countermeasures Equipment Suite (TSCM)	36	50	53	56	Continuing	Continuing

** Funded in Program Element 63730M, Marine Corps Intelligence/Electronic Warfare Systems
*** Funded in Program Element 26425M, Marine Corps Intelligence/Electronic Warfare Systems

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 engineering 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 shown in the FY 1982 Descriptive Summary and that shown in this Descriptive Summary are as follows: Communications and NonCommunications Electronic Countermeasure Systems: This project was titled Non Communication Electronic Countermeasures System in the FY 1983 and prior descriptive summaries. The new title more accurately reflects Marine Corps requirements for communications as well as non communications jammers; the decrease in this project of 3,713 in FY 1984 reflects this projects continuation in PE 63730M in order to initiate development of a communication jammer. Foliage Penetration Battlefield Surveillance Device: The FY 1982 increase of 38 is due to completion of documentation and evaluation of developmental tests, the FY 1983 decrease of 69 is due to a reduction in management support contracts, and the FY 1984 increase of 20 due to travel costs as this project will cease active development and become a monitoring effort. Expendable Jammers: FY 1982 decrease of 15 due to completion of Hand Emplaced Exjam. The FY 1984 decrease of 10 is due to an inflation adjustment. Mobile Electronic Warfare Support System: FY 1984 decrease of 65 is due to revised acquisition strategy stressing off-the-shelf rather than development of new equipment for the MEWSS suite and refinement of cost estimants, including escalation. All Source Imagery Processor: FY 1984 decrease of 31 is due to a refinement in costs, including escalation. Forward Pass: Increase of 130 in FY 1982 was for system integration, continued environmental testing and preparation of integrated logistics support functions in preparation for developmental and operational testing scheduled in FY 1983.

262

Program Element: 64718M

Title: Marine Corps Intelligence/Electronic Warfare Systems (Engineering)

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	2,615	2,985	2,736	9,237**	Continuing	Continuing
C0066	Forward Mass	1,455	884	*	*	TBD	TBD
C0061	Foliage Penetration Battlefield Surveillance Device (FOLPEN)	598	567	567	*	*	*
C0066	Noncommunication Electronic Countermeasure System	-	**	**	3,713	TBD	TBD
C0068	Expendable Jammers	515	534	454	459	TBD	TBD
C0937	Mobile Electronic Warfare Support System (MEWSS)	-	**	1,665	1,147	TBD	TBD
C1396	All Source Imagery Processor	-	**	**	3,874	TBD	TBD
C1463	Technical Surveillance Countermeasures Equipment (TSCM)	47	-	50	53	TBD	TBD

* Funded in Program Element 26623M, Ground Combat/Supporting Arms Systems.
** Funded in Program Element 63730M, Marine Corps Intelligence/Electronic Warfare Systems.

E. (U) OTHER 1984 APPROPRIATIONS FUNDS:

Procurement, Marine Corps	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	FY 1984 Estimate	Additional Estimate	Estimated Cost
All Source Imagery Processor	-	-	-	-	138,920	138,920

F. (U) RELATED ACTIVITIES: Other service development in electronic warfare, sensor systems, and intelligence systems.

G. (U) WORK PERFORMED BY: In-House: Naval Electronic Systems Command, Washington, D.C.; Naval Air Development Center, Warminster, PA; Naval Avionic Center, Indianapolis, IN; Naval Surface Weapons Center, Dahlgren, VA; Harry Diamond Laboratory, Adelphi, MD; Naval Weapons Center, China Lake, CA; Naval Air Systems Command, Washington, DC

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

(U) Project C0061, Foliage Penetration Battlefield Surveillance Device: This device is a lightweight, single-man transportable ground surveillance radar that will detect moving men or vehicles at 1500 meters in open terrain or 300 meters in dense foliage. It will locate, track and provide distance and azimuth information on moving targets. This is a new capability and is not a replacement for any fielded system and is a joint development program with the Air Force.

(U) In FY 1982, this program:

- Completed a joint advanced development program with the Air Force.
- Demonstrated the feasibility of a radar detecting moving vehicles and personnel in dense foliage.

(U) The FY 1983 program consists of:

- Monitoring the USAF engineering development effort.

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

- Continue monitoring of USAF development effort.
- Participate in critical design reviews, evaluation of tests and demonstrations.

(U) Project C0068, Expendable Jammers: Expendable Jammer units provide countermeasures for targets beyond the effective range of stand-off electronic warfare systems. Subprojects are grouped according to delivery technique: artillery delivered, hand emplaced, air delivered.

(U) In FY 1982, this program:

- Completed joint engineering development and testing of the hand emplaced expendable jammer with the Army.
- Continued joint development of the artillery delivered expendable jammer with the Army.
- Monitored other Service air delivered expendable jammer developments.

(U) The FY 1983 program consists of:

- Improving hand emplaced expendable jammers to be effective against low probability of intercept communications.
- Developing concept of operations and employment of hand emplaced/artillery delivered and air delivered expendable jammers.

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

- Construct an Engineering Development Model of the artillery delivered expendable jammer in coordination with the Army.
- Continue monitoring other Service efforts on air delivered jammers.

(U) Project C093, Mobile Electronic Warfare Support System: This is an electronic warfare suite of equipment designed to fit in a highly mobile tactical vehicle. It will provide the ground commander with a mobile electronic warfare system capable of operating in a variety of tactical situations. The electronic warfare suite will be modular in design to facilitate quick installation and removal. It will detect, locate and degrade enemy tactical AM and FM radio communications.

(U) In FY 1982, this program:

- Evaluated other service efforts.
- Completed requirement definition and documentation.

(U) The FY 1983 program consists of:

- Selecting electronics and antennas to achieve the required capability.
- Developing concept of operations and employment.

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

- Complete fabrication and selection of electronic and antennas.

- o Test/evaluate electronic equipment and antennae.
- o Evaluate compatability of electronic warfare suite with host vehicle.
- o Evaluate concept of operations.

(U) Project C1296, All Source Imagery Processor: An All-Source Imagery Processor is required by FY 1989 to exploit/analyze multi-sensor digital imagery in soft copy and selectively printed hard-copy. The processor will eventually replace the current Imagery Interpretation and Imagery Processing Subsystems of the Marine Air Ground Intelligence System which only have the capability of analyzing visible-spectrum hard copy.

(U) In FY 1982, this program initiated the advanced development effort.

(U) The FY 1983 program consists of:

- o Completing advanced development.
- o Testing/evaluating the system.
- o Developing concept of operations and demonstrating various receipt capabilities.

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

- o Initiate engineering development.
- o Establish a joint engineering development effort with another service (Army/Air Force)
- o Develop specifications for the production system.
- o Demonstrate receipt of national and tactical imagery.

(U) Project C1463, Technical Surveillance Countermeasures Equipment Suite: A continuing requirement exists for improved Marine Corps equipment to expand and enhance the capability of counterintelligence teams to detect sophisticated clandestine surveillance devices employed by hostile intelligence services. RDT&E of this equipment is accomplished by the other Services and agencies of the national intelligence community. Marine Corps requirements are met by evaluating and purchasing off-the-shelf equipment and by monitoring other Service and government agencies developments and techniques.

(U) In FY 1982, selected items were purchased for evaluation by Marine Corps teams.

(U) In FY 1983, telephone analyzers will be purchased, operationally tested, and evaluated.

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

- o Monitor developments of equipment by other Services, government agencies and commercial sources.
- o Continue testing/evaluating off-the-shelf purchases.
- o Procure telephone analyzers.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64719M
DoD Mission Area: 344 - Tactical Command and Control

Title: Marine Corps Command/Control/Communications Systems (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	61,044	27,706	24,925	28,090	TBD	TBD
C0022	Tactical Warfare Simulation, Evaluation and Analysis System	924	927	1,169	879	TBD	TBD
C0036	Marine Integrated Fire and Air Support System	15,305	9,299	6,323	5,610	TBD	TBD
C0037	Tactical Combat Operations System	9,169	14,148	4,863	7,810	TBD	TBD
C0038	Tactical Air Operations Central - 1985	29,306	*	*	*	*	*
C0042	Position Location Reporting System	6,022	2,982	5,659	2,441	TBD	TBD
C0052	NAVSTAR Global Positioning System	165	223	225	74	TBD	TBD
C0053	Joint Tactical Information Distribution System	153	127	2,051	782	TBD	TBD
C1420	Marine Tactical Command and Control System (MTACCS) Modernization	-	-	4,635	10,494	TBD	TBD

* Funded in 64720M, Tactical Air Operations Central - 1985 in FY 1983 and subsequent 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 funds for the Engineering Development of Marine Corps Command, Control and Communications systems. Most of the projects are Marine Tactical Command and Control Systems improvements. This concept envisions an air/ground tactical command and control systems integration to the maximum extent possible and oriented toward the amphibious environment to meet the unique requirements of Landing Force Commanders. The projects are aimed toward more effective command and control of tactical forces during both amphibious operations and land operations.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between the funding profile shown in the 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Tactical Warfare Simulation Evaluation and Analysis System: The FY 1982 decrease of 3 is due to costs associated with transferring the Principal Development Activity from the Naval Ocean Systems Center to the Naval Training Equipment Center; the FY 1983 decrease of 76 is due to a reduction in management support contracts; and the FY 1984 decrease of 16 is due to an inflation adjustment. Marine Integrated Fire and Air Support System: The FY 1982 increase of 14 is due to better estimation of total program costs as the project nears completion, the FY 1983 decrease of 41 is due to a reduction in management support contracts, and the FY 1984 increase of 2867 is due to initiation of previously deferred capabilities for the Engineering Development Model which will be incorporated during

production. Tactical Combat Operations System: The FY 1982 decrease of 51 and the FY 1984 decrease of 13,395 are due to refinement of the program to cut all but absolutely essential requirements, and the FY 1983 decrease of 58 is due to a reduction in management support contracts. Position Location Reporting System: Congress, in the FY 1982 Budget review, deleted procurement funding and directed funds to correct developmental problems. FY 1982 increase of 3497 is due to increased costs associated with the required Productibility, Engineering, Planning/Reliability, Availability, Maintainability, Producibility, Maintainability program results. The FY 1984 increase of 3684 is a direct result of the additional FY 1982 Productibility, Engineering, Planning/Reliability, Availability, Maintainability program causing a delay in FY 1982 and FY 1983 planned programs. NAVSTAR Global Positioning System: The FY 1982 decrease of 1 and FY 1984 decrease of 3 are the result of program restructuring to refine cost estimates including escalation. Joint Tactical Information Distribution System: The FY 1982 and FY 1983 decrease of 7, and the FY 1984 increase of 1454 are due to a refinement of costs, including esc ation, associated with the conduct of Tactical Air Operations Central-1985/Joint Tactical Information Distribution System class 1A integration and joint requirement of the 1989 Initial Operating Capability.

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

Project No.	Title	FY 1981 Actual	FY 1982 Estimate	FY 1983 Estimate	Total FY 1984 Estimate	Additional to Completion	Estimated Cost
	TOTAL FOR PROGRAM ELEMENT	62,291	48,573	27,038	25,699	TBD	TBD
C0022	Tactical Warfare Simulation, Evaluation and Analysis System	1,189	927	1,003	1,185	TBD	TBD
C0036	Marine Integrated Fire and Air Support System	18,616	15,291	9,340	3,456	TBD	TBD
C0037	Tactical Combat Operations System	801	9,220	14,206	18,258	TBD	TBD
C0038	Tactical Air Operations Central - 1985	41,090	20,286	*	*	*	*
C0042	Position Location Reporting System	781	2,525	2,982	1,975	TBD	TBD
C0052	Navigation System Using Time and Ranging Global Positioning System	14	166	223	228	TBD	TBD
C0053	Joint Tactical Information Distribution System	(5**)	160	134	597	TBD	TBD

* Funded in 64720M, Tactical Air Operations Central - 1985 in FY 1983 and subsequent years.
** Funded in 26313M, Marine Corps Telecommunications in FY 1981 and prior years.

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
Tactcial Warfare Simulation Evaluation and Analysis System (Fleet Marine Hardware Upgrade)	200	290			290	TBD
AN/TPQ-36 FIREFINDER				-	TBD	TBD
Radar Set AN/TPQ-36	-	TBD	TBD	-	TBD	TBD
(Quantity)				-	TBD	TBD
Marine Integrated Fire and Air Support System	-	TBD	TBD	-	TBD	TBD
(Quantity)				-	TBD	TBD
Tactical Combat Operations (TCO)	-	TBD	TBD	-	TBD	TBD
(Quantity)				-	TBD	TBD
Position Location Reporting System	-	44,246	52,346	55,464	219,542	371,598
(Quantity)	-	(2)	(2)	(2)	(7)	(13)

Program Element: 64719N Title: Marine Corps Command/Control/Communications Systems (Engineering)

F. (U) RELATED ACTIVITIES: This program relates to all tactical command and control 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 Electronic Systems Command, Washington, DC; Tactical Information Processing and Interpretation - Program Office, L.G. Hanscom Field, Boston, MA; U.S. Army Electronic Command, Fort Monmouth, NJ; Naval Weapons Center, China Lake, CA; U.S. Air Force Space and Missile Organization, Los Angeles, CA; Joint Tactical Information Distribution System Program Office, Air Force Electronic System Division, Boston, MA; Naval Ocean Systems Center, San Diego, CA; and Naval Training Equipment Center, Orlando, FL. Contractors: Norden Systems, Norwalk, CT; and Hughes Aircraft Company, Fullerton, CA.

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

(U) Project C0022, Tactical Warfare Simulation Evaluation and Analysis System: This is a computer assisted tactical training device to assist in the design, conduct, control and evaluation of Fleet Marine Force/Marine Corps Development and Education Command tactical field exercises, tests, and map maneuvers.

(U) In FY 1982, three hardware suites were fielded and placed in operation, and the Initial Field Maneuver/Map Maneuver software programs were accepted.

(U) The FY 1983 program consists of:

- o Continuing to design, produce and test the Integrated Maneuver Controller software applications and expanding the data base for new scenarios.
- o Designing integrated software to include force level simulation.

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

- o Expand the data base for new scenarios using digitized terrain techniques.
- o Continue to develop modules to support varied warfare scenarios including air-to-air, urban warfare and combat service support.

(U) Project C0036, Marine Integrated Fire and Air Support System: This project is a selectively automated tactical command and control system for the integration of mortars, artillery, naval gunfire and direct air support assets to achieve more effective and responsive fire support for ground maneuver forces. It is designed to be implemented at all echelons of the Marine Air Ground Task Force, and will be located at the headquarters, division, infantry and artillery regiments/battalions. Remote firing units and observer teams will interface directly with the Marine Integrated Fire and Air Support System using the Digital Communications Terminal equipment.

(U) The FY 1982 program:

- o Continued fabrication of the Engineering Development Model.
- o Commenced Development Testing.
- o Delivered prototypes of all hardware.

(U) The FY 1983 program will:

- o Continue fabrication of the Engineering Development Model.

268

- o Continue Developmental Testing II.
- o Commence Systems Integration.
- o Complete hardware deliveries.

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

- o Complete Engineering Development Model fabrication with final integration of both hardware and software into the operating system.
- o Complete Developmental Testing II.
- o Commence Operational Testing of equipment and organization.

(U) Project C0037, Tactical Combat Operations Systems: This program is designed to assist Marine Commanders and their staffs as they execute the command and control functions of amphibious operations. It will provide information that has been processed by selective automation and will enhance the effectiveness in which combat operations are conducted by efficiently depicting the current enemy/friendly situation and integrating information from other command and control systems.

(U) In FY 1982, continued support for Marine Integrated Fire and Air Support System/Tactical Combat Operations common hardware and software through application of Tactical Combat Operations funds to the Marine Integrated Fire and Air Support System Engineering Development Model contract. Refinement of essential Tactical Combat Operations requirements commenced.

(U) The FY 1983 program will continue refinement of system requirements and continue Marine Integrated Fire and Air Support System contract support.

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

- o Initiate hardware/software development for Tactical Combat Operations unique functions.
- o Continue support of Marine Integrated Fire and Air Support System Engineering Development Model contract.

(U) Project C0042, Position Location Reporting System: This is a joint Army/Marine Corps program to provide accurate (ground within 15-30 meters; air within 25-100 meters), real-time, position location and identification of friendly combat elements automatically to the Marine commander to facilitate better maneuver control and more effective fire and air support, and, to provide equipped users with reliable position/navigation aid.

(U) The FY 1982 program:

- o Completed Developmental and Operational Testing on the Engineering Development Model (EDM).
- o Initiated a pre-production engineering reliability effort.
- o Obtained a production decision from the Marine Corps System Acquisition Review Council (MSARC) III.
- o Initiated development of the Position Location Reporting System Test Set and Maintenance Van.

Program Element: 64719M

Title: Marine Corps Command/Control/Communications Systems (Engineering)

(U) In FY 1983, it is planned to:

- o Complete the production engineering reliability effort.
- o Continue development of the Position Location Reporting System Test.
- o Award contract for development of Test Requirement Documents, Test Program Sets, and Post Deployment Software Support .
- o Award initial production contract.
- o Deploy Engineering Development Model to 2nd Marine Division and 9th Intelligence Division for doctrine and concept refinement.

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

- o Continue development of Position Location Reporting System Test Set, Test Requirement Documents (TRD), Test Program Sets and Post Deployment Software Support.
- o Initiate Full-Scale Engineering of Position Location Reporting System Steerable Null Antennas Process to enhance system electronic warfare capability.

(U) Project C0052, NAVSTAR Global Positioning System: This program is a space-based radio navigation system that provides equipped users the capability to determine absolute, three-dimensional position, velocity and reference time around the globe. (DoD directed joint program with the U.S. Air Force as executive agency).

(U) In FY 1982, fabrication of the Engineering Development Model began.

(U) In FY 1983, it is planned to continue:

- o Fabrication of the Engineering Development Model by Magnavox and Rockwell Collins.
- o Commence Developmental and Operational Testing II.

(U) For FY 1984, it is planned to continue monitoring Operational Tests in preparation for a source selection and production decision at DSARC III in May 1984.

(U) Project C0033, Joint Tactical Information Distribution System: This project will develop secure, jam resistant, digital information exchange of communications, navigation, and identification data.

(U) In FY 1982, requirements and concept of employment were defined.

(U) The FY 1983 program will develop Joint Tactical Information Distribution System/Tactical Air Operations Central-1985 interface specifications and initiate development of test support facilities.

(U) For FY 1984 modify Joint Tactical Information Distribution System terminals for Tactical Air Operations Central - 1985 interoperation, acquire Full-Scale Development terminals for integration, initiate integration/validation testing.

Program Element: 64719M

Title: Marine Corps Command/Control/Communications Systems (Engineering)

(U) Project C1420, Marine Tactical Command and Control System Modernization: This program provides for the upgrading of the Marine Tactical Command and Control components, because such upgrading is outside the scope of normal maintenance and modification.

(U) FY 1982/1983 Program: Not applicable - program was not active.

(U) FY 1984, it is planned to upgrade the Marine Integrated Fire and Air Support System Marine Integrated Fire and Air Support System Engineering Development Model to support essential testing. This will include Unit Level Message Switch work-around, fire planning, and fire plan execution software documentation and programming for the Marine Integrated Fire and Air Support System Engineering Design Model.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64720M
DoD Mission Area: 344-Tactical Command and Control

Title: Tactical Air Operations Central - 1985
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	29,306*	12,703	5,224	3,139	TBD	TBD
C0038	Tactical Air Operations Central - 1985	29,306	12,703	5,224	3,139	TBD	TBD

* FY 1982 and prior funding in PE 64719M, Marine Corps Command/Control/Communications 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 for the engineering development of Marine Corps Command, Control and Communications Systems. Specifically, this project provides an improvement to the Marine Air Command and Control 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 due to maturation of the program as it nears the end of the Engineering Development Model contract. FY 1982 increase of 9022 results from the fact that both the government and contractor had underestimated the level of the effort for that year. The contractor is performing on a cost plus fixed fee plus incentive fee Engineering Development Model contract. If the additional funds had not been provided to meet the contract obligation, renegotiation of the contract would have been necessary at an additional cost to the government. The FY 1983 decrease of 33 is due to a reduction in management support contracts. The increase of 756 in FY 1984 is due to an effort to structure the program so that cost estimates are refined to include all 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	41,090*	20,284*	12,736	4,468	TBD	TBD
C0038	Tactical Air Operations Central - 1985	41,090	20,284	12,736	4,468	TBD	TBD

* FY 1981 and 1982 funding in PE 64719M, Marine Corps Command/Control/Communications Systems (Engineering)

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
Tactical Air Operation Control-1985	-	-	-	66,374	286,435	352,809
Quantity				(4)	(44)	(48)

F. (U) RELATED ACTIVITIES: This project is related to all other Tactical Command and Control System projects.

Program Element: 64720M Title: Tactical Air Operations Central - 1985

G. (U) WORK PERFORMED BY: In-House: Headquarters Marine Corps, Washington, D.C.; Marine Corps Development and Education Command, Quantico, VA; Marine Corps Tactical System Support Activity, Marine Corps Base, Camp Pendleton, CA; Naval Electronics System Center, Washington, D.C.; Naval Ocean Systems Center, San Diego, CA. Contractor: Litton Data Systems, Van Nuys, CA.

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

(U) Project C0030, Tactical Air Operations Central - 1985: This program will replace the existing Tactical Air Operations Central/Tactical Data Communications Central which was fielded in 1966 and will essentially be worn out in service, logistically unsupportable and incapable of meeting the postulated threat by 1985. It will fulfill the Marine Corps' unique requirement for integrated air defense, enroute air traffic control and will serve as the data hub to agencies external to the Marine Corps for real-time tactical air data. Also it will possess a modular capability which will allow it to be tailored to support Marine Amphibious Unit (MAU) through Marine Amphibious Force (MAF) sized operations.

(U) In FY 1982, this program continued the Full-Scale Development Phase with fabrication of the Engineering Development Model.

(U) The FY 1983 program consists of:

- o Continuing the Engineering Development Model fabrication and developmental testing.
- o Commence systems integration.
- o Conduct effort to determine whether AN/UYQ-44 computers can be used to replace AN/AYK-14 computers for production systems.

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

- o Continue developmental testing and systems integration.
- o Complete Engineering Development Model.
- o Conduct Operational Test II for the Engineering Development Model.
- o Conduct Marine System Acquisition Review Council III with a production decision following.
- o Commence studies and testing towards developing Engineering Change Proposals and modification to production system.
- o Initiate Joint Tactical Information distribution System feasibility investigation/integration.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 647238 Title: Regional Tactical Surveillance
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	-	1,500	39,023	39,044	25,000	104,567
X1779	Over-the-Horizon Radar	-	1,500	39,023	39,044	25,000	104,567

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: In response to requirements stated by the Joint Chiefs of Staff and the Commander in Chief Atlantic, the Secretary of Defense has directed the Navy to undertake and expedite development of a wide-area active surveillance system in the form of an Over-the-Horizon Radar. This program provides near-term improvements to Navy sea lane defense[ ]requirements as well as input to an integrated tactical surveillance product.

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
OPN, (BA2)(332926)	-	-	-	119,000	480,000	599,000
Procurement Quantity (Sites)	-	-	-	(1)	TBD	TBD

F. (U) RELATED ACTIVITIES: Integrated Tactical Surveillance System, Program Element 637638; Command and Control Systems Engineering, Program Element 64711N; Command and Control Systems (ASW), Program Element 63717N; CONUS Over-The-Horizon Backscatter, Program Element 12417F; Sea Lane Surveillance, Program Element 12418F.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead Laboratory is the Naval Research Laboratory, Washington, D.C. OTHERS: Naval Ocean Systems Center, San Diego, California. CONTRACTORS: SRI, Palo Alto, CA; Prime Contractor is to be determined.

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

(U) Project X1779, Over the Horizon Radar

1. (U) DESCRIPTION (Requirement and Project): This project provides for the development, testing, and deployment of relocatable over-the-horizon radars to provide surveillance of long range Soviet bomber attacks against U.S. and Allied Naval Forces, shipping, and forward bases. A Sea Lane Defense Study and the Integrated Tactical Surveillance System concept studies determined that over-the-horizon radar is the most cost effective sensor to support near-term, wide-area ocean surveillance. The Secretary of Defense directed the Navy to accelerate the over-the-horizon radar development proposed by the Integrated Tactical Surveillance System Program. The objectives of this project are to procure and install a fixed over-the-horizon radar site for [ ] and to develop, test, and procure a number of relocatable over-the-horizon radars for deployment at selected locations. The exact number and locations will be determined following the Navy program review and decision process.

Program Element: 64725N Title: Regional Tactical Surveillance

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: This is a new start in FY 1983. However, under Program Element 63763N, Integrated Tactical Surveillance System, contractor concept studies recommended a relocatable over-the-horizon radar system to provide near-term wide-area surveillance of [redacted].

b. (U) FY 1983 Program: Define system requirements, complete systems analysis and conceptual design, develop a performance specification, and issue a Request for Proposal, following the Chief of Naval Operations approval to proceed.

c. (U) FY 1984 Planned Program: Commence hardware and software development for the relocatable prototype system. Initiate development of connectivity and interfaces to existing command and control nodes. Upgrade an existing experimental facility to support hardware and software development.

d. (U) Program to Completion: Continue development of the relocatable system. In FY 1986 begin testing of the relocatable system. In FY 1987, commence testing of the relocatable system at selected deployed locations.

e. (U) Milestones

MILESTONE	DATE
1. CNO Executive Board	December, 1982
2. Contract Award	1st Quarter - 1984
3. COMOPTEVFOR Testing	3rd Quarter - FY 1986
4. Deployment Testing	1st Quarter - FY 1987
5. Milestone III	4th Quarter - FY 1987
6. Production	[redacted]

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64761N Title: Intelligence (Engineering)
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	6,069	12,022	8,890	9,109	Continuing	Continuing
R0246	Anti-Compromise Destruct System	1,103	0	1,061	1,149	Continuing	Continuing
T0772	Foreign Material Exploitation	2,201	2,768	2,403	2,614	Continuing	Continuing
X0809	Electro-Optical Sensor Development	2,271	1,090	3,020	3,073	Continuing	Continuing
T1459	Foreign Material Acquisition	494	455	438	461	Continuing	Continuing
T1668	LINK MANOO*	(7,966)*	5,514	1,968	1,812	Continuing	Continuing
X1797	Special Sensors	0	2,195	0	0	0	2,195

*Funded in another Program Element in FY 1982 and prior. Details available at a higher classification.

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: Expansion of the Soviet fleet has placed an increased burden on the Navy to [redacted] The resources of this program element are focused on the development of [redacted] Also included in the program element is development of a family of systems [redacted]

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 -209 in FY 1984 is the result of program adjustments including inflation for Project R0246 (-23), Project T0772 (-60), Project X0809 (-66), Project T1459 (-10), and Project T1668 (-48). In Project R0246, Anti-Compromise Destruct System, the net decrease of 1,070 in FY 1983 results from Congressional Direction and the net decrease of 2,195 (X0809), results from a re-alignment of project numbers and developing agencies to eliminate duplication of effort by consolidating intelligence-related electro/optical sensor developments under the Office of Naval Intelligence.

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	5,189	6,069	13,092	9,099	Continuing	Continuing
R0246	Anti-Compromise Emergency Destruct (ACED)	854	1,103	1,070	1,086	Continuing	Continuing
T0772	Foreign Material Exploitation	2,090	2,201	2,768	2,463	Continuing	Continuing
X0809	Electro-Optical Sensor Development	2,245	2,271	3,285	3,086	Continuing	Continuing
T1459	Foreign Material Acquisition	0	494	455	448	Continuing	Continuing
T1668	LINK MANOO	(2,346)*	(7,966)*	5,514	2,016	Continuing	Continuing

*Funded in another Program Element in FY 1982 and prior. Details available at a higher classification.

Program Element: 64761N Title: Intelligence (Engineering)

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

F. (U) RELATED ACTIVITIES: Army and Air Force developments are continually monitored for techniques and technology which are applicable to Foreign Material Exploitation and Shipboard/Airborne Electro-Optical Intelligence Collection sensor development. Program Element 63522N Advanced Submarine Surveillance Equipment Program, Program Element 64792N Surface Electromagnetic/Optical Systems (advanced) are ongoing related Advanced and Engineering Development programs. Program Element 31022F Air Force Scientific and Technical Intelligence, Program Element 64255N Air Electronics Warfare and Program Element 64709A Evaluation of Foreign Components are ongoing efforts related to Foreign Material Exploitation.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington DC; Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Ordnance Station, Indian Head, MD; Naval Air Development Center, Warminster, PA; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: Texas Instruments, Ridgecrest, CA; Martin Marietta, Orlando, FL; Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; Ford Aerospace, Newport Beach, CA; Solid Photography, Inc., Melville, NY; Hi-Shear Corporation, Torrance, CA; Martin Electronics, Inc., Orlando, FL; Unidynamics, Phoenix, AZ.

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

(U) Project R0246, Anti-Compromise Destruct System: This project will develop, test and prepare for production [redacted]

(U) In FY 1982:

- Development continued on a portable document destruct device, a security filing cabinet destruct device, a microform destruct device and a magnetic tape destruct device.
- The bulk of safety tests were completed on cabinet energy sources and a dual-solvent microform destruct system was identified.
- Contracts were awarded for the fabrication and delivery of a prototype magnetic tape destruct device and an automatic microfiche destruct device.

(U) The FY 1983 program consists of:

- Technical Evaluation testing will be completed and Approval for Service Use will be obtained for the Portable Document Destruct Device.
- A two-year, three-phase, $1 Million contract effort will be awarded competitively for development, testing, and delivery of pre-production cabinet destruct devices.
- Final testing and release for service use for a dual solvent, manually operated microfiche destruct system.
- Testing of a prototype automatic microfiche destruct device and prototype magnetic tape destruct device.
- Concept demonstration tests on sublevel systems having application to electronic equipment destruction.

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

- Introduce the portable document destruct device to operational use.

Program Element: 64761N Title: Intelligence (Engineering)

- o Continue engineering development of the cabinet destruct system and the magnetic tape destruct system.
- o Obtain Approval for Production for the automatic microfiche destruct device.
- o Refine engineering designs for an electronic equipment destruction sublevel components.
- o Initiate development[ ]
- o Development and testing will continue to completion in the late 1980's.

(U) This is a continuing program.

(U) Project T0772, Foreign Material Exploitation: This project provides[ ]

(U) In FY 1982, principal accomplishments included:

- o Continued exploitation[ ]
- o Exploitation[ ]
- o Exploitation[ ]
- o Exploitation[ ]
- o Exploitation[ ]

(U) The FY 1983 program consists of:

- o Continuing exploitation[ ]
- o Continuing exploitation[ ]
- o Exploitation[ ]
- o Exploitation[ ]
- o Continuing exploitation[ ]

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

- •[ ]

(U) Program to Completion: Continue similar activity.

(U) Project X0809 Electro-Optical Sensor Development: [ ]

Program Element: 64761N Title: Intelligence (Engineering)

[ ]

(U) In FY 1982, principal accomplishments included:

- o Completion of development [ ] and installation of two systems in CLIPPER TROOP platforms.
- o [ ] helicopter operations completed.
- o Sensor development of and deliver to end user of [ ]

(U) The FY 1983, program consists of:

- o Upgrading [ ] system to improve reliability and performance.
- o Complete CLUSTER SAM [ ]
- o Initiate development of surface ship [ ]

(U) For FY 1984, the following activities are planned:

- o Continue development of the surface ship [ ]
- o Initiate [ ] development effort.
- o Develop [ ] for airborne and surface ship deployment.

(U) Program to Completion: Continue similar activity.

(U) Project T1459, Foreign Material Acquisition: This project provides for the acquisition [ ]

(U) In FY 1982, purchased [ ]

(U) In FY 1983, continue acquisition [ ]

(U) In FY 1984, acquisition program will continue [ ]

(U) Program to Completion: Continue similar activity.

(U) Project T1668, LINK MANOD: Details available at a high classification.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64771M
Title: Medical Development (Engineering)
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	2,046	2,314	2,426	2,554	Continuing	Continuing
M0933	Medical/Dental Equipment (Development)	2,046	2,314	2,426	2,554	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: An essential component of the Navy Medical Department's mission is the development and improvement of medical/dental equipment that will enhance casualty care in any operational theater. The unique demands of combat operations and other military engagements place stringent performance requirements on support systems and equipment necessary to maintain total combat readiness. This program element involves the development, testing and evaluation of medical and dental equipment designed for durability and reliability in field and shipboard use and compatibility with other Navy and Marine Corps equipment. The program includes the engineering development of several new items as they transition from earlier stages of the developmental cycle. This includes modification of off-the-shelf medical equipment for field and shipboard use. This development effort is directly related to the unique environmental aspects of Navy and Marine Corps operations and is closely coordinated with the efforts of the other services to avoid duplication. These developments are not available from the private sector.

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 minor changes in 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	1,329	2,047	2,314	2,464	Continuing	Continuing
M0933	Medical/Dental Equipment (Development)	1,329	2,047	2,314	2,464	Continuing	Continuing

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

Program Element: 64771M Title: Medical Development (Engineering)

F. (U) RELATED ACTIVITIES: The program is coordinated through the Armed Services Biomedical Research Evaluation and Management Committee. Related Army medical equipment development is conducted by the U. S. Army Medical Bioengineering R&D Laboratory, Ft. Detrick, MD. Development of the aviation biomedical monitoring system is closely coordinated with the Air Force.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Health Research Center, San Diego, CA; Naval Aerospace Medical Research Laboratory, Pensacola, FL; Naval Dental Research Institute, Great Lakes, IL; CONTRACTORS: E Systems Inc., Dallas, TX.

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

(U) Project M0933, Medical/Dental Equipment (Development): This project provides for the engineering development, testing, and evaluation of medical and dental equipment to (1) enhance the care of combat casualties and (2) improve the performance and occupational health of Navy and Marine Corps personnel.

(U) In FY 1982 the following work was accomplished:

- Completed design of the engineering development model of the Remote Medical Diagnosis System.
- Completed test and evaluation and operational manual for the Medical Back Pack.
- Completed operational testing of Portable Life Support Stretcher Unit.
- Developed and fabricated a portable instrument for determining carbon dioxide levels in firefighters.
- Fabricated a microprocessor-controlled group audiometer for support of the Navy Hearing Conservation Program.
- Developed data acquisition procedures for In-Flight Physiological Data Acquisition System.

(U) The FY 1983 program consists of:

- Completing test, training, and integrated logistics support plans for the engineering development model of the Remote Medical Diagnosis System.
- Commencing field-testing of the Marine Corps Expeditionary Dental Shelter.
- Continuing operational test and evaluation of a semi-automated prototype Occupational Health Information System.
- Testing "active" hearing protectors.
- Developing hardware and software for the Navy Mental Health Information System.
- Initiating technical evaluation of prototype Oculo-Vestibular Function Testing System to detect motion-sensitive personnel.
- Commencing test and evaluation of the microprocessor-based Naval Aviator Selection System.
- Initiating development of improved sonar headphones.

Program Element: 64771M Title: Medical Development (Engineering)

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

- Complete engineering development of the first terminal for the Remote Medical Diagnosis System.
- Complete operational test and evaluation of the Marine Corps Expeditionary Dental Shelter.
- Continue testing of and develop selection criteria for Navy hearing protectors.
- Expand scope of Occupational Health Information System for use in Navy Regional Medical Centers.
- Complete test and evaluation of the In-Flight Physiological Data Acquisition System.
- Test and evaluate data handling capability of the Navy Mental Health Information System.
- Complete test and evaluation of the microprocessor-based Naval Aviator Selection System.
- Develop specification for sonar headphones.

(U) This is a continuing program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64779M
DoD Mission Area: 344 - Tactical Command and Control
Title: Joint Interoperability of Tactical Command and Control 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	4,689	6,337	8,058	11,679	Continuing	Continuing
X1080	Joint Interoperability of Tactical Command and Control Systems	4,689	6,337	8,058	11,679	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 and test of bit and character oriented message standards for use in joint tactical information exchange. Included in the development of bit oriented messages is Tactical Digital Information Link J or NATO Link 16 for use with the Joint Tactical Information Distribution System. The program element also provides configuration management testing of bit oriented messages used by tactical systems in the Joint Tactical Air Operations interface (formerly the Tactical Air Control Systems/Tactical Air Defense Systems) designated Tactical Digital Information Links A and B; and the development and test of character oriented message standards for joint tactical operations in five functional segments: Intelligence, Air Operations, Operations Control, Fire Support and Maritime Operations.

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 changes: A decrease of 816 in FY 1982 due to internal Navy reprogramming action, a decrease of 58 in FY 1983, and of 3,460 in FY 1984 as a result of both funding constraints and refined estimates for 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	8,245	5,505	6,395	11,518	Continuing	Continuing
X1080	Joint Interoperability of Tactical Command and Control Systems (JINTACCS)	8,245	5,505	6,395	11,518	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: The bit oriented message standard, Tactical Digital Information Link J/NATO Link 16 is being developed under the Joint Interoperability of Tactical Command and Control Systems program element as the message standard for use with the Joint Tactical Information Distribution System, Program Element 25604N. U.S. Army, U.S., Marine Corps, and U.S. Air Force activities complement but do not duplicate U.S. Navy activities.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington, D.C.; Naval Electronic Systems Engineering Activity Detachment, Philadelphia, PA; Fleet Combat Direction Systems Support Activity, San Diego, CA; Naval Ocean Systems Center, San Diego, CA; Navy Tactical Interoperability Support Activity, San Diego, CA. CONTRACTORS: PRC, Inc., Philadelphia, PA; Systems Exploration, Inc., San Diego, CA; Techplan Corp., Maple Shade, NJ; Logicon, Inc., San Diego, CA; and others.

Program Element: 64779M Title: Joint Interoperability of Tactical Command and Control Systems

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

(U) Project X1080, Joint Interoperability of Tactical Command and Control Systems: The purpose of the Joint Interoperability of Tactical Command and Control Systems program is to achieve compatibility and interoperability and to improve the operational effectiveness of selected Operational Facilities and Tactical Command and Control systems used in Joint and NATO/Allied Operations. Character and bit-oriented message standards are being developed and configuration managed to provide effective, interoperable Tactical Command and Control data/information transfer. The Joint Interoperability of Tactical Command and Control Systems character-oriented message standard has been structured in five functional segments: Intelligence, Air Operations, Operations Control, Fire Support and Maritime Operations. Tasking to develop and test a bit-oriented message standard, Tactical Digital Information Link J for Joint Tactical Information Distribution System, was added to this program in 1977. Also, in 1978, configuration management testing responsibility for the Tactical Air Control System/Tactical Air Defense System bit-oriented message standards transferred into this program element.

(U) In FY 1982, development continued to develop Character-Oriented message standards of Tactical Digital Information Links A and B.

(U) The FY 1983 program consists of:

- Continue development/configuration management of the bit-oriented message standard for Tactical Digital Information Link J/NATO Link 16.
- Completion of the development of the Maritime segment of the Character Oriented message standard.
- Continue configuration management and testing of the Intelligence and Air Operations segments and the demonstration of their operational effectiveness during a joint exercise.
- Compatibility and Interoperability testing of the Operations Control and Fire Support segments of the character-oriented message standard.
- Continued configuration management testing of the bit-oriented message standards Link A and Link B.

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

- Development/configuration management of the Tactical Digital Information Link J message standard.
- Configuration management of the Intelligence, Air Operations, Maritime and Operations Control segments of the character-oriented message standard.
- Compatibility and Interoperability testing and configuration management of the Fire Support segment of the character-oriented message standard.
- Continued configuration management testing of the bit-oriented message standards, Link A and Link B.
- Preparation for the Operational Effectiveness Demonstration of all segments, scheduled for FY 1985.
- Development and testing will continue to completion in FY 1989.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64780M
DoD Mission Area: 344 - Tactical Command and Control Systems

Title: Joint Interoperability of Tactical Command and Control 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	1,275	1,624	6,459	10,055	Continuing	Continuing
C1079	Joint Interoperability of Tactical Command and Control Systems (JINTACCS)	1,275	1,624	6,459	10,055	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 supports the Joint Chiefs of Staff sponsored Joint Interoperability of Tactical Command and Control Systems program which provides for development of joint message standards and procedures to insure interoperability between Marine Corps data systems and other Services/Agency systems.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands). The FY 1982 increase of 26 is due to an increase in actual contract costs, the FY 1983 decrease of 75 is due to a reduction in management support contracts, and the decrease of 1161 in FY 1984 is due to refined estimates of scheduling and costs based upon actual achievements of the program in FY 1981 and 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	1,030	1,249	1,699	7,620	Continuing	Continuing
C1079	Joint Interoperability of Tactical Command and Control Systems (JINTACCS)	1,030	1,249	1,699	7,620	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: This program relates to all tactical command and control 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. Contractors: Systems Development Corporation, McLean, VA.

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

(U) Project C1079, Joint Interoperability of Tactical Command and Control Systems: The Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program was established to ensure achievement of compatibility and interoperability of tactical command and control systems used in joint military operations. Additionally, it will ensure the development and testing of joint message standards for the Joint Tactical Information Distribution System. In accomplishing these tasks, U.S./NATO

Program Element: 64780M Title: Joint Interoperability of Tactical Command and Control Systems

interoperability requirements will be considered to the maximum extent practicable.

(U) The FY 1982 program consisted of:

- o Completing Intelligence, Air Operations, Fire Support, Amphibious Operations, and Operations Control technical design interface plans.
- o Developing tactical data link message standards for the Joint Tactical Information Distribution System.
- o Commencing Marine Air Ground Intelligence System retrofit.
- o Completing compatibility/interoperability testing of the Intelligence and Air Operations segments.
- o Commencing Tactical Air Control System/Tactical Air Deployment System interface configuration management.

(U) For FY 1983, it is planned to:

- o Commence compatibility and interoperability testing of Operation Control standards.
- o Continue configuration management testing for Intelligence, Air Operations and Operations Control segments.
- o Continue Tactical Air Control System/Tactical Air Deployment System interface configuration management.
- o Prepare and conduct for Air Operation/Intelligence operational effectiveness demonstration.

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

- o Commence compatibility/interoperability testing for Fire Support and Amphibious Operations segments.
- o Continue configuration management testing for Intelligence, Air Operations and Operations Control, and Tactical Air Command System/Tactical Air Defense System interface.
- o Incorporate standards into the Marine Air Ground Intelligence System.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65155N
DoD Mission Area: 735 - Naval Warfare Support

Title: Fleet Tactical Development and Evaluation
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	17,257	17,666	19,327	21,032	Continuing	Continuing
R0130	Intra-Type Tactical Development and Evaluation	8,286	8,405	8,550	10,055	Continuing	Continuing
R0131	Monitor and Assess Fleet Tactical Development and Evaluation Program	2,767	2,801	3,026	3,316	Continuing	Continuing
R0151	Inter-type Tactical Development and Evaluation	6,204	6,460	7,751	7,661	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 element provides commanders in the fleet with technical and analytical support during fleet operations, exercises, and operational experiments for the purposes of developing and evaluating tactics necessary to achieve maximum combat readiness of operational forces and 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 (+1 in FY 1982, -390 in FY 1983 and -3,635 in FY 1984) result from minor adjustments in FY 1982 and FY 1983 to accommodate anticipated support costs and a level-of-effort adjustment 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	17,070	17,257	18,316	22,962	Continuing	Continuing
R0130	Intra-Type Tactical Development and Evaluation	8,484	8,285	8,795	11,098	Continuing	Continuing
R0131	Monitor and Assess Fleet Tactical Development and Evaluation Program	2,729	2,767	2,801	3,497	Continuing	Continuing
R0151	Inter-Type Tactical Development Evaluation	5,857	6,205	6,720	8,367	Continuing	Continuing
T1038	Acoustic Analysis Support	0	0	0	0	0	*

* Continued in Program Element 65853N, Management and Technical Support, in FY 1981 and subsequent years.

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

F. (U) RELATED ACTIVITIES: The Fleet Tactical Development and Evaluation Support Program, Program Element 63711N, develops standardized procedures and equipment (manual, semi-automatic, and automatic) for collection of exercise and operational data, develops systems for reconstruction of these events and provides a central library of tactical development information.

287

Program Element: 65155M Title: Fleet Tactical Development and Evaluation

G. (U) WORK PERFORMED BY: IN-HOUSE: Commanders in the fleet, having established development requirements, will plan the actions necessary to investigate tactical problems, formulate solutions, evaluate them, and disseminate the results. Fleet commands receive technical and analytical support from Navy Laboratories including Naval Air Development Center, Warminster, PA; Naval Underwater Systems Center, Newport, RI; Naval Surface Weapons Center, Silver Spring, MD; Naval Ocean Systems Center, San Diego, CA; Naval Coastal Systems Center, Panama City, FL; and Naval Weapons Center, China Lake, CA. CONTRACTORS: Center for Naval Analysis (Operations Evaluation Group), Arlington, VA; Pacific Analysis Corp., Honolulu, HI; Walter V. Sterling, Inc., San Diego, CA; Analysis and Technology, Inc., North Stonington, CT; Atlantic Analysis Corp., Norfork, VA; Planning Systems, Inc., McLean, VA; Daniel H. Wagner Associates, Inc., Paoli, PA; Mantech Systems, Rockville, MD; Stanford Research Institute, Menlo Park, CA; Planning Research Corp., Los Angeles, CA; and Ketron, Inc., Arlington, VA.

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

(U) Project R0130, Intra-Type Tactical Development and Evaluation: This project was initiated in FY 1977 to encompass major tactical and fleet operational analysis and systems performance/effectiveness evaluation in Tactical Development and Evaluation for Surface, Submarine and Air Platforms and their installed equipment. These analyses and evaluations will be instrumental in the development of fleet tactics to improve our combat readiness relative to a rapidly expanding and increasingly capable threat. The work in this project will be specifically oriented to the development and introduction of new or improved tactics addressing the peculiarities of individual platform types in order to increase their operational effectiveness. The development and evaluation of tactics will be accomplished principally through the design, conduct, reconstruction, analysis, documentation and reporting of fleet exercises and operational events under the direction of the Fleet and Type Commanders. Specific tasks associated with each tactical development requirement will be carried out primarily at the operational staff and unit level including commands such as Submarine and Surface Warfare Development Groups; Patrol Wings, Atlantic and Pacific; and Commander, Mine Warfare Command.

(U) In FY 1982, commanders in the fleet planned, reconstructed and analyzed fleet exercises with emphasis on: (1) coordination and integration of multiple platform/escort activities; (2) command and control, and communications among air, surface and subsurface platforms; (3) improved methods for coordination of electronic warfare capabilities; (4) coordination and integration of newly introduced long-range weapons systems; and (5) defense against and offensive use of tactical nuclear weapons. Investigations of various other tactical concepts and procedures both at the platform and task force level were also conducted.

(U) The FY 1983 program will include designing, performing and analyzing fleet experiments and exercise to investigate better methods of employing Over-the-Horizon detection and weapon systems for all platform types, surface ship tactics against diesel and shallow-water submarines, arctic tactics for submarines, ship/air wing tactics coordination, and new mine countermeasures tactics with equipment entering the force.

(U) In 1984, the program will pursue tactical deficiencies identified through fleet and type operations and exercises which are entered into the Tactical Development Evaluation Master Plan as they are identified.

(U) This is a continuing project.

(U) Project R0131, Monitor and Assess Fleet Tactical Development and Evaluation Program: Project tasks are designed to improve the combat readiness and war fighting capability of the U.S. Navy. Tasks include: (1) review of fleet tactical development and evaluation product documentation for consistency with tactical development and evaluation project objectives, and review of contractor technical support provided in pursuit of these objectives; (2) aggregation of documentation (including exercise/real-world operations analyses) resulting from fleet tactical development and evaluation projects related either by common systems, platform, warfare areas or similar criteria in order to provide data from which an assessment of tactical development and evaluation program contributions can be made by the program coordinator; (3) assist in determining when the effec-

tiveness of current weapons systems cannot be appreciably improved upon by improving methods of tactical employment and, providing that additional effectiveness is required to meet Navy mission requirements, identifying opportunities to improve this tactical effectiveness through current or emerging technology; and (4), as appropriate, provide the results of the above tasks to the fleets (to support tactical development and evaluation program planning), to CNO mission area sponsors (to support warfare appraisals) and to the R&D community (to support systems development) via the program coordinator.

(U) In FY 1982, efforts included: a survey conducted among fleet participants to ascertain quality of contractor support received and devise methods for improving this support. Advantage was taken on emerging technology in capability of receiving real time satellite photography to support planning and conduct of amphibious operations. Analysis was conducted on improving command and control capabilities throughout the fleet.

(U) In FY 1983, the program will continue to monitor contractor contributions to the tactical development and evaluation program, will aggregate tactical documentation in major warfare areas for analysis and identification of tactical deficiencies and to identify hardware deficiencies which emerging technology may provide solutions.

(U) In FY 1984, program is anticipated to continue the efforts to improve tactical readiness of the fleet and will respond to fleet needs in identifying emerging technology which potentially improved tactical readiness.

(U) This is a continuing project.

(U) R0151, Inter-Type Tactical Development and Evaluation: Project involves tactical and fleet tactical performance/effectiveness evaluation in order to support the development and evaluation of new or improved tactics for the employment of mixed platform types in an integrated force. The analysis, evaluation and technical support provided to the fleet under this program are critical to the development of tactical procedures which will promote maximum combat readiness against an increasingly sophisticated threat. The work in this project is specifically directed at the development and introduction of new or improved tactics for use by integrated forces; i.e., battle groups or forces, which consist of multi-platform types. Tactics developed under the intra-type program for specific platform types frequently serve as the building blocks for the tactical considerations for the coordinated employment of mixed factors. Inter-type tactical development is essential for continued investigation and resolution of the complexities involved in exploiting the diverse capabilities of the different platform and systems in order to achieve a cohesive, tactically integrated force with maximum combat effectiveness and readiness.

(U) In FY 1982, efforts continued to evaluate the threat and provide guidance to simulate a realistic threat to allow development of viable tactics, integration of tactical air and long-range missile systems, develop tactics for electronic warfare including all-source information processing and dissemination, mine warfare tactics to support a battle force and battle group support in amphibious operations.

(U) FY 1983 efforts will be directed toward solving deficiencies identified by fleet commanders and will include strike tactics, tactics for offensive use of and defense against tactical nuclear weapons.

(U) FY 1984 program is a continuing program to respond to fleet identified tactical deficiencies.

(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: 65803M
DoD Mission Area: 360 - Support and Base Communications
Title: Electromagnetic Spectrum Management
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	5,586	4,589	7,301	8,308	Continuing	Continuing
X0706	Electromagnetic Compatibility and Radio Frequency Management	5,586	4,589	7,301	8,308	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 enhances combat readiness and operational effectiveness of Navy forces by reducing electromagnetic interference among deployed systems. It develops the tools, techniques, and equipment to control interference in command, control, communications, and weapons systems, and it provides electromagnetic compatibility analyses to support the development, operation, and maintenance of Navy equipment, systems, and 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: an increase of 90 in FY 1982 to fund at-sea concept evaluation of an automated spectrum use management system and a decrease of 231 in FY 1984 because of anticipated economies in testing an advanced development model of a time-domain signal processor for interference 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	5,700	5,496	4,589	7,532	Continuing	Continuing
X0706	Electromagnetic Compatibility and Radio Frequency Management	5,700	5,496	4,589	7,532	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	0	897	1,664	2,044	Continuing	Continuing

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center, Dahlgren, VA; Electromagnetic Compatibility Analysis Center, Annapolis, MD; Naval Ocean Systems Center, San Diego, CA; Naval Research Laboratory, Washington, DC; Naval Air Development Center, Warminster, PA; Naval Underwater Systems Center, Newport, RI; Naval Electronics Systems Engineering Activity, St. Inigoes, MD.

Program Element: 65803N Title: Electromagnetic Spectrum Management

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

(U) Project X0706, Electromagnetic Compatibility and Radio Frequency Management: As electronic systems have increased in complexity to meet ever more demanding needs to support operations of the modern U.S. Navy, serious degradation and deficiencies in performance of equipment, systems, and platforms have resulted from electromagnetic interference. Most of the interference results from lack of appropriate technology, deficient operating doctrine and inadequately established standards. This project was started in FY 1979 to perform electromagnetic spectrum analyses and develop the techniques, tools, and doctrine necessary to achieve electromagnetic compatibility among Navy systems and equipment in an operational environment. These products are used during the development, test, operations, and maintenance of Navy systems. Objectives of specific numbered project tasks are:

- o Task (1) Electromagnetic Compatibility/Radio Frequency Analysis: Conduct analyses of equipment, systems, and platforms with potential electromagnetic incompatibilities, and advise acquisition managers of necessary corrective actions. Develop software for the purpose of permitting real-time assignment of frequencies for U.S. Navy tactical communications, radars, and weapon systems to achieve interference-free operations in the crowded electromagnetic spectrum.

- o Task (2) World Administrative Radio Conferences: Perform technical analyses to develop U.S. Navy positions for use in the World Administrative Radio Conferences and the International Radio Consultative Committee of the International Telecommunication Union.

- o Task (3) Measurement and Simulation Techniques for Interference Control: Develop technology for the detection, measurement, analysis, and simulation of electromagnetic interference in the shipboard environment, and improved test procedures and test equipment for use by ship and ashore personnel.

- o Task (4) Interference Suppression Modules: Develop prototype add-on modules to suppress electromagnetic interference in Navy systems using time and frequency blanking, phase data integration, and other emerging techniques.

- o Task (5) Automated Design Methodology for Electromagnetic Interference Control in Platform Design and Integration. Develop a methodology to assure adequate consideration of electromagnetic compatibility by designers in the acquisition and modernization of Navy ships and aircraft.

- o Task (6) Standards and Automated Criteria for Control of Electromagnetic Environmental Effects: Execute lead Service responsibility, assigned Navy by the Department of Defense, to publish and/or revise standards to assure electromagnetic compatibility among electronic systems. This includes documenting established and newly-emerging techniques and supporting data to control electromagnetic environmental effects for incorporation in Navy and Department of Defense standards, specifications and manuals. These will be used in the design, installation, modification, and operation of equipment, systems, and platforms for all the services.

(U) In FY 1982:

- o Task (1): Reviewed 300 acquisition related documents for adequacy of Electromagnetic Compatibility addressal; gave extensive assistance in frequency management to system project managers; developed and began use of automated system and software to track status of electromagnetic interference control in acquisitions; conducted limited concept validation test at sea of spectrum use management system, and prepared a preliminary system specification.

- o Task (2): Researched and prepared Navy positions supporting participation in meetings of the Medium Frequency Conference, the Mobile Conference, and the Broadcast Satellite Conference of the International Telecommunications Union.

- o Task (3): Conducted at-sea test of advanced development model of automated antenna/transmission line condition test set; performed test and evaluation of a commercial radio-frequency arc detector both ashore and at sea; continued

development of an automated intermodulation interference evaluation test set; initiated conceptual planning for an automated on-board instrument to monitor electromagnetic radiation hazard levels for personnel.

- o Task (4): Tested engineering development model of notch filters and time-frequency blankers; completed a brass board model of a time domain signal processor; synthesized and tested chemical agents to prevent or reduce intermodulation interference from corroded shipboard steel-to-steel junctions.

- o Task (5): Prepared and promulgated a coordinated plan for revision of a complete range of electromagnetic compatibility standards for the Departments of the Navy and Defense; updated ship and shore power line transient requirements in MIL-STD-461B (Military Standard requirements for Electromagnetic Compatibility in terms of emissions and susceptibility); included new test procedures and emission limits in MIL-STD-469 (Military Standard requirements for Electromagnetic Compatibility and Electromagnetic Interference in Radar systems); initiated revision of MIL-HDBK-235 (Itemizes the emissions to be expected in the electromagnetic environment).

- o Task (6): Developed a concept and a plan of action to coordinate and automate the ship design process to assure electromagnetic compatibility in ship construction.

(U) The FY 1983 program consists of:

- o Task (1): Continue assistance to project managers in electromagnetic interference control and frequency management; complete data entry into automated system to track addressal of electromagnetic compatibility in acquisitions; complete development of baseline configuration of an automated spectrum use management system.

- o Task (2): Participate in the High Frequency Conference of the International Telecommunications Union; complete Navy implementation of frequency assignments resulting from the first Mobile Conference.

- o Task (3): Evaluate engineering development model of the antenna test set and arc detector; test advanced development model of the intermodulation interference test set and begin the engineering development model; start development of electromagnetic radiation hazard monitoring instrument.

- o Task (4): Begin Fleet introduction of notch filters and time-frequency blankers; build advanced development model of the time domain signal processor; complete evaluation tests of chemicals for reduction of intermodulation interference in steel-to-steel shipboard junctions, and develop agents for use with other metals.

- o Task (5): Update MIL-STD-1310 (Military Standard requirements for bonding and grounding practice in ships) and MIL-B-5087 (Military Standard requirements for bonding and grounding practice in aircraft); issue revisions to standards listed in FY 1982 plan, within funding constraints.

- o Task (6): Specify methodology to incorporate electromagnetic compatibility into the design efforts of ships and ship systems; identify available data and procedures for potential application.

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

- o Task (1): Continue electromagnetic interference control and frequency management assistance to system project managers; test use of automated tracking system, and begin routine operation; complete software development and detailed system specification for an automated spectrum use management system.

- o Task (2): Prepare technical Navy positions and participate in planning sessions for the second Medium Frequency Broadcast Conference and the Space Conference of the International Telecommunications Union; implement appropriate frequency re-assignments resulting from the High Frequency Conference and the Broadcast Satellite Conference.

Program Element: 65803N Title: Electromagnetic Spectrum Management

- Task (3): Begin Fleet introduction of the antenna test set and arc detector; test the engineering development model of the intermodulation interference test set; test the advanced development model of an electromagnetic radiation hazard monitor test set; begin improvement of Navy electromagnetic interference test facilities with extended frequency coverage, higher power, and contemporary modulation capability to represent more accurately current and future electromagnetic environments.

- Task (4): Test advanced development model of a time domain signal processor; continue development and testing of chemical agents to prevent/reduce intermodulation interference from corroded metal-to-metal joints.

- Task (5): Update electromagnetic environment standard to be included in military handbooks; revise MIL-HDBK-237 (Guidance for development program managers concerning procedures to provide for Electromagnetic Compatibility at each stage in the development and acquisition of electronic systems); review electromagnetic compatibility standards for ship platforms.

- Task (6): Continue development of a logical approach to incorporate electromagnetic compatibility in the integrated ship design process.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65853N
DoD Mission Area: 235 - Naval Warfare Support

Title: Management and Technical 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	10,160	11,685	12,237	14,724	Continuing	Continuing
S0231	ASW System Support	4,774	5,376	5,260	6,145	Continuing	Continuing
R0905	Naval Warfare Tactical Analyses*	2,008	2,832	2,675	2,894	Continuing	Continuing
T1038	Acoustic/Non-Acoustic Analysis Support	3,330	3,457	4,302	5,685	Continuing	Continuing
R1562	Warfare Planning Support	50	**	**	**	**	**

* Formerly Sea Control Tactical and Operational Analysis
** Funded in PE 65873N after FY 1982.

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 element provides centralized management control by the Chief of Naval Operations (OP-095) through the use of contractor and other government activities, engineering, technical, analytical and management support. It provides ASW Systems engineering systems analysis support to the Chief of Naval Material (PM-4) and, under the direction of the Naval Intelligence Support Center, it provides analyses of acoustic/non-acoustic data on submarine characteristics to determine parameters that may be exploited by revised tactics or new ASW 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 result from the following: net decreases of 2,386 in FY 1982 and 1,625 in FY 1984 result from cost adjustments including inflation and the termination of an acoustic analysis effort in project T1038. The increases in R0905 of 1,270 in FY 1983 (reprogrammed from project T1038) and 925 in FY 1984 are due to an expanded scope in Project CHALK SLATE.

D. (U) FUNDING AS REFLECTED IN THE FY 1982 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	12,335	12,546	11,685	13,862	Continuing	Continuing
S0231	ASW System Support	4,201	4,774	5,376	5,480	Continuing	Continuing
R0905	Sea Control Tactical and Operational Analysis	2,920	2,136	1,582	1,750	Continuing	Continuing
T1038	Acoustic/Non-Acoustic Analysis Support	5,214	5,586	4,727	6,632	Continuing	Continuing
R1562	Warfare Planning Support	0	50	*	*		

*Funded in PE 65873N after FY 1982.

E. (U) OTHER APPROPRIATION FUNDS: None.

F. (U) RELATED ACTIVITIES: All Naval tactical warfare efforts.

294

Program Element: 65853N Title: Management and Technical Support

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; Naval Weapons Center, China Lake, CA; Naval Research Laboratory, Washington, DC; Naval Underwater Systems Center, Newport, RI; Naval Surface Weapons Center, White Oak, Silver Spring, MD; Naval Surface Weapons Center, Dahlgren, VA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Air Development Center, Warminster, PA; Office of Naval Research, Arlington, VA; Naval Ocean Systems Center, San Diego, CA; Chief of Naval Education and Training, Pensacola, FL; Naval Ocean Research and Development Activity, Bay St. Louis, MS; Naval Intelligence Support Center, Suitland, MD. CONTRACTORS: TRW Inc., McLean, VA; Presearch, Inc., Arlington, VA; Automation Industries, Inc., (Vitro Laboratories), Silver Spring, MD; *Planning Research Corporation, Los Angeles, CA.; Systems Planning Corporation, Arlington, VA.; *MATRIX Corporation, Vienna, VA; Applied Management Techniques, Inc., Arlington, VA; *Defense Systems, Inc., McLean, VA; *Doty Associates, Inc., Rockville, MD; *Ketron, Inc., Arlington, VA; *ORI, Inc., Silver Spring, MD; Energystics, Inc., Arlington, VA.

*Small contracts (under 100K).

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

(U) Project S0231, ASW System Support: This project provides systems engineering and systems analysis support to the Anti-Submarine Warfare Systems Project Office in the areas of ASW multi-platform integration and evaluation; ASW Command, Control, Communications and Surveillance; ASW systems/subsystems; ASW sensor systems programs and ASW management support.

(U) FY 1982 accomplishments:

- o Annual baseline update and engagement model upgrading was completed.
- o ASW effectiveness analyses were conducted against current and projected future threat submarines.
- o Conducted analyses to identify deficiencies in ASW Operations Center and in ASW Command and Control.
- o Sensor-oriented studies were conducted to determine advanced design definition and standards of performance.
- o ASW weapon and countermeasure effectiveness criteria were developed in support of the overall ASW effectiveness effort.

(U) The FY 1983 program consists of:

- o Continuing annual baseline and engagement model update.
- o Conducting sensor trade-off studies with emphasis on emerging improvements in [ ] acoustic sensor systems technology.
- o Continuing overall ASW effectiveness study efforts.
- o Investigating commonality and interoperability in NATO and allied ASW Operations Centers.
- o Resolving ASW issues resulting from FY 1982 programs and new issues as they arise.

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

- o Continue update of acoustic and non-acoustic baselines, ASW engagement models, U.S. NATO and threat weapons effectiveness documents. Determine adequacy of current and planned ASW capability against projected threat to support ASW Warfare appraisal. Conduct specific analyses, assessments and investigation at the system, platform and

cross-platform levels as necessary to resolve emerging ASW sensor and weapons issues.

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

(U) Project R0905, Naval Warfare Tactical Analyses: This project provides analytical support to the Chief of Naval Operations (OP-095) in his mission as Naval Warfare task area sponsor for Anti-Submarine Warfare, Anti-Air Warfare, Anti-Surface Warfare, Strike Warfare, Amphibious Warfare, Mine Warfare, Electronic Warfare, Chemical Warfare, Special Warfare, Maritime Prepositioning and Oceanography. The major undertaking of this project is the continuous analysis of the Navy's capabilities and limitations in the execution of these assigned missions. Warfare Master Plans are developed as foundations to help insure clarity and continuity of the Navy's efforts to improve its tactical effectiveness, and annual formal appraisals are conducted to assess progress and problems.

(U) In FY 1982 the Annual Warfare Task Area Appraisals were conducted for Anti-Submarine Warfare, Anti-Air Warfare, Strike/Anti-Surface Warfare, Amphibious Warfare, Mine Warfare plus a summary appraisal across the spectrum of Navy tactical warfare. Master Plans for Anti-Air Warfare and ASW Environmental Support were completed in draft form. The first edition of the Special Warfare Master Plan was published. A new planning methodology for sizing tactical forces was developed and evaluated. An interagency program was undertaken with Defense Nuclear Agency to increase tactical nuclear warfare expertise and awareness among senior Naval officers.

(U) FY 1983 program consists of:

- o Conducting annual appraisals in the same warfare task areas as in FY 1982 plus Electronic Warfare and Chemical Warfare.
- o Completing and publishing Master Plans for Strike/Anti-Surface Warfare, Mine Warfare, Amphibious Warfare, Anti-Air Warfare and ASW Environmental Support.
- o Modifying and testing force sizing methodology.
- o Completing joint Navy/Defense Nuclear Agency tactical nuclear warfare programs.
- o Project CHALK SLATE continues with an expanded scope.

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

- o Continue all annual warfare appraisals.
- o Complete Anti-Air Warfare Environmental Support Master Plan.
- o Conduct first major revisions to other existing Master Plans as required.
- o Incorporate force level sizing methodology into Navy and Joint Chiefs of Staff planning process.
- o Project CHALK SLATE continues

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

Program Element: 65853M Title: Management and Technical Support

(U) Project T1038, Acoustic/Non-Acoustic Analysis Support: This project is a data collection and analysis support program for exploitation of acoustic and non-acoustic sensor data in support of sensor and weapons system developments. Program supports analysis, hardware, and software development for efficient processing of sensor data at Naval Intelligence Support Center. Reduced data is used to define threat signature parameters in support of ASW sensor and weapons system developments.

(U) FY 1982 accomplishments:

- o Expanded [ ] signature data base.
- o Continued development of new [ ]
- o Completed Phase I of program to validate sound pressure level measurements.
- o Developed and applied statistical measures of signature variability and quieting.
- o Completed first measurements of [ ] Soviet submarines.

(U) FY 1983 program consists of:

- o Completing procurement of [ ]
- o Continuing measurements of [ ] signatures.
- o Continuing [ ] signature analysis.
- o Continuing characteristics analysis to:
  - a. Identify components of radiated noise which can be used to improve passive sonar systems performance.
  - b. Provide to systems developers data needed for sonar and weapons sensor designs.
  - c. Reduce or eliminate false classification of targets.
  - d. Provide technical data on systems characteristics, layouts, noise producing mechanisms and radiators.

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

- o Procure automated [ ] analysis.
- o Examine non-acoustic data processing concepts.
- o Examine feasibility of processing acoustic data [ ] and implement as needed.

Program Element: 63853M Title: Management and Technical Support

- Determine feasibility of [redacted]
- Continue [redacted] target strength measurements.

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

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

298

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65853N
DoD Mission Area: 353 - Naval Warfare
Title: Tactical Electro Support
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	3,197	0	1,050	4,794	Continuing	Continuing
R0112	Tactical Electromagnetic Program	974	0	1,050	1,568	Continuing	Continuing
X0738	Command and Control Architecture Management and Support	1,224	0	0	2,226	Continuing	Continuing
X0912	Coordination in Direct Support System Engineering and Management Support	491	0	0	0	0	3,440
X1371	Communications Interoperability	508	0	0	323	Continuing	Continuing
R1015	Long Range Electronic Warfare Planning	*	*	0	677	Continuing	Continuing

*Project R1015 is funded in Program Element 24575N in FY 1983 and prior.

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 except for Project X0912 which is through FY 1982 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program element increases effectiveness of Navy command support systems, surveillance systems, and electromagnetic systems, develops command, control and communications architectures, and integrates the evolution of passive and active electromagnetic combat systems, surface warfare combat systems and threat emitters. This program element also provides for technical assessments and Fleet evaluations of tactical command, control, and communications equipment for submarines, surface ships and ASW aircraft operating together in a task force and provides support to ensure that ongoing and new Navy communications programs are harmonized with requirements for interoperability with NATO and Allied Navies in the joint 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 1013 in FY 1982 is attributed to reprogramming 377 from Project X0738, Command and Control Architecture Management and Support (362 to PE 63717N, X0709, Navy Command and Control System Afloat to resolve software development problems in the redefined Tactical Flag Command Center Baseline and 15 to PE 65152N, R0133, National Academy of Sciences Naval Studies Boards for support of the Navy Space Symposium) and 479 from Project X0912, Coordination in Direct Support (100 to PE 33109N, X0731, FLT-SATCOM and 379 to PE 64510N, X0744, Flight Deck Communication System to resolve development problems) as well as minor cost revisions. The decrease of 157 in Project X1371 is due to revision of cost estimates, including inflation. The FY 1983 funding was zeroed by Congressional action "without prejudice". In FY 1984, 3075 has been reprogrammed to PE 11401N, X0792, Extremely Low Frequency Communications to satisfy higher priority commitments and cost estimates have been revised.

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	4,309	4,210	4,005	4,125	Continuing	Continuing
R0112	Tactical Electromagnetic Program	1,331	974	1,451	1,525	Continuing	Continuing
X0738	Command and Control Architecture and Management Support	2,101	1,601	2,019	2,060	Continuing	Continuing
X0912	Coordination in Direct Support System Engineering and Management Support	877	970	0	0	0	6,882
X1371	Communications Interoperability	0	665	535	540	Continuing	Continuing

Program Element: 65858N Title: Tactical Electro Support

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

F. (U) RELATED ACTIVITIES: Program Element 65711N, Command and Control Systems (Engineering); Program Element 63717N, Command and Control Systems (Advanced); Program Element 65866N, Command and Control Systems Planning and Engineering Support; Program Element 64554N, Surface Electronic Warfare; Program Element 63797N, Surface Electromagnetic and Optical Systems (Advanced); Program Element 65803N, Electromagnetic Spectrum Management; Program Element 64566N, Acoustic Communications (Engineering).

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronic Systems Command, Washington, D.C.; Naval Sea Systems Command, Washington, D.C.; Naval Research Laboratory, Washington, D.C.; Naval Ocean Systems Center, San Diego, CA; Naval Air Development Center, Warminster, PA; Naval Surface Weapons Center, White Oak, MD; Electromagnetic Compatibility Analysis Center, Annapolis, MD; Naval Telecommunications Command, Washington, D.C.; Naval Security Group Command, Washington, D.C.; National Security Agency, Ft. Meade, MD. CONTRACTORS: John Hopkins University/Applied Physics Laboratory, Laurel, MD; MAR Incorporation, Rockville, MD; Ketron Incorporated, Rosslyn, VA; TRACOR, Inc., Falls Church, VA; Booz-Allen Applied Science, Bethesda, MD; TRW Inc., McLean, VA.

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

(U) Project S0112 Tactical Electromagnetic Program: This project supports the development, procurement and installation of cost-effective surface combat systems through effectiveness assessments of individual weapons, Electronic Support Measures sensors, combat direction systems and other systems.

(U) In FY 1982, analysis projects were performed on the AN/SLQ-32 Monopulse Electronic Countermeasure system, the expendable Remote Piloted Vehicle, LAMPS MK III Combat Effectiveness, Radar Improvement Project, Underwater Communications Intercept and Radar/Electronic Support Measures Multec Techniques for the SLQ-32, Electronic Support Measures Suite.

(U) The FY 1983 program has been zero funded by Congressional direction.

(U) For FY 1984 it is planned to:

- o Initiate programs to ensure completion of critical FY 1982 projects;
- o Continue the updating of critical elements of the surface combat system analytical assessment data base; and,
- o Analysis of combat systems requirements.

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

(U) Project X0738, Command and Control Architecture and Management Support: This project identifies and analyses requirements for reconnaissance, intelligence, command and control and interfacing and supporting systems.

(U) In FY 1982, the Navy Command and Control Plan was completed and issued. This Plan establishes Navy Command and Control goals and objectives for both strategic and general purpose forces; current capabilities are assessed, major deficiencies are identified and strategies are identified to achieve and maintain effective operational systems.

(U) During FY 1983, the project has been zero funded by Congressional action "without prejudice."

(U) In FY 1984, this project has been zero funded through the reprogramming of resources to a higher priority effort in PE 11401N, X0792, Extremely Low Frequency Communications.

(U) Project X0912, Communications in Direct Support System Engineering and Management Support: This project provides coordination and support to satisfy tactical command and control requirements for surface, submarine and air platforms to operate

effectively against enemy task force threats at-sea; the requirement is to integrate all platforms into a cohesive, coherent, effective command and control system.

(U) In FY 1982, alternative acoustic and electromagnetic communications systems, navigation systems and data exchange programs were evaluated for effectiveness. Evaluations were accomplished in fleet exercises and laboratory environments.

(U) In FY 1983, this project has been zero funded by Congressional action "without prejudice."

(U) In FY 1984, project was terminated based on FY 1983 Congressional action.

(U) Project X1371, Communications Interoperability: This project ensures that requirements for interoperability with NATO and Allies in a Joint environment are coordinated and integrated with ongoing and new Navy communications programs.

(U) In FY 1982, studies were initiated to determine common system parameters between USN, NATO and Allied Ultra High Frequency and High Frequency radios for electronic counter-countermeasures systems. NATO control of shipping communications are under review. Work is underway to improve High Frequency prediction techniques, determine the impact on Navy systems of NATO Integrated Communications System improvements and analyze the use of the military Ultra High Frequency band for NATO and Allied maritime purposes.

(U) In FY 1983, this project has been zero funded by Congressional action "without prejudice."

(U) In FY 1984, this project has been zero funded through the reprogramming of resources to a higher priority effort in PE 11401N, X0792 Extremely Low Frequency Communications.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65867N
DoD Mission Area: 323 - TIARA for Naval Warfare
Title: Command and Control Surveillance and Reconnaissance 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	1,594	1,968	4,223	4,751	Continuing	Continuing
T1034	Tactical Satellite Reconnaissance Office	1,594	1,968	4,223	4,751	Continuing	Continuing

As this 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 direction and management of overall ocean surveillance and targeting programs by the Director, Command and Control Programs through contractor and laboratory technical, analytical, managerial and intelligence support. The program provides for a continuation of a 1978 Congressional initiative to investigate tactical applications of National assets to Navy missions. The Tactical Satellite Reconnaissance Office project will continue to develop tactical concepts to utilize those systems in the outyears which will compliment the Integrated Tactical Surveillance System, Program Element 63763N.

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 T0687, Tactical Surface and Air Surveillance, will be completed in FY 1983 as a separate effort accounting for the decrease of 839 in FY 1984; Project T1034, Tactical Satellite Reconnaissance Office: a reduction of 100 in FY 1982 due to revision of cost estimates and a net increase of 54 in FY 1984 due to refinement of 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	3,597	1,694	2,820	3,116	Continuing	Continuing
T0687	Tactical Surface and Air Surveillance	742	0	852	839	Continuing	Continuing
T1034	Tactical Satellite Reconnaissance Office (TENCAP)	2,855	1,694	1,968	4,277	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: PE 63711N, Navy Command and Control, Afloat, and PE 64711N, Navy Command and Control System, Ashore Nodes. Both are key elements to Tactical Satellite Reconnaissance Office initiatives whereby national sensor outputs are continually being tasked and evaluated to analyze time and quality of receipt through each of these elements in reaching the tactical commander. Hardware for each ashore and afloat unit is continually tested for enhanced capabilities. Tactical Satellite Reconnaissance Office has sought to compliment Program Element 63763N, Integrated Tactical Surveillance System, by indepth analysis and recommendations for utilization of existing and future national sensors which might become an element or cuing mechanism for the Integrated Tactical Surveillance System.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Ocean Systems Center, San Diego, CA. OTHERS: Naval Research Laboratory, Washington, D.C. CONTRACTORS: Work performed under contracts at a higher classification.

Program Element: 65867N Title: Command and Control Surveillance and Reconnaissance Support

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

(U) Project T1034, Tactical Satellite Reconnaissance Office: This project, established by Congressional direction, provides resources to exploit all available National and Service sensor systems for tactical support to fleet operational commanders. It also provides support to fleet exercises, which provide background for development of modifications to existing programs and assist in establishing and validating requirements for new programs. Specific details of accomplishments and planned efforts are at a higher classification.

(U) The FY 1982 program:

[ ]

o Initiated National capabilities simulation into Navy war gaming.

[ ]

o Sponsored the U.S. Navy Space Symposium.

[ ]

(U) The FY 1983 program consists of:

o Continuing to exploit National sensor systems for Navy tactical use.

o Providing Navy requirements to the executive agencies of specific National systems.

o Continuing joint and fleet exercises in order to assess utility to tactical commanders and to validate requirements for improved data dissemination.

o Preparing and coordinating the service-wide Tactical Satellite Reconnaissance Office Joint Chiefs of Staff Master Test Plan. During FY 1984, the Chief of Naval Operations will serve as executive agent for the test plan.

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

o Continue efforts to fully exploit National sensor systems for the tactical commander.

o Support the Chief of Naval Operations as executive agent for a service-wide Tactical Satellite Reconnaissance Office Joint Chiefs of Staff Master Test Plan.

o Evaluate concepts for enhanced, more timely information flow from National capabilities to tactical commanders.

(U) This is a continuing program. The project will explore concepts and resolve deficiencies evolving from the Tactical Satellite Reconnaissance Office Joint Chiefs of Staff Master Test Plan.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65871M
DoD Mission Area: 322 - TIARA for Tactical Land Warfare

Title: Marine Corps Tactical Exploitation of National Capabilities
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	236	360	399	469	Continuing	Continuing
C1424	Tactical Exploitation of National Capabilities (TENCAP)	236	360	399	469	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 RDT&E funds for activities designed to enhance the ability of tactical Marine Corps Forces to exploit the capabilities of national intelligence gathering 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: The FY 1982 decrease of 12 is due to less than anticipated program costs, the FY 1984 increase of 25 above the previous estimate is due to the increased tasking and utilization of Tactical Exploitation of National Capabilities assets foreseen as a result of the education, training and exercise efforts and the new capabilities provided by other Service development efforts.

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	255a/	248	360	374	Continuing	Continuing
C1424	Tactical Exploitation of National Capabilities (TENCAP)	255a/	248	360	374	Continuing	Continuing

a/ Funded through Navy Tactical Exploitation of National Capabilities Funds, Program Element 65867N, Command and Control Surv/Recon/Support, T1034, Tactical Satellite Recon Office.

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

F. (U) RELATED ACTIVITIES: Other Services' Tactical Exploitation of National Capabilities programs. All Source Imagery Processor.

G. (U) WORK PERFORMED BY: To be determined.

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

(U) This program is a Congressionally directed effort to maximize tactical exploitation of national intelligence systems by the military services. It requires close and continuous liaision with the intelligence community and involves complex and most-

sensitive activities. It involves training and familiarization with national systems and participation in the Joint Chiefs of Staff test plan for evaluation of this projects capabilities under various operational environments. The program requires special contractor activity for technical support to ensure continuity of management.

(U) In FY 1982, efforts to upgrade Tactical Exploitation of National Capabilities related instruction and liaison with national intelligence organizations was initiated.

(U) The FY 1983 program consists of:

- o Continuing liaison/discussion with national intelligence organizations.
- o Continuing and expanding training and education.
- o Implementing recommendation of the national/tactical intelligence interface study.
- o Revision/update the consolidated Tactical Exploitation of National Capabilities Master Plan.
- o Conduct of exercise activities.

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

- o Continue liaison/discussion with national intelligence organizations.
- o Continue training and education.
- o Submit tactical impact statements to the Congress.
- o Conduct intelligence planning conferences.
- o Initiate follow-on action to implement findings of the national/tactical intelligence interfaces study.

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

305 306B

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 31303N
DoD Mission Area: 312 - General Defense Intelligence Program
Title: Field Operation Intelligence Office
Budget Activity: 5 - Intelligence and Communications

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	-	-	[redacted]	[redacted]	Continuing	Continuing
X1799	Field Operation Intelligence Office	-	-	[redacted]	[redacted]	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.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Present collection systems overlap in the coverage of strategic and tactical targets thus blurring the distinction between strategic and tactical intelligence. New collection systems and block changes being implemented [redacted] will exacerbate the overlap in addition to providing increased data (by several orders of magnitude). Intelligence information processing systems do not accommodate the overlap nor can they cope with current data rates. Therefore, this program develops a capability for the intelligence processing system; [redacted]

The program provides for the application of [redacted] information processing.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) New start in FY 1984.

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

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

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: TBD

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

(U) Project X1799, Field Operation Intelligence Office: (NEW START) The Joint National Intelligence Dissemination System is an effort to develop an information management system designed to accommodate present and projected levels of sensor data. The result will be an improvement in the quality and timeliness of Indications and Warning and Operational Intelligence production and dissemination to selected Department of Defense Intelligence Information System nodes at the Service, and Unified and Specified Command level, [redacted]

(U) The Joint National Intelligence Dissemination System is three differentbut interrelated tasks: [redacted]

1118 307 A 308

307 fn. 308

Program Element 31303N Title: Field Operation Intelligence Office

[ ]

(U) FY 1982 program: Not applicable.

(U) FY 1983 program: Not applicable.

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

- o Develop and refine concepts.
- o Identify current and planned related programs.

(U) This is a continuing program.

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

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 33109N
DoD Mission Area: 333 - Strategic Communications

Title: Satellite Communications
Budget Activity: 5 -Intelligence and Communications

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	38,811	5,527	8,225	12,922	Continuing	Continuing
X0728	Extremely High Frequency Satellite Communications System	34,198	*	*	*	Continuing	Continuing
X0730	Advanced Shipboard Super High Frequency	1,059	1,627	587	4,782	Continuing	Continuing
X0731	Fleet Satellite Communications	3,554	3,900	7,638	8,140	Continuing	Continuing

* Funded under Program Element 64577N in FY 1983 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 supports development of equipments for two Navy satellite communications systems. These systems include space vehicles and associated terminals, control facilities/services, interconnect and technical facilities as designated. The primary objective is to develop systems to support fleet requirements for improved worldwide satellite command and control 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: Net increase of 5 in FY 1982 and decrease of 5 in FY 1983 for Project X0730 are due to revised cost estimates including inflation; a net decrease of 318 in FY 1984 in Project X0730 is due to inflation and reprogramming to other higher priority Navy requirements. Increased funds for Project X0730 in FY 1985 will support advanced anti-jam development, antenna upgrades, and additional interfacing with existing shipboard systems. A net increase of 2,226 in X0731 in FY 1982 was due to expanded development of the Submarine Demand Assigned Multiple Access and Tactical Automated Digital Information Exchange Subsystem tasks for computer-to-computer communications from shore terminals to TOMAHAWK capable ships. Project X0731 was completed in FY 1982 upon successful development of the Demand Assigned Multiple Access task. New developments, which utilize the technologies developed in these tasks, result in reactivation of the project in FY 1984 to develop software and hardware to extend existing Information Exchange Subsystems to small tactical use ships.

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	5,357	36,580	1,632	905	946	264,989***
X0728	Extremely High Frequency Satellite Communications System	1,845*	34,198	**	**	**	45,256***
X0730	Advanced Shipboard Super High Frequency	1,900	1,054	1,632	905	946	72,454
X0731	Fleet Satellite Communications	1,612	1,328	0	0	0	147,279

* Additional FY 1981 funding for this effort provided in Program Element 11403N, HYDRUS
** Funded under Program Element 64577N in FY 1983 and beyond.
*** Through FY 1982 for Project X0728.

Program Element: 33109N Title: Satellite Communications

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)(333210/333220)	50,702	38,694	71,322	70,740	Continuing	Continuing
WPN (Quantity)	64,900	230,300 (2)	115,100 (1)	49,700	141,600	988,175

F. (U) RELATED ACTIVITIES: The current program interfaces with the Defense Communications Agency, Army, and Air Force Satellite Communications development activities. Air Force Space Division is responsible for acquisition, launch, test and evaluation of the Fleet Satellite Communications spacecraft. The Surface Towed Array Sensor System Program (Program Element 64789N, Project X0758) shares development of common use Super High Frequency terminals for Surface Towed Array Sensor System equipped ships. The Communications Automation Program (Program Element 24163N, Project X0725) develops the Navy Modular Automated Communications System that interfaces with the Fleet Satellite Communications System.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Ocean Systems Center, San Diego, CA; Naval Electronic Systems Engineering Center, Vallejo, CA; Naval Electronic Systems Engineering Activity, St. Inigoes, MD; Naval Air Systems Command, Washington, DC; Naval Sea Systems Command, Washington, DC; Naval Avionics Center, Indianapolis, IN; Naval Ship Engineering Center, San Diego, CA; Navy Space Systems Activity, Los Angeles, CA; Fleet Combat Direction Systems Support Activity, San Diego, CA; plus minor efforts at numerous others. CONTRACTORS: TRW, Redondo Beach, CA; Aerospace Corporation, Los Angeles, CA; ITT Defense Communications Division, Nutley, NJ; Magnavox Research Laboratories, Torrence, CA; Motorola, Scottsdale, AZ; E-Systems (ECI Division), St. Petersburg, FL; Computer Sciences Corporation, Falls Church, VA; Harris Corporation, Melbourne, FL; Raytheon Company, Sudbury, MA; Rockwell International Corporation, Anaheim, CA; E-Systems, Garland, TX.

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

(U) Project X0730, Advanced Shipboard Super High Frequency: This project provides for development of a portion of the Defense Satellite Communications System. Navy is assigned responsibility for operation and maintenance of eight earth terminals and development and procurement of shipboard Super High Frequency Terminals for specified command and control functions afloat. Lightweight Super High Frequency Shipboard Terminal (AN/WSC-6) and associated spread spectrum modulator-demodulator and multiplexing equipments are in various stages of development and procurement for use on major combatant and Surface Towed Array Sensor System equipped ships. These shipboard terminals will operate with Defense Satellite Communications System satellites and future Super High Frequency systems to fulfill high level command and control data relay requirements.

(U) In FY 1982, awarded initial AN/WSC-6 terminal production contracts for installation on both combatant and Surface Towed Array Sensor Systems ships, and continued development of the combatant version spread modulator-demodulator to improve reliability and maintainability.

(U) The FY 1983 program consists of improving the anti-jam capability and operations of the communications system under random noise and nuclear scintillation conditions through use of a Burst Error Coder.

(U) For FY 1984, it is planned to continue to make improvements to the AN/WSC-6 shipboard terminals and shore communications equipments to provide resistance to pulse jamming and increased performance under random noise conditions through use of a Burst Error Coder.

(U) For FY 1985, and until program completion, numerous system improvements are planned to improve the efficiency of interfaces between shipboard systems and Department of Defense shore and airborne equipment. Communications Network Control software being designed to solve problems of man-machine interfaces under system stress conditions will provide better utilization of limited channel capability. Develop improved anti-jam capability through use of more efficient high gain antennas.

Program Element: 33109N Title: Satellite Communications

(U) Project X0731, Fleet Satellite Communications: This project provides for development of a system to partially satisfy Navy's most urgent near term Ultra High Frequency Satellite Communications requirements and to provide satellite capacity for high priority Air Force operational users. The Fleet Satellite Communications System provides fleet broadcast service to all Navy ships, command and control links to computer-to-computer exchange of digital data among shore stations, fleet ballistic missile submarines, aircraft carriers, cruisers, and selected other aircraft, ships and submarines, and support for selected Air Force requirements, including Presidential, Airborne Command Post, Strategic Air Command, and emergency mission support communications. Additional space segment service for the Fleet Satellite Communications system will be provided by a Leased Satellite System. Three more Fleet Satellite Communications satellites will be procured to provide continuity of service to Air Force Satellite Communications users and additional Navy channelization. Continuing development will improve shipboard and shore terminals to increase efficiency of the communications to improve computer-to-computer data dissemination to fleet units via controlled, netted circuits.

(U) In FY 1982, continued software development for improvements to the Information Exchange Subsystems providing interfaces to the Demand Assigned Multiple Access System and initiated development of the Tactical Automated Digital Information Exchange Subsystem software package.

(U) In FY 1983, there were no funds budgeted.

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

- o Develop improvements to hardware and software systems to provide multi-system capability in submarine and aircraft satellite communications.
- o Develop Demand Assigned Multiple Access System capability for submarines.
- o Develop interfaces for Navy aircraft.
- o Complete software packages for the Tactical Automated Digital Information Exchange Subsystem shipboard and shore gateway communication links.

(U) Development will continue in hardware and software systems to increase Ultra High Frequency communication system efficiency, operational capability and human interfaces in order to optimize flow of tactical data throughout active Fleet units.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 33126N
Title: Long Haul Communications-Defense Communications Systems
DoD Mission Area: 393 - Long Haul Communications
Budget Activity: 5 - Intelligence and Communications

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	689	5,465	1,172	675	Continuing	Continuing
X0733	Supervisory Control/Technical Control	689	865	0	0	0	3,720
X1285	Secure Voice Improvement Program	0	0	0	675	Continuing	Continuing
X1691	Movement Information Network	0	4,600	1,172	0	0	5,772

The above funding profile includes out-year escalation and encompasses all work or development phases now planned or anticipated for all projects except X1285 which is through FY 1985 only as it is a continuing project.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: The Defense Communications Agency is promoting development and use of new technologies in the Defense Communications System switched networks and advanced techniques for communications control. A high degree of interoperability between the Naval Telecommunications System and the Defense Communications System is essential to command and control of Naval forces by the National Command Authority/Commander in Chief. This element will identify and develop, on a system-wide basis, more efficient means of management and technical control at the communications station to provide for maximum standardization and interoperability with the Defense Communications System. This element also supports the acquisition, development and installation of a world-wide multi-service data transmission network which includes a multi-service logistics data transmission network in the European theater.

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 in FY 1983 of 3,500 due to the addition of the Defense Data Network (X1691) as directed by the Office of the Secretary of Defense; in FY 1982 a reduction of 499 programmed due to a deferral of funding of the Secure Voice Improvement Program (X1285) until FY 1985. An increase of 1,172 in FY 1984 funds expanding the Movement Information Network into Southern Europe (X1691) and the decrease of -825 is due to completion of Project X0733 in FY 1983.

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	2,423	1,188	1,965	825	Continuing	Continuing
X0732	Architecture and Integration	310	0	0	0	0	1,066
X0733	Supervisory/Technical Control	1,030	689	865	825	Continuing	Continuing
X1285	Secure Voice Improvement Program	0	499	0	0	0	499
X1340	Commander in Chief Initiatives	1,083	0	0	0	0	1,083
X1691	Movement Information Network	0	0	1,100	0	0	1,100

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

F. (U) RELATED ACTIVITIES: The technical basis for interoperability in the Defense Communications System program plan will be satisfied in part by the Tri-Service Joint Communications Program interoperability requirements. The System Planning, System Control, Nodal Control and Equipment Support concepts and technology, which contribute to interoperability by providing the basis

for management and technical control of tactical communications circuits and the interface of their control elements, is being developed under Program Element 28010F, TRI-TAC, by the Air Force. Concepts and technology for automated quality control of point-to-point, non-tactical communications circuits is being developed for the Defense Communications System by the Air Force under Program Element 33126F, Long Haul Communications.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA (Lead Laboratory); Naval Electronic System Engineering Activity, St. Inigoes, MD; Defense Communications Agency, Arlington, VA. CONTRACTORS: General Telephone and Electronics, Sylvania, Needham, MA.; and Bolt, Beranek and Newman, INC., Cambridge, MA 02138.

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

(U) Project X0733, Supervisory Control/Technical Control: This project provides for the development of equipment that will automate control of communications circuits at the Naval Communications Station.

(U) In FY 1982 development concentrated on an automated data base and resource management functions.

(U) The FY 1983 program consists of:

- o Completion of development.

(U) Project X1691, Movement Information Network: The Movement Information Network program is a logistics information network being implemented in the European Command which will facilitate improved management of the movement of materiel and repair parts required to sustain the operations of naval forces deployed to European waters. This system employs packet switching technology to provide electronic mail service, query response data processing and remote entry data processing. It is a component of the Defense Data Network and will support multi-service use.

(U) In FY 1982 Movement Information Network Program:

- o Not funded in RAD.

(U) The FY 1983 program:

- o Will consist of developing the Movement Information Network testbed and installing the Movement Information Network nodes in the United Kingdom and Germany.
- o Provide funds to the Defense Communications Agency for development of the Defense Data Network which will provide interactive query/response and bulk data transfer capabilities for distributed data processing systems.

(U) For FY 1984 program:

- o It is planned to expand the testbed to include Southern Europe.
- o Begin work to incorporate the Movement Information Network into the Defense Data Network.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 33401N
Title: Communications Security
DoD Mission Area: 380 - Communications Security
Budget Activity: 5 - Intelligence and Communications

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	13,939	17,091	[redacted]	[redacted]	Continuing	Continuing
X0703	Secure Telemetry	371	400	[redacted]			
X0734	Communications Security R&D	4,787	4,704	[redacted]	[redacted]	Continuing	Continuing
X0746	Signal Security (CLASSIC FOX)	6,651	7,789			Continuing	Continuing
X1236	Signal Security System Engineering	950	881			Continuing	Continuing
X1237	TEMPEST R&D	1,180	893	[redacted]	[redacted]		
X1419	Secure Voice Interoperability System	-	2,424			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: Secure Telemetry provides support for the integration of communications security modules into the Navy weapons systems and TEMPEST support to the Navy test ranges. The Communications Security R&D project supports studies, experiments and hardware developments to determine the technical, operational and fiscal implications of fulfilling Navy Communications Security requirements. CLASSIC FOX is aimed at developing equipment [redacted] and other signals exploitation susceptibilities. The Signal Security System Engineering project is intended to define and test feasible cost effective changes to be phased into major Signal Security System subsystems, upgrade the Central Analysis Facility and develop specifications and advanced techniques for the future Navy Signal Security System. The TEMPEST project investigates the TEMPEST characteristics of operational and developmental Navy systems. The Secure Voice Interoperability system will develop hardware [redacted]

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: Communications Security R&D (X0734): In FY 1982 the increase [redacted] is due to an OSD decision to fund the development of Secure Voice and Graphic Conferencing. In FY 1984 the decrease [redacted] is due to a Navy Communications Security funding reduction. Secure Telemetry (X0703): In FY 1984 the decrease [redacted] results from completion of the program early. In FY 1984 the decrease [redacted] is due to a Navy decision to terminate the TEMPEST Program. Secure Voice Interoperability System (X1419): FY 1984 decrease [redacted] is due to a Navy decision to reprogram funds to higher priority Communications Security Communications Projects. Signal Security (CLASSIC FOX) (X0746): FY 1982 decrease [redacted] is a result of budget adjustments. FY 1984 increase [redacted] was a result of Navy reprogramming of funds from Signal Security Systems Engineering (X1236) to meet expanded requirements of program. Signal Security Systems Engineering (X1236): FY 1982 decrease [redacted] was due to inflation adjustments. FY 1984 decrease [redacted] was the result of Navy reprogramming funds into Signal Security (CLASSIC FOX) (X0746).

(U) FY 1982, 1983 and 1984 OP,N funding increases [redacted] are a result of meeting time phased requirements and introduction of cryptographic devices.

Program Element: 33401N Title: Communications 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	9,241	13,472	17,091		Continuing	Continuing
X0703	Secure Telemetry	-*	371	400		Continuing	Continuing
X0734	Communications Security R&D	4,204	3,946	4,704		Continuing	Continuing
X0746	Signal Security (CLASSIC FOX)	4,010	7,024	7,789		Continuing	Continuing
X1236	Signal Security System Engineering	645	951	881		Continuing	Continuing
X1237	TEMPEST R&D	382	1,180	893		Continuing	Continuing
X1419	Secure Voice Interoperablity System	-	-	2,424		Continuing	Continuing

* Included in X0734 for FY 1981 and prior years.

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
OP,N	60,915	89,467	[redacted]	[redacted]	Continuing	Continuing
Cryptographic Equipments	Various	Various	Various	Various	Various	Various

F. (U) RELATED ACTIVITIES: Cryptographic equipments developed by the National Security Agency under the TEMLEY/SEELEY/KERSEE and Advanced Narrowband Digital Voice Terminal programs will be directly involved wih the Navy Communications Security program. Additional equipments, techniques and/or technical advances resulting from the National Security Agency THORTON and Secure Voice Improvement programs will be applied to this development. The Communications Security R&D project develops advanced components and techniques for all future Communications Security developments. National Security Agency Program Element 33401C applies.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, D.C.; and Naval Electronic Systems Security Engineering Center, Washington, D.C.; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: ITT, Nutley, NJ; TRW, Redondo Beach, CA; Atlantic Research Corporation, Alexandria, VA; and GTE Sylvania, Mountain View, CA.

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

(U) Project X0703, Secure Telemetry: This project will terminate for R&D purposes: [redacted]

(U) In FY 1982, the program included provision of communications engineering support to test ranges prior to technical test and evaluation.

(U) In FY 1983, the program includes technical test and evaluation and transition to production.

(U) Project X0734, Communications Security R&D: The Communications Security R&D project supports studies to determine the technical, operational and fiscal implications of fulfilling Navy Communications security requirements.

(U) In FY 1982 the program included:

- o Investigation of Advanced Voice Processing Techniques.

372

Program Element: 33401N Title: Communications Security

- o Initiation of the Low Data Rate Terminal development.
- o Preliminary development of a Navy key distribution system.
- o Development of specification of the Shipboard Adapter Unit for the replacement of the KW-7.
- o Support to ongoing National Security Agency Communication Security developments.

(U) The FY 1983 program consists of:

- o Use of the Communications Security Control Group hardware to validate Navy key distribution concepts.
- o Laboratory testing of the Very Low Data Rate Voice Processor.
- o Investigation of algorithms using data rates below 600 bits per second will continue.
- o Development of the low rate voice terminal will continue.
- o Support to the DOD Secure Voice Consortium will continue with voice quality testing, algorithm simulation/analysis and performance analysis.
- o Support to the National Security Agency for the Advanced Narrowband Digital Voice Terminal Communications Security module development will continue.
- o Development of an improved test system for automated testing of Communications Security equipment will be initiated.
- o The KG-84 shipboard adapter unit will continue development.
- o Design and specification of the Fixed Plant Interface Adapter Unit for adapting the KG-84 to shore KW-7, KW-26 and KG-13 installations will commence.

) For FY 1984, it is planned to continue:

[redacted]

(U) This is a continuing program.

(U) Project X0746, Signal Security (CLASSIC FOX): This project provides for the design and development of both mobile land based and shipboard signal security collection, analysis, and vulnerability assessment equipment, and capabilities to support Tactical Navy Commanders afloat.

Program Element: 33401N Title: Communications Security

(U) In FY 1982, development proceeded as two subprojects. The CLASSIC COYOTE (land mobile) system entered the full scale development phase following the award of a competitive contract. The CLASSIC FOX (Afloat) Vulnerability Assessment Device commenced development of an advanced development model which had the capability to support further at sea testing and integration.

(U) The FY 1983 program consists of:

- Continuing development of the CLASSIC COYOTE Land Mobile System.
- Continuing development of the Vulnerability Assessment Device software and hardware design.[ ]

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

[ ]

(U) Program to Completion: [ ]

(U) Project X1236, Signal Security Systems Engineering: This project provides for the development and upgrade of several existing Signal Security systems to meet new technical requirements to insure continued security of Navy telecommunications traffic. [

(U) In FY 1982, development proceeded.[ ]

(U) The FY 1983 program consists of:

- Continuing upgrade developments of hardware and software[
- Establishing calibration standards and interface compatibility with existing systems.
- Developing engineering change proposals to implement these interfaces.
- Evaluating deficiencies and continuing requirements definition.
- Testing and correcting [ ]

Program Element: 33401N Title: Communications Security

(U) Program to Completion: [

(U) Project X1237, TEMPEST R&D: The Navy TEMPEST effort deals with all aspects of controlling compromising emanations to keep these to acceptable levels. The TEMPEST RDT&E Program investigates the TEMPEST characteristics of operational and developmental Navy systems. This includes developing techniques, instrumentation and devices.

(U) In FY 1982, the NONSTOP Instrumentation System was further developed and evaluated.

(U) The FY 1983 program consists of:

- Continuing Advanced Analysis Techniques development.
- Initiating efforts to define the technical requirements for an Advanced Solid State Data Collection and Storage System.
- [ ]
- Continuing evaluation of the TEMPEST characteristics of Operational and Developmental systems and equipments.
- Evaluating new instrumentation for application to TEMPEST testing.
- Beginning work on designing the TAILSPIN test system.
- Continuing the Full-Scale Engineering Development of the advanced NON-STOP Instrumentation System.

(U) The FY 1984 program consists of:

- Continuing the Full-Scale Engineering Development of the advanced NON-STOP Instrumentation System.

(U) Project X1419, Secure Voice Interoperability System: The Secure Voice Interoperability System [

Program Element: 33401N Title: Communications Security

(U) In FY 1982, developed specifications [redacted]

(U) The FY 1983 program consists of:

- o Evaluating proposals [redacted]
- o Developing a Concept of Operations Report and near- and far-term system specifications for Secure Voice Interoperability Program.
- o [redacted]

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

[redacted]

(U) This is a continuing program.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 34111N
DoD Mission Area: 313 - Classified Programs

Title: Special Activities
Budget Activity: 5 - Intelligence and Communications

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	101,690	134,038	166,221	206,635	Continuing	Continuing
T0139	Special Activities	101,690	134,038	166,221	206,635	Continuing	Continuing

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: Details of this program are of a higher classification and of limited access nature.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63518N
DoD Mission Area: 157 - Navigation and Position Fixing
Title: Advanced Navigation Development
Budget Activity: 5 - Intelligence and Communications

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	2,739	476	955	2,942	Continuing	Continuing
S0254	CV Navigation System (MINI SINS)	2,739	476	489	-	0	10,383
S1418	Submarine Navigation System Advanced	-	-	466	2,942	Continuing	Continuing
	Quantity:						
	CV Navigation System (Development Test and Evaluation/ Operational Test and Evaluation)						(1)
	Submarine Navigation System (Development, Test, and Evaluation)						(1)

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 85 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program pursues navigation system development aimed at providing improved shipboard self-contained capabilities for the determination of own ship position, heading and velocity for alignment of carrier-based aircraft inertial platforms and for submarines.

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 597 in FY 1982 for Project S0254 as a result of revised costs estimates including inflation and an increase of 489 in FY 1984 to conduct Follow-on Test and Evaluation and removal of the CV Navigation System from the test ship. There is a minor reduction of 10 in Project S0418 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	1,608	2,142	476	476	Continuing	Continuing
S0254	CV Navigation System (MINI SINS)	1,608	2,142	476	-	0	9,297
S1418	Submarine Navigation System Advanced	-	-	-	476	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
S0254	CV Navigation System	-	-	-	7,775	27,875	35,650
	OPN	-	-	-	-	4,200	4,200
	PMP	-	-	-	(5)	(10)	(15)
S1418	Submarine Navigation System Advanced	-	-	-	-	-	-

F. (U) RELATED ACTIVITIES: S0254 - As the result of a competitive award, the CV Navigation System will use the AN/WSN-1(V)2 Dual Inertial Navigation System, which is installed in SSN 688 Class submarines and is under procurement for the SSN 594 Class submarine backfit program. S1418 - Program element 62721N, Subproject 21232, Ship and Submarine Navigation Technology.

Program Element: 63518N Title: Advanced Navigation Development

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Sea Systems Command, Washington, DC; Naval Air Development Center (lead laboratory), Warminster, PA; Naval Avionics Center, Indianapolis, IN; Naval Sea Systems Command Detachment, Norfolk, VA; Navy Ship Parts Control Center, Mechanicsburg, PA. CONTRACTORS: Rockwell International, Anaheim, CA.

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

(U) Project 80254, CV Navigation System: This project will provide a highly reliable shipboard self-contained capability to align aircraft inertial navigation systems. The Carrier Navigation System will consist of a dual inertial navigation system (AN/WSN-1(V))2), two AN/UYK-20 computers and peripherals which will provide continuous alignment data to aircraft inertial systems. The system will also provide for the Automatic Carrier Landing System, Naval Tactical Data System, ship control and navigation. This project provides for the development, integration, test, certification and documentation necessary for the replacement of the current single Ship's Inertial Navigation System (SINS MK 3 MOD 7) with a dual state-of-the-art inertial navigation system on aircraft carriers.

(U) In FY 1982, development continued on software modifications and documentation development.

(U) The FY 1983 program consists of completing software development and certification, installing system on designated carrier (CV 62), conducting Technical Evaluation, and initiating Operational Evaluation.

(U) For FY 1984, it is planned to complete Evaluation, obtain Approval for Service Use and conduct Follow-On Test and Evaluation and remove CV Navigation System from the test ship.

(U) Project 81418, Submarine Navigation System Advanced: (NEW START) This project will provide a precise, self-contained inertial navigation system using ring laser gyro technology to meet requirements of SSN navigation. Use of ring laser gyro technology promises advantages of higher reliability, greater shock resistance and lower cost compared to current systems.

(U) This project is a new start in FY 1984. The FY 1984 program consists of specification preparation and procurement planning. Limited gyro testing may also be conducted.

(U) Program to completion will consist of the design, fabrication, test and evaluation of a Ring Laser Gyro Navigation System (Advanced Development Model).

(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: 64514N — Title: Navigation Systems
DoD Mission Area: 357 - Navigation and Position Fixing — Budget Activity: 5 - Intelligence and Communications

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	5,649	3,820	4,116	3,067	1,759	62,199
S0247	Electrically Suspended Gyro Navigator	4,260	2,849	3,195	2,353	1,354	53,312
S0253	Doppler Log	1,389	971	921	714	405	8,887

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: This program element provides for the development of improved self-contained navigation capabilities (own ship position, attitude, and velocity) primarily for attack submarines with the potential for application to surface ships.

C. (U) COMPARISON WITH THE 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 program element increase in FY 1984 of 2,629; S0247 - Increase of 1,987 due to additional shock/maintainability/development; S0253 - Increase of 642 because of additional at-sea testing to reduce the risks and to conduct follow on test and evaluation to verify product improvement or correction of design deficiencies.

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	5,210	5,649	3,820	1,487	1,888	56,632
S0247	Electrically Suspended Gyro Navigator	4,449	4,257	2,849	1,208	1,604	49,219 3/
	(Quantity Electrically Suspended Gyro Navigator - Engineering Development Models 1/2/)						(2) 1/2/
S0253	Doppler Log	761	1,392	971	279	284	7,413 4/
	(Quantity Doppler Log - Engineering Development Model)		(4) 1/				(4) 1/

1/ Development/Operational Test and Evaluation
2/ Procured prior to FY 1981
3/ Includes $17,308 thousand prior to FY 1977 in Program Element 63518N.
4/ Includes $700 thousand in FY 1978 in Program Element 63518N.

Program Element: 64514N Title: Navigation Systems

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
Shipbuilding and Conversion, Navy	2,094	8,477	13,326	18,923	40,726	83,546
Procurement Quantity	(1)	(2)	(3)	(4)		
Other Procurement, Navy						
Electrically Suspended Gyro Navigator	14,042	4,118	18,470	30,699	69,000	136,329
Procurement Quantity	(9)	(2)	(8)	(9)	(34)	(68)
Doppler Log	-	-	-	-	43,314	43,314
Procurement Quantity	(-)	(-)	(-)	(-)	(256)	(256)

F. (U) RELATED ACTIVITIES: The Air Force Gimbaled Electrostatic Airborne Navigation System and Standard Precision Navigator System hardware was modified for shipboard operation and used in Navy development by Project S0247, Electrically Suspended Gyro Navigator. Navy Strategic Systems Project Office systems work under Program Element 11228N, Project S0003, TRIDENT Missile System, using Electrically Suspended Gyro technology was monitored to avoid duplication. The stand-alone processing effort is required so that the MK-117 Fire Control System (Program Element 64562N, Project S0236) can accommodate an Over-the-Horizon Targeting Capability as required for submarine deployment of the TOMAHAWK Cruise Missile (Program Element 64367N, Project X0545). The Electrically Suspended Gyro Navigator has been identified as part of the navigation subsystem of the Submarine Advanced Combat System (Program Element 64524N, Project S1347). Project S0253, Doppler Log: Work under Exploratory Development Program, Program Element 62721N (Command and Control Technology), provided the basis for the intended Doppler Sonar Velocity Log development.

G. (U) WORK PERFORMED BY: IN-HOUSE: The Lead Laboratory is the Naval Air Development Center, Warminster, PA. CONTRACTORS: Electrically Suspended Gyro Navigator - Rockwell International (Autonetics Group), Anaheim, CA. Contractor for Doppler Log - Sperry Marine Systems, Charlottesville, VA.

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

(U) Project S0247, Electrically Suspended Gyro Navigator

(U) In FY 1982: Completed hardware design; continued with software development to support incorporation of stand-alone firmware capability in Electrically Suspended Gyro Navigator; initiated integrated testing of stand-alone Electrically Suspended Gyro Navigator with the Central Computer Complex.

(U) The FY 1983 program consists of:

- Completed stand-alone Electrically Suspended Gyro Navigator integration with Central Computer Complex.
- Initiate Electrically Suspended Gyro Navigator stand-alone capability technical evaluation/operational evaluation.
- Complete maintainability demonstration with ships personnel.
- Continue follow-on test and evaluation.

Program Element: 64514N Title: Navigation Systems

(U) For FY 1984 it is planned to:

- o Initiate electrically Suspended Gyro Navigator Shock Capability Improvement Program.
- o Continue follow-on test and evaluation.

(U) Program to completion: Complete Shock Improvement Capability; complete follow-on test and evaluation.

(U) Project 80253, Doppler Log

(U) FY 1982: Completed design, qualification testing, reliability and maintainability testing; completed fabrication of Engineering Development Models 1 and 2. Engineering development models 3 and 4 are being fabricated.

(U) The FY 1983 program consists of:

- o Complete fabrication of Engineering Development Models 3 and 4.
- o Initiate first article testing.

(U) For FY 1984 it is planned to:

- o Commence technical evaluation and complete operational evaluation.
- o Initiate follow-on test and evaluation as required.

(U) Program to completion: Complete follow-on test and evaluation.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64577N
DoD Mission Area: 333 - Strategic Communications

Title: Extremely High Frequency Satellite Communications
Budget Activity: 5 - Intelligence and Communications

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	(34,198)	45,902	57,424	62,296	42,693	254,609
X0728	Extremely High Frequency Satellite Communications System	(34,198)	21,996	19,656	23,014	27,180	144,361
X1660	Navy Fleet Satellite Communications Extremely High Frequency Package	-	23,906	37,768	39,282	15,513	116,469
	RDT&E,N Quantities (Development Prototype, Initial Operational Test and Evaluation)						(12)

FY 1982 funds provided under Program Element 33109N (Satellite Communications).

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 develops the Navy Extremely High Frequency Satellite Communications System which will provide modest cost, widely deployed, Extremely High Frequency terminals and the Navy Fleet Satellite Communications Extremely High Frequency Package. The terminals will be compatible with the Military Strategic Tactical and Relay Satellite System. The Extremely High Frequency terminal and satellite system meets a fleet requirement for survivable, reliable, wartime, covert, anti-jam communications under projected threat environments. The Fleet Satellite Communications Extremely High Frequency Package will provide an Extremely High Frequency initial operational capability and an orbital test and evaluation capability to support the Joint Service Military Strategic Tactical and Relay terminal production decisions.

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 changes: Extremely High Frequency Satellite Communications System: A net increase of 2,100 in FY 1983 is due to inflation and revision of cost estimates; a net decrease of 4,215 in FY 1984 is due to inflation and budgetary constraints; a net decrease of 25,679 in total estimated costs due to refined cost estimates in FY 1985 and the outyears. Navy Fleet Satellite Communications EHF Package: A net decrease of 24 in FY 1983 is due to inflation and revised cost estimates; a net decrease in FY 1984 is due to inflation and budgetary constraints; a net decrease of 18,909 in total estimated cost due to refined cost estimates in FY 1985 and the outyears.

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	*	*	43,826	61,149	146,630	305,418
X0728	Extremely High Frequency Satellite Communications System	(1,845)	(34,198)	19,896	23,871	90,230	170,040
X1660	Navy Extremely High Frequency Space Segment	0	**	23,930	37,278	56,400	135,378

*FY 1981 and FY 1982 funds provided under Program Element 33109N (Satellite Communications).

**FY 1982 funds provided under Program Element 11403N (HYDRUS) but not identified as a separate project.

333

(333)

Program Element: 64577N Title: Extremely High Frequency Satellite Communications

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	-	-	-	-	931,424	931,424
(Quantity)					(376)	(376)

F. (U) RELATED ACTIVITIES: 33601F, Air Force Satellite Communications; 33603F, Military Strategic Tactical and Relay Satellite Communications; 33142A, Extremely High Frequency Communications Terminals; 62721N, Navy Extremely High Frequency Exploratory Development Program. The Joint Military Strategic Tactical and Relay Satellite Communications Program Office has overall responsibility for the Department of Defense program and manages development of the satellite and mission control segments. The Extremely High Frequency Communications Terminal Program Office has responsibility for joint terminal development among Navy, Air Force, and Army.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory is the Naval Ocean Systems Center, San Diego, CA. OTHER: Naval Underwater Systems Center, New London, CT; Naval Electronic Security Engineering Center, Vallejo, CA; Naval Research Laboratory, Washington, DC; Naval Air Development Center, Warminster, PA; Naval Surface Weapons Center, White Oak, MD; National Security Agency, Fort George G. Meade, MD; and Naval Electronic Systems Engineering Activity, St. Inigoes, MD. CONTRACTORS: Harris, Melbourne, FL and Raytheon, Sudbury, MA are the prime contractors. OTHERS : Lincoln Laboratory, Lexington, MA; TRW, Redondo Beach, CA; and ARINC, Annapolis, MD.

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

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

(U) Project X0728 Extremely High Frequency Satellite Communications Systems

1. (U) DESCRIPTION (Requirement and Project): The objective of the Navy's Extremely High Frequency Satellite Communications project is to design, develop, acquire and deploy affordable, survivable wartime communications terminals which will provide anti-jam and covert communications against threats projected through the year 2000. Three competitive contracts were funded through System Definition and Concept Demonstration phases. Two Full Scale Development contracts were awarded in 1982. Production Award to a single contractor will be based upon Operational Test and Evaluation and production bid. Scheduled initial operational capability for the system is FY 1991. A buy of 376 terminals is projected.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Under Program Element 33109N, the Navy Extremely High Frequency Satellite Communications Project obtained approval of the Chief of Naval Operations Executive Board and the Department of the Navy Systems Acquisition Review Council to proceed with Full Scale Development. Two Full Scale Development contracts were awarded January 20, 1982. The program was designated an element of the Military Strategic Tactical and Relay Satellite System shortly after contract award. Completed draft satellite to terminal and mission control element to terminal interface documentation.

b. (U) FY 1983 Program: Conduct Preliminary and Critical Design Reviews for the terminal. Award a contract for development of a Type 8 Mod 3 submarine periscope to accommodate an Extremely High Frequency antenna. Initiate procurement of Government Furnished Security Equipment and engineering development terminal parts after Preliminary Design Review approval.

c. (U) FY 1984 Planned Program: Continue Full Scale Development of 12 Extremely High Frequency Engineering Development Model terminals. Initiate factory acceptance testing in late FY 1984. Conduct Fleet Satellite Communications Extremely High Frequency Package/Terminal compatibility testing to insure interoperability. Commence integration and test of an Extremely High

Frequency Satellite Communications antenna and radome onto a Type 8 Mod 3 submarine periscope. Perform studies to integrate an Air Force Extremely High Frequency aircraft terminal aboard Navy aircraft. Decreased funding of -2,340 over FY 1983 is due to an OSD Program restructure.

d. (U) Program to Completion: Complete Factory Acceptance Test and deliver 12 Extremely High Frequency Engineering Development Model terminals for installation in FY 1985. Commence land-based testing and technical test and evaluation in FY 1985. Install Extremely High Frequency Engineering Development Model terminals on ships, submarines, and shore sites to complete technical test and evaluation. Install Type 8 Mod 3 periscopes on submarines as part of the Technical Evaluation. Perform Operational Test and Evaluation in FY 1986 and 1987, using the on-orbit Extremely High Frequency Satellite Communications Package capability. A Department of Navy Systems Acquisition Review Council III is scheduled for FY 1987. If approved, initiate terminal production in FY 1988 to provide an Initial Operational Capability in FY 1991. Aircraft Terminal integration studies will continue through FY 1989.

e. (U) Milestones

MILESTONE	DATE
1. Commence Terminal Full Scale Development	2nd QTR FY 1982
2. Commence Development Test and Evaluation	3rd QTR FY 1985
3. Commence Initial Operational Test and Evaluation	3rd QTR FY 1987
4. Department of Navy System Acquisition Review Council III	4th QTR FY 1987
5. Award Production Contract	4th QTR FY 1987

(U) Project X1660 Fleet Satellite Communications Extremely High Frequency Package:

1. (U) DESCRIPTION (Requirement and Project): The objective of the Fleet Satellite Communications Extremely High Frequency Package project is to develop a small Extremely High Frequency Communications Package to provide the Military Strategic Tactical and Relay Joint Terminal Project Office with an adequate test bed to demonstrate Military Strategic Tactical and Relay Extremely High Frequency Engineering Development Model Terminal capabilities prior to awarding terminal production contracts. A secondary objective is to provide the National Command Authority and selected units with Satellite Communications connectivity in stressed environments. These performance objectives will be pursued within physical and technical constraints and design-to-cost and schedule goals without appreciable risk to the Fleet Satellite Communications System existing baseline performance. By a Joint Memorandum of Understanding, the Navy Department is the Executive Agent for the Fleet Satellite Communications Extremely High Frequency Package to be integrated and flown on Fleet Satellite Communications satellites F-7 and possibly F-8. Fleet Satellite Communications satellites F-7 and F-8 are scheduled for launch in 1986 and 1987, respectively. The Fleet Satellite Communications Extremely High Frequency Package is being developed by the Massachusetts Institute of Technology Lincoln Laboratory under management of the Military Strategic Tactical and Relay Satellite System Joint Program Office, with guidance and direction from the Navy Fleet Satellite Communications System Project Office.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Under Program Element 33109N, designated the Navy Fleet Satellite Communications Extremely High Frequency Package part of the Military Strategic Tactical and Relay Satellite Program, with Navy as the Executive Agent and Air Force as the Program Management Office to develop the Extremely High Frequency Package. Designated the Massachusetts Institute of Technology Lincoln Laboratory to design, develop and fabricate Extremely High Frequency Packages. Conducted preliminary Design Reviews for design of the Extremely High Frequency Package and for integration of the Extremely High Frequency Package aboard Fleet Satellite Communications satellite F-7. Commenced fabrication of a ground qualification model of the Extremely High Frequency Package.

b. (U) FY 1983 Program: Continue fabrication of the ground qualification model, and perform qualification testing. Commence fabrication of the Extremely High Frequency Package satellite antennas. Continue laboratory support to monitor efforts with respect to Fleet Satellite Communications Extremely High Frequency Package and terminal compatibility.

Program Element: 64577M Title: Extremely High Frequency Satellite Communications

c. (U) FY 1984 Planned Program: Complete qualification testing and initial terminal interoperability testing for the Extremely High Frequency Package flight model. Initiate fabrication of the flight model Fleet Satellite Communications Extremely High Frequency Package upon completion of Critical Design Review. Complete Fleet Satellite Communications Extremely High Frequency Package and terminal compatibility testing. Continue significant laboratory support for Extremely High Frequency Package development and testing. Increased funding of 13,862 over FY 1983 is due to package parts delivery, breadboard and assembly.

d. (U) Program to Completion: Complete and test Extremely High Frequency Package antennas in FY 1985. Continue fabrication of the Fleet Satellite Communications Extremely High Frequency Package. Perform Package and Terminal compatibility tests with an actual Fleet Satellite Communications Extremely High Frequency Package in late FY 1985. Deliver a Fleet Satellite Communications Extremely High Frequency Package to the contractor for integration with the Fleet Satellite Communications satellite F-7 in late FY 1985. Perform integration and test of the Fleet Satellite Communications Extremely High Frequency Package and the Extremely High Frequency antennas with Fleet Satellite Communications satellite F-7 during first half of FY 1986. Launch Fleet Satellite Communications satellites F-7 and possibly F-8 with Extremely High Frequency Packages in FY 1986 and FY 1987, respectively. Commence initial on-orbit terminal operational testing.

e. (U) Milestones

MILESTONE	DATE
1. Contract Award	2nd QTR FY 1982
2. Specification Completion	2nd QTR FY 1983
3. Package Integration	4th QTR FY 1985
4. Space Package Launch	3rd QTR FY 1986
5. Operational Status	3rd-4th QTR 1986

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64777N
Title: NAVSTAR Global Positioning System
DoD Mission Area: 357 - Navigation and Position Fixing
Budget Activity: 5 - Intelligence and Communications

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	34,000	39,822	65,443	88,250	Continuing	Continuing
X0699	Clock Technology Development	4,060	10,478	13,108	13,029	Continuing	Continuing
X0708	NAVSTAR Global Positioning System	1,800	3,220	391	489	1,500	67,576*
X0921	NAVSTAR Global Positioning System Equipment	28,140	26,124	51,944	74,732	161,651	380,524*
	RDT&E,N quantities (development prototypes, Initial Operational Test and Evaluation)						(48)

* The total estimated cost includes prior year funding under Program Element 63401N.

The above funding includes out-year escalation and encompasses all work or development phases now planned or anticipated through FY 1985 only for project X0699 and through completion for other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program develops Navy's portion of the Joint Service NAVSTAR Global Positioning System. The system will consist of at least 18 satellites, a master control network, and user equipment in vehicles such as ships, airplanes, and portable manpacks. Fundamental to the successful accomplishment of military missions is the ability to precisely position friendly forces relative to each other and with respect to enemy forces. The NAVSTAR Global Positioning System will fulfill the military need to provide global, highly accurate positioning/navigation information to a broad spectrum of military and civilian missions. The objectives are to develop atomic frequency standards for the NAVSTAR Global Positioning System Space and Control segments, participate in the Joint Program Office for Phase II Full Scale Engineering Development of NAVSTAR Global Positioning System, and develop and integrate Navy's portion of the Joint Service NAVSTAR Global Positioning System user equipment unique to Navy platforms. The Defense System Acquisition Review Council II of 5 June 1979 and the Secretary of Defense memorandum of 24 August 1979 approved transition into Phase II Full Scale Engineering 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: a net decrease of 31,997 in FY 1984 due to inflation and delayed procurement and installation schedules under Other Procurement Navy Program Element 35164N, NAVSTAR Global Positioning System User Equipment.

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	22,002 1/	34,000	39,822	97,440	Continuing 2/	Continuing 2/ 3/
X0699	Clock Technology Development	1,033 1/	4,000	10,478	13,297	Continuing 2/	Continuing 2/
X0708	NAVSTAR Global Positioning System	3,833 1/	1,800	3,220	420	1,415	47,782
X0921	NAVSTAR Global Positioning System User Equipment	17,136 1/	28,200	26,124	83,723	199,424	376,662 3/

1/ The total actual cost includes FY 1981 and prior funding under Program Elements 63401N (Projects X0699 and X0708) and 64778N (Project X0921).
2/ Atomic clock development will continue until such time as a stable, reliable and accurate frequency standard is operational.
3/ The total estimated cost includes prior funding appropriated under Program Element 63401N, Project X1089.

Program Element: 64777N Title: NAVSTAR Global Positioning System

E. (U) OTHER FY 1984 APPROPRIATIONS FUNDS:

	FY 1982 Actual	FY 1983 Estimate	FY 1984 Estimate	FY 1985 Estimate	to Completion	Estimated Cost
OPN	-	-	-	6,745	102,117	108,862
(Quantity)	-	-	-	(28)	(906)	(934)
APN	-	-	-	4,972	641,827	646,799
(Quantity)	-	-	-	(0)	(4,620)	(4,620)

Procurement funds are contained in Program Element 35164N.

F. (U) RELATED ACTIVITIES: This is a joint program with all Services participating. The Air Force is the executive agent. Other Service development funding for the joint program is contained in Program Element 63403A, NAVSTAR Global Positioning System. Army and Air Force funds for full scale engineering development are carried in Program Elements 64778A, NAVSTAR Global Positioning System, and 64778F, NAVSTAR Global Positioning System, respectively.

G. (U) WORK PERFORMED BY: IN-HOUSE: Lead laboratory for Project X0699 is the Naval Research Laboratory, Washington, D.C. Lead laboratory for Project X0921 is the Naval Air Development Center, Warminster, PA. OTHERS: Navy Space Systems Activity, Los Angeles, CA; Naval Avionics Center, Indianapolis, IN; Naval Ocean Systems Center, San Diego, CA; Naval Electronic Systems Engineering Center, San Diego, CA; Commander, Operational Test and Evaluation Force, Norfolk, VA. CONTRACTORS: Hughes Aircraft Company, Malibu Beach, CA; Kern Company, Danvers, MA; Frequency Electronics, New Hyde Park, NY; Frequency and Time Systems, Inc., Beverly, MA; Rockwell Collins, Cedar Rapids, IA; Magnavox Government and Industrial Electronics, Torrance, CA.

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

(U) Project X0708N, NAVSTAR Global Positioning System: This project provides for management and joint-service support to coordinate among services and Navy System Commands the transition to production phase, and includes personnel support of Joint Program Office, logistics and support planning. The majority of effort under this project transfers to Project X0921 in FY 1984.

(U) In FY 1982, continued integration and installation planning for prototype user equipment on Navy platforms and personnel support of Joint Program Office.

(U) The FY 1983 program consists of:

- o Developing logistics and management support plans.
- o Initiating Phase II testing on Navy initial operational test and evaluation platforms.
- o Continuing personnel support of Joint Program Office.

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

- o Continue personnel support of Joint Program Office. The decreases from FY 1983 are due to transfer of effort to Project X0921.

(U) Personnel support of Joint Program Office will continue to completion in FY 1988.

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

(U) Project X0699, Clock Technology Development:

1. (U) DESCRIPTION (Requirement and Project): This project funds development of atomic frequency standards for use in NAVSTAR Global Positioning System satellites. NAVSTAR Global Positioning System technology requires an extremely accurate time

reference and a very reliable and precise frequency standard is necessary on global positioning satellites. The more precise the time standard, the more accurate the measurement of position and velocity, and the more stable the frequency standard, the less frequently corrections have to be made by the ground control station. Emphasis is on improving reliability and stability of cesium frequency standards and in development of a follow-on hydrogen maser standard for space applications. Operational test results of NAVSTAR Global Positioning System have shown that atomic frequency standard reliability is the only remaining major technical problem.

2. (U) Program Accomplishments and Future Events:

a. (U) FY 1982 Program: Preproduction models of improved cesium standards were delivered, tested and integrated into NAVSTAR replenishment satellites. Radiation test models from each of the cesium clock contractors were delivered for testing.

b. (U) FY 1983 Program: Deliver and test remaining preproduction cesium standards at the Naval Research Laboratory which will have capability to conduct long term tests of cesium clocks and will collect technical data on clock performance. Based on testing results, a decision will be made and contracts awarded for follow-on cesium clock production. Resume design and development of hydrogen maser standards.

c. (U) FY 1984 Planned Program: Fabricate and deliver a prototype hydrogen maser standard in the last quarter. Complete final testing of production models of improved cesium standards prior to installation on satellites. Complete expansion of the long term test facility at the Naval Research Laboratory so that long term thermal, vacuum and stress testing for genetic failures and reliability verification can be conducted on up to 12 cesium clocks. The increase in test facility activity and the incremental funding profile for Maser Development are major contributors to the $2,630,000 increase from FY 1983 to FY 1984.

d. (U) Program to Completion: This is a continuing program. Development of a hydrogen maser standard will continue until such time that it will be ready for use on operational satellites. Commence testing of a prototype hydrogen maser standard in 1985.

e. (U) Milestones

MILESTONE	DATE
1. Defense Systems Acquisition Review Council II	June 1979
2. Cesium Engineering Development Model Deliveries	1979-1980
3. Improved Cesium Contract Awards	August 1980
4. Hydrogen Maser Contract Award	August 1980
5. Improved Cesium Prototype Deliveries	1982-1983
6. Defense Systems Acquisition Review Council III	May 1984
7. Cesium Production Model Deliveries	1984
8. Hydrogen Maser Engineering Development Model Delivery	1984-1985

(U) Project X0921, NAVSTAR Global Positioning System Equipment

1. (U) DESCRIPTION (Requirement and Project): This project funds Navy's portion of the NAVSTAR Global Positioning System user equipment development and integration unique to Navy platforms. Extensive investigations, analysis, and tests by all the Services have confirmed the feasibility of a highly precise, satellite-based positioning system capable of satisfying a broad spectrum of Department of Defense positioning requirements. The Defense Systems Acquisition Review Council III is scheduled for 1984 as part of the decision process to proceed to the third phase, System Acquisition and Support. A worldwide two-dimensional capability is expected in 1986 and a three-dimensional capability with an 18 satellite constellation is expected in 1988. User equipment includes manpacks, units for wheeled and tracked vehicles, ships and submarines, and avionics for many types of aircraft. These equipments will have high commonality and interchangeability of parts. Each Service is responsible for establishing user equipment performance characteristics to meet its needs and to integrate the user equipment into its own platforms.

Program Element: 64777N Title: NAVSTAR Global Positioning System

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Continued parallel development of prototype user equipments (antenna, receiver/processor, and flexible modular interfaces) for integration into a submarine, an aircraft carrier, and an A-6 aircraft for developmental and operational test and evaluation.

b. (U) FY 1983 Program: After factory testing, deliver initial prototype user equipment for Developmental Test and Evaluation and installation on Initial Operational Test and Evaluation host platforms. First set delivery is scheduled for November 1982.

c. (U) FY 1984 Planned Program: Conduct installation test and evaluation of prototype user equipments in various environments. Continue Initial Operational Test and Evaluation. Complete assessment of operational test and evaluation results before Defense Systems Acquisition Review Council III. Assuming approval, continue user equipment development and design interfaces for this equipment and platform modifications and kits to support remaining Navy platforms receiving NAVSTAR Global Positioning System user equipment. The intense test effort contributes slightly to the 25,820 increase over FY 1983. However, the major increase is due to developmental effort (modification kit, modification documentation and procedures) for follow-on (Phase III) aircraft and ships whose equipment procurement begins in FY 1986.

d. (U) Program to Completion: Continue to design interfaces and equipment installations and to conduct testing of the first platform of each Navy platform type receiving NAVSTAR Global Positioning System user equipment.

e. (U) Milestones:

MILESTONE	DATE
1. Defense Systems Acquisition Review Council II	June 1979
2. Awarded contracts for prototype user equipment development	July 1979
3. User Equipment Initial Operational Test and Evaluation	June 1983
4. Defense Systems Acquisition Review Council III	May 1984
5. 18 Satellite Constellation established	1988

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65866N
Title: Command and Control Systems Planning/Engineering Support
DoD Mission Area: 360 - Support & Base Communications
Budget Activity: 5 - Intelligence and Communications

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	2,948	5,060	5,136	6,139	Continuing	Continuing
X0739	Telecommunications System Architecture Support	930	2,029	2,535	3,048	Continuing	Continuing
X0740	Telecommunications Engineering Support	2,018	3,031	2,581	3,091	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 provides continuing systems engineering and planning support to the development of Navy Command and Control systems; and defines the research, development, centralized control and management required to replace a Navy Command and Control System which has the desired properties of responsiveness, reliability, survivability, flexibility, security and interoperability.

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 1,267 in FY 1982 and a decrease of 1,700 in FY 1984. Project X0739 has a decrease of 450 in FY 1982 due to required support for higher priority strategic connectivity and Navy Command and Control System developments. An FY 1984 decrease of 877 is due to Navy directed budgetary adjustments. The project X0740 decrease of 817 in FY 1982 was reprogrammed for essential support of the Officer in Tactical Command Information Exchange System and accelerated development of a teletype replacement program. An FY 1984 decrease of 823 is due to Navy directed budgetary 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	3,271	4,215	5,060	6,836	Continuing	Continuing
X0739	Telecommunications System Architecture Support	1,396	1,380	2,029	3,432	Continuing	Continuing
X0740	Telecommunications Engineering Support	1,875	2,835	3,031	3,404	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: This effort is related to Navy RDT&E efforts in Command, Control and Communications, and to those of other military services, Defense Communications Agency, National Security Agency, Worldwide Military Command and Control System Architecture Support (PE 63735N WWMCCS), Joint Tactical Communications Program (PE 28010N TRI-TAC), Joint Interoperability of Tactical Command and Control Systems (PE 64779N JINTACCS) and Joint Tactical Information Distribution System (PE 25604N JTIDS).

G. (U) WORK PERFORMED BY: IN-HOUSE: Telecommunications System Architecture Support: Navy Ocean Systems Center, San Diego, CA, Navy Air Development Center, Warminster, PA., Navy Research Laboratory, Washington, DC., Electromagnetic Compatibility Analysis Center, Annapolis, MD., Navy Underwater Systems Center, New London, CONN. CONTRACTORS: The MITRE Corporation, McLean, VA., Johns Hopkins University/Applied Physics Laboratory, Laurel, MD. Booz-Allen Applied Research, Arlington, VA.

Program Element: 65866N Title: Command and Control Systems Planning/Engineering Support

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

(U) Project X0739 Telecommunications System Architecture Support: This project provides support required for the determination of command and control system architectures and the identification of derivative Navy Command and Control System configurations; strategic and tactical command and control support systems are also considered.

(U) In FY 1982, requirements for Navy support of the World Wide Military Command and Control System were determined for all Navy sites; high frequency radio systems compatibility and interoperability with other U.S. Navy systems was examined; requirements for use with command, control and communications countermeasures systems were reviewed; the Joint Tactical Information and Distribution System was examined for identification, friend or foe use.

(U) The FY 1983 program consists of:

- Data bases are being examined for commonalities in order to reduce redundancies.
- Requirements for command facility display and decision aids to support the Fleet Commanders in Chief are being determined.
- LINK 11 improvements are being defined.
- Technical approaches to determine capabilities and the selection of systems for electronic counter countermeasure, anti-jam and frequency spectrum compatibility and supportability are being defined.
- Update 1982 Command and Control Plan.
- Navy Command and Control System site requirements are being functionally allocated into major subsystems.
- High frequency capabilities in the Indian Ocean area are being evaluated.

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

- Navy Command and Control Plan will be revised to reflect current Navy strategic and tactical warfare plans and programs.
- Fleet Commander in Chief command and control systems will be defined at the component and unit level and supporting connectivity and interoperability requirements will be defined.
- Evolving Navy requirements for command and control support will be identified, defined and addressed.
- Support to these systems will continue.

(U) Project X0740 Telecommunications Engineering Support: This project reviews approved command and control systems and architectures and develops quantitative supporting command and control plans and engineering support documentation.

(U) In FY 1982, Navy Fleet command and control organizations and systems were reviewed and equipment implementation plans were developed; a Royal Navy high frequency communications systems was examined for potential use in the High Frequency Improvement Program; Command and Control Processor documentation was developed; Battle Group Command, Control, Communications and Intelligence support requirements were analyzed and recommendations were provided.

Program Element: 65866N Title: Command and Control Systems Planning/Engineering Support

(U) The FY 1983 program consists of:

- o Command and Control Processor system parameters will be defined and technical parameters established.
- o Advanced Combat Direction System modules for Composite Warfare Coordinator and commanders use will be functionally analyzed.
- o Correlation systems and algorithms with high volume processing capability will be developed.
- o Site specific top level system design alternatives will be developed for theater-level commanders.
- o Functional allocations for battle group command support systems will be developed.
- o A command and control, communications countermeasures software and hardware simulation test site will be established.
- o Development of the Sea Mobile Command Center will be pursued; and requirements for Navy support of World Wide Military Command and Control System needs will continue to be defined.

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

- o Resolution of deficiencies identified by the FY 1983 Command and Control Plan.
- o Navy missions, threats and technology changes will be identified and documented.
- o Review and support will continue.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 35111N
Title: Weather Service
DoD Mission Area: 420 - Global Military Environmental Support
Budget Activity: 6 - Defense Wide Mission Support

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	2,867	1,186	1,568	1,425	Continuing	Continuing
W0523	Satellite Data Processing System	980	948	1,079	936	Continuing	Continuing
X0922	Environmental Sensor Assessment	217	238	489	489	Continuing	Continuing
W0943	Automated Environmental Prediction System II	1,670	-	-	-	-	7,016

As this is a continuing program, the above funding profile excludes 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 develops an ashore meteorological and oceanographic satellite data processing center, regional subsystems and associated software for receiving, processing and displaying satellite data required for reliable and comprehensive environmental support of global naval operations.

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 is unchanged in total. However, 60 was reprogrammed from project W0943 to W0523 for added software documentation. FY 1983 is unchanged. The increase of 477 in FY 1984 results from an addition of 489 to project X0922[ ] and a decrease of 12 in Project W0523 is due to transfer to the Navy Industrial Fund.

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	2,998	2,867	1,186	1,091	Continuing	Continuing
W0523	Satellite Data Processing System	975	920	948	1,091	Continuing	Continuing
X0922	Environmental Sensor Assessment	205	217	238	-	-	3,798
W0943	Automated Environmental Prediction System II	1,818	1,730	-	-	-	7,076

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

F. (U) RELATED ACTIVITIES: Project W0524, Defense Meteorological Program Navy Support (Program Element 35160N), provides equipment and facilities to develop and operate the Navy's portion of the Defense Meteorological Satellite Program. Project X1697, Navy Remote Ocean Sensing System (Program Element 35160N), will provide remotely sensed geophysical data for input to the satellite data processing center. Project W0513, Automated Environmental Prediction System (Program Element 63207N), develops the analysis and prediction models necessary to ingest geophysical data records provided by the Satellite Data Processing System to improve environmental forecasts. Project R1596, Satellite Oceanography Tactical Applications (Program Element 63704N), uses satellite altimetry data provided by a data link supported by the Project W0523, Satellite Data Processing System (Program Element 35111N). Project W0532, Environmental Equipment Support (Program Element 64218N), provides for direct receipt of data from satellites.

345 B1 346

Program Element: 35111N Title: Weather Service

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Environmental Prediction Research Facility, Monterey, CA (lead activity for Project WO523, Satellite Data Processing System); Naval Research Laboratory, Washington, D.C. (lead laboratory for Project X0922, Environmental Sensor Assessment); OTHERS: Fleet Numerical Oceanography Center, Monterey, CA; Naval Ocean Research and Development Activity, Bay St. Louis, MS: Navy Space Systems Activity, Los Angeles, CA. CONTRACTORS: No prime contractor. OTHERS: Control Data Corporation, Monterey, CA; Ocean Data Systems, Inc., Rockville, MD; Systems and Applied Sciences, Inc., Riverdale, MD; Ishar Shy Industries, Inc., Santa Ana, CA; Lockheed Missile and Space Corp., Sunnyvale, CA; Bendix Field Engineering Corp., Columbia, MD; Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; Applied Physics Laboratory, John Hopkins University, Laurel, MD.

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

(U) Project WO523, Satellite Data Processing System: This project provides for the design, development and modifications of the central and regional satellite data processing systems necessary to convert environmental satellite radiance values and reflected energy into geophysical data records for use in analyses and forecasts of meteorological and oceanographic parameters required to support Naval Warfare.

(U) In FY 1982, development continued on software to use sensor data from the Defense Meteorological Program/National System satellites; as well as, completed the evaluation of a regional Satellite Processing and Display System.

(U) The FY 1983 program consists of:

- o Completing an interface to provide Geostationary Operational Environmental Satellite digital data to the Satellite Data Processing Center, Monterey, CA.
- o Providing support for data link for the Geodesy Satellite A-Oceans Applications program.
- o Continuing modification of software for satellite data processing center to receive and process data from new satellite sensors.
- o Initiating concept and design for Navy to share satellite data with U.S. Air Force and the National System.

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

- o Continue support for Geodesy Satellite A-Oceans Applications Program.
- o Complete Special Sensor Microwave Imager software development and implement.
- o Provide capability to emulate the upgrade of the Navy's Satellite Data Processing Center and initiate software development.
- o Interface Satellite Processing and Display System with Satellite data receiver SMQ-11.
- o Development and incorporation of technological advances will continue.

(U) This is a continuing program.

(U) Project X0922, Environmental Sensor Assessment:

Program Element: 35111N Title: Weather Service

(U) The FY 1983 program consists of:

[redacted]

(U) For FY 1984, the program will consist of:

[redacted]

(U) This is a continuing program.

(U) Project W0943, Automated Environmental Prediction System II: This project provides for design, development and modification of software for the Navy's Primary Environmental Prediction System.

(U) In 1982, continued software modifications to implement functional application models transitioning from Advanced Development and modified models to increase system efficiency. Project was transferred to O&M,N during FY 1983 budget development.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 35128N
Title: Security and Investigative Activities
DoD Mission Area: 471 - General Management Support
Budget Activity: 6 - Defensewide Mission Support

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	0	0	0	0	0	0
XG767	Criminal Investigative Support	0	0	0	0	0	0

2. (U) BRIEF DESCRIPTION OF ELEMENT: This program element was designed to provide Naval Investigative agents with the tools they need to apprehend and/or prevent criminal activities on Naval ships and Naval reservations. Counterintelligence, narcotics violations, kidnapping, anti-terrorist activities, theft of government property, sabotage and other such crimes require specialized equipment designed to work in the environment that these crimes may occur. As such, the program was designed to provide quick response devices, for use by the Naval agents in the field, to counter these threats.

3. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: RDT&E funding for this program element was deleted by Congressional Committee as duplicative of other Federal Criminal Investigative Research and Development Efforts.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 35160N
Title: Defense Meteorological Satellite Program
DoD Mission Area: 420 - Global Military Environmental Support
Budget Activity: 6 - Defensewide Mission Support

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	750	773	802	2,964	Continuing	Continuing
W0524	Defense Meteorological Satellite Program - Navy Support	750	773	802	1,004	Continuing	Continuing
X1697	Navy Remote Ocean Sensing System	-	-	-	1,960	164,740	166,700

As Project W0524 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 for that project and through completion for Project X1697.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This element includes equipment, facilities and costs required to develop and operate the Navy segment of the Defense Meteorological Satellite 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 that shown in this Descriptive Summary are as follows: The decrease of 600 in FY 1982 results from reprogramming to Program Element 64218N, Environmental Systems, to support development of the AN/SMQ-11 meteorological satellite receiver prototype and concomitant testing. The decrease of 543 in FY 1983 results from reprogramming. The decrease of 263 in FY 1984 results from Navy action in March 1982 to support an emergent higher priority requirement.

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	1,901	1,350	1,316	1,065	Continuing	Continuing
W0524	Defense Meteorological Satellite Program - Navy Support	1,901	1,350	1,316	1,065	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 Shipboard Satellite Readout Equipment	-	-	-	-	31,454	57,597
(Quantity)	-	-	-	-	(14)	(14)
Laser Dry Processor	-	-	-	-	5	13
Shipboard Terminal Systems	-	-	-	-	29,200	33,928
WPN Defense Meteorological System Program - Navy Support	3,000	-	-	-		
(Quantity)						
Microwave Radiometer	(1)	-	-	-	(3)	(4)

F. (U) RELATED ACTIVITIES: Program Element 35160F, Air Force Defense Meteorological Satellite Program; Program Element 35111N, Weather Service, Project W0523, Satellite Data Processing System.

350

Program Element: 35160N Title: Defense Meteorological Satellite Program

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, D.C.; Navy Space Systems Activity, Los Angeles, CA; Naval Ocean Research and Development Activity, Bay St. Louis, MS. CONTRACTORS: Harris Corp., Melbourne, FL; RCA, Princeton, NJ; Hughes Aircraft Co., Los Angeles, CA.

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

(U) Projects W0524, Defense Meteorological Satellite Program - Navy Support: As directed by the Memorandum of Agreement on the Joint Service Management and Operations of the Defense Meteorological Satellite Program, each service is responsible for the specific requirements placed on the Defense Meteorological Satellite Program by that particular service. The purpose of this continuing effort is to improve the capabilities of the Defense Meteorological Satellite Program system to satisfy unique Navy requirements.

(U) In FY 1982, validated the antenna pattern measurements and accepted delivery of the follow-on special sensor microwave imager. Completed design studies for modernization of the AN/SMQ-10 meteorological satellite receiver.

(U) The FY 1983 program consists of:

- o Develop plan and baseline data for validation of microwave radiometer.
- o Complete ground truth validation plan for special sensor microwave imager.

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

- o Ground-truth validation of the special sensor microwave imager algorithms.
- o Perform advanced studies for the microwave sensor development.

(U) Program to Completion: Complete the pre-launch and post-launch validation of microwave radiometer.

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

351

351

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64208N
Title: Range Instrumentation and Systems Development
DoD Mission Area: 454 - Other Test and Evaluation Support
Budget Activity: 6 - Defense Wide Mission Support

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	10,988	9,873	14,099	15,074	Continuing	Continuing
W0604	Training Range and Instrumentation Development	3,264	5,065	8,838	9,417	Continuing	Continuing
W0881	Test and Evaluation Range Instrumentation Development	4,508	4,355	5,261	5,657	Continuing	Continuing
S0990	Mobile Tracking Range	1,396	0	0	0	0	9,394
X1048	Wide Area Active Surveillance Radar	1,820	453	0	0	0	18,407

As this is a continued 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: Requirements for new and improved range instrumentation and systems to meet the needs of Major Range Test Facility Base and Fleet Training Ranges are developed within this program element. Training Instrumentation Development (W0604) provides the necessary funding for the development of Fleet Training Range Instrumentation and systems necessary to meet the training requirements of new production weapon systems recently introduced into the fleet. Test and Evaluation Instrumentation (W0881) funding initiates development of scientific and technical test instrumentation and systems required by more than one Major Range and Test Facility Base Activity to conduct development and operational test and evaluation on Navy weapons systems undergoing research and development. The Mobile Tracking Range (S0990) was cancelled in FY 1982. The Wide Area Active Surveillance Radar (W1048) is a land-based multifunction phased array surveillance system under development to eliminate existing range control and safety problems directly involving ships and aircraft undergoing Fleet Readiness Training, and to support weapon systems test and evaluation at the Atlantic Fleet Weapons Training Facility. This project will be completed in FY 1983.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes between funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: a net increase of 671 in FY 1982 including a transfer (reduction) of 615 from project W0604 to cover in part an increase of 900 in project W0881 for the Multiple-target Instrumentation Radar development; a reduction of 919 in the Mobile Tracking Training Range project as a result of cancellation; and an increase of 1,305 for the Wide Area Active Surveillance Radar, project X1048, to enable completion of the project in FY 1983. Changes for FY 1983 reflect refined cost estimates and adjustments for inflation. The new reduction of 3,136 in FY 1984 reflects completion of the Wide Area Active Surveillance Radar project in FY 1983 and 300 in project W0604 for economies and a decision by the Navy to reduce project W0881 by 1,096 for higher priority projects.

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	13,276	10,317	12,392	17,235	Continuing	Continuing
W0604	Training Range and Instrumentation Development	2,324	3,879	5,638	9,138	Continuing	Continuing
W0881	Test and Evaluation Range Instrumentation Development	2,401	3,608	4,653	6,357	Continuing	Continuing
S0990	Mobile Tracking Range	4,066	2,315	0	0	0	11,367
X1048	Wide Area Active Surveillance Radar	4,485	515	2,101	1,740	Continuing	Continuing

752

Program Element: 64208N

Title: Range Instrumentation and Systems Development

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
Other Procurement, Navy	11,800	11,056	7,600	10,700	Continuing	Continuing
Aircraft Procurement, Navy	0	0	4,300	4,800	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Program Element 65864N, Test and Evaluation Support; Program Element 65852N, Atlantic Undersea Test and Evaluation Center; and Program Element 65859N, Mobile Sea Range; will use the developments that are provided by Program Element 64208N, Range Instrumentation and Systems Development, or support related programs which also develop test range capabilities unique to a particular Test and Evaluation facility.

G. (U) WORK PERFORMED BY: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Research Laboratory, Washington, D.C.; Naval Air Test Center, Patuxent River, MD; Naval Undersea Systems Center, Newport, RI; Naval Air Development Center, Warminster, PA; Fleet Analysis Center, Corona, CA. CONTRACTORS: Stanford Research Institute, Menlo Park, CA; Raytheon Company, Wayland, MA; Bunker Ramo, Westlake, CA; MITRE Corp., Washington, D.C.

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

(U) Project W0604, Training Range and Instrumentation Development: This project develops specialized range instrumentation systems to maximize fleet readiness training effectiveness, and minimize instrumentation requirements while reducing operating maintenance costs and manpower. The project supports a number of tasks for training range electronic warfare simulators and telemetry systems. The electronic warfare systems efforts include: development of a Threat Radar Simulator; Threat Platform Simulator upgrade requirements; Noise Jammer Simulator scenario development and testing development of Deception Jammer Simulator performance requirements; and communications, navigation, identification simulators/jammers. The prototype Electronic Warfare Simulators were developed for the Southern California Range Electronic Warfare Simulator in this line and will be procured for other fleet ranges using OP,N funds. Telemetry development and test efforts complement other telemetry improvement programs with the development of telemetry record/relay pods to support combat air patrol and cruise missile training. It will also identify upgrade/modernization requirements to improve accuracy, reduce data turn around time, and O&M,N costs at the fleet telemetry stations. An engineering development model fleet telemetry station will be constructed with evaluation/optimization continuing through early FY 1986.

(U) The FY 1982 efforts initiated development of the Threat Radar Simulator, completed threat Platform Simulator update requirements, and Noise Jammer Simulator scenario requirements; and continued development of a telemetry record/relay pods.

(U) FY 1983 efforts will:

- Continue Threat Radar Simulator Development
- Complete Noise Jammer Simulator Scenario requirements testing
- Perform carrier qualification of Telemetry Pod
- Initiate fleet telemetry station modernization/upgrade
- Initiate Skin Return and Deception Jammer Simulator

Program Element: 64206N Title: Range Instrumentation and Systems Development

(U) FY 1984 efforts will:

- Continue Threat Radar Simulator Development
- Continue fleet telemetry station modernization/upgrade
- Continue Skin Return/Deception Jammer Simulator
- Initiate communication, navigation, identification jammer development

(U) This is a continuing program.

(U) WU681, Test and Evaluation Range Instrumentation Development:

(U) The FY 1982 efforts continued implementation of secure telemetry and development of an interim open-ocean target control system to comply with Naval Telecommunications Command direction to Ultra High Frequency spectra; completed development of the Multiple-Target Instrumentation Radar and initiated test and evaluation of the radar; initiated technology assessment for phased array telemetry antennas.

(U) FY 1983 efforts will:

- Continue the secure telemetry task
- Complete development of the interim open-ocean target control system
- Initiate development of a low cost surface target control system
- Initiate development of an open-ocean target control system with a service life equal to the Integrated Target Control Systems
- Complete test and evaluation of the basic Multiple-Target Instrumentation Radar and initiate development of clutter-processing equipment for the radar
- Continue development of the phased array telemetry antenna

(U) The FY 1984 efforts will:

- Complete the secure telemetry task
- Complete development of the low cost surface target control system
- Continue the open-ocean target control system
- Perform test and evaluation of the clutter modification to the Multiple-Target Instrumentation Radar
- Continue the phased array telemetry antenna
- Initiate development of advanced weapons scoring systems

Program Element: 64208N Title: Range Instrumentation and Systems Development

(U) Project C0990, Mobile Tracking Range: This project was cancelled in FY 1982. The FY 1982 efforts were devoted to close out of the program.

(U) Project X1048, Wide Area Active Surveillance Radar:

- The FY 1982 efforts completed test and evaluation of the radar at the Atlantic Fleet Weapons Training Facility
- The FY 1983 efforts will close out the project and provide initial spares for the radar

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64258N
DoD Mission Area: 452 Aerial Targets
Title: Targets Systems Development
Budget Activity: 6 - Defensewide Mission Support

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	58,803	43,861	53,652	89,439	Continuing	Continuing
W0609	Aerial Target Systems Development	9,229	5,196	4,243	5,194	Continuing	Continuing
W0610	Weapon System T&E Targets	34,679	30,373	44,017	64,884	Continuing	Continuing
W0611	Supersonic Low Altitude Target	8,046	4,000	991	15,500	Continuing	Continuing
W0612	Surface Targets Development	1,294	1,182	1,322	1,334	Continuing	Continuing
W0613	Target Auxiliary Systems	3,555	3,110	3,079	2,527	Continuing	Continuing
R1796	Retract Rouge	2,000	0	0	0	0	2,000

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 though FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Threat representative targets are required to evaluate Navy weapon systems performance throughout their life cycle, including developmental testing and realistic operational evaluation, and to provide effective Fleet training. This program element provides for the development of target systems and associated electronic and infrared subsystems necessary to duplicate or simulate significant threat characteristics, radar cross section, infrared signature, radio frequency emissions, scoring, and control systems. It also provides for the conversion of aircraft and missile systems to be used as targets as well as for targets intended for use only in filling weapon system test and evaluation requirements.

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 summary are as follows: Changes within the FY 1982 program were related to the termination of the FIREBRAND program. 8,046 was utilized by FIREBRAND in W0611 in FY 1982. The balance of Project W0611, 10,054, plus $558 were added to Project W0610 to fund 20 additional AQM-37C targets, AQM-81 FIREBOLT procurement and modification, and design modification of the VANDAL and to procure seven additional VANDALs. In Project W0609 the decreases in FY 1983 and FY 1984 of 4,983 and 9,456 reflect the decision not to develop a new subsonic target to replace the BQM-34A/S. The resources have been shifted to Project W0610. In FY 1983 Project W0612 has been reduced by 1,132. In FY 1983 and 1984 Project W0613 has been reduced by 1,613 and 1,733 respectively. In FY 1983 and FY 1984 the overall program element has been decreased by 40 and increased by 5,540, respectively. Project W0611 has been funded with 4,000 in FY 1983 and 991 in FY 1984 to provide for the initiation of the Supersonic Low Altitude Target development. Project W0610 has been increased by 3,688 in FY 1983 and 15,756 in FY 1984 to fund VANDAL procurements and improvement, activation of East Coast VANDAL, procurement of additional AQM-37C, and modification and procurement of the AQM-81 FIREBOLT targets.

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	43,045	58,803	43,901	48,112	Continuing	Continuing
W0609	Aerial Target Systems Development	5,201	10,760	10,179	13,699	Continuing	Continuing
W0610	Weapon System T&E Targets	15,707	24,067	26,685	28,261	Continuing	Continuing
W0611	Supersonic Low Altitude Target Development	17,395	18,100	0	0	0	84,303
W0612	Surface Target Systems Development	552	1,294	2,314	1,340	Continuing	Continuing
W0613	Target Auxiliary Systems Development	4,190	4,582	4,723	4,812	Continuing	Continuing

356

Program Element: 64258 Title: Targets Systems Development

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
Weapons Procurement, Navy	69,800	74,700	112,900	91,000	Continuing	Continuing
Other Procurement, Navy	0	1,425	5,000	6,500	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Test and evaluation of: current in-service weapons systems: AIM-7E/F, AIM-9H/L/M, AIM-54A, Basic Point Defense, TARTER, TERRIER, Standard Missile 1, Close-in Weapon System; systems currently in test and evaluation: AIM-7M, AIM-54C, AMRAAM, Standard Missile 2, Rolling Airframe Missile, SEASPARROW, and AEGIS; weapons systems to enter test and evaluation: 5" guided projectile, high energy laser, Fleet weapons training with air-to-air, surface-to-air, air-to-surface and surface-to-surface weapons.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Weapons Center, China Lake, California; Naval Air Development Center, Warminster, Pennsylvania; Pacific Missile Test Center, Point Mugu, California; Naval Surface Weapon Center, Dahlgren, Virginia; Naval Air Propulsion Center, Trenton, New Jersey; Naval Ordnance Station, Indian Head, Maryland. CONTRACTORS: Bendix Corporation, Mishawaka, Indiana; Teledyne Ryan Aeronautical, San Diego, California; Beech Aircraft, Wichita, Kansas; Northrop, Ventura, California; Marquardt Corporation, Van Nuys, California; Williams Research, Walled Lake, Michigan; Vega, Vienna, Virginia; Rasdal, Arcadia, California; PDA, Santa Ana, California.

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

(U) Project W0609, Aerial Target Systems Development: This project provides for development of aerial targets to meet weapons test and evaluation and Fleet training requirements.

(U) In FY 1982 a contract was awarded to modify AQM-37A to determine feasibility of operating at 90,000 feet Mach 3.5; prototype auxiliary equipments were developed and tested for application in the TDU-34A tow target; integration of TDU-34 target auxiliary systems into A/A47U-4 tow reels and development of a 240-pound engine for the BQM-74C were initiated.

(U) The FY 1983 program consists of:

- o Flight testing the modified AQM-37A at 90,000 feet Mach 3.5.
- o Initiating the AQM-37A product improvement program to provide a safer propulsion system, upgrade system and payload, and extend endurance.
- o Continuing development work on the BQM-74C 240-pound thrust engine.
- o Continuing integration of TDU-34 tow target auxiliary equipment into A/A47U-4 tow reels.
- o Improving MK-91 Jet Assisted Take-off performance for BQM-74C ground launch.

(U) For FY 1984 it is planned to:

- o Continue development of the AQM-37A product improvement program.
- o Test TDU-34 tow targets with auxiliary equipments with A/A47U-4 tow reels.
- o Test the BQM-74C 240-pound thrust engine.

- Initiate QF-86 replacement program.
- Continue improvement of MK-91 performance for BQM-74C ground launch.

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

(U) Project W0611, Supersonic Low Altitude Target: This project provides for the development of a supersonic target system capable of "SEA-SKIMMER" operations effectively replicating anti-ship missile threats in the post-1990 timeframe.

(U) FY 1982 funding reflects termination of the FIREBRAND program. FY 1983 reflects initiation of the Supersonic Low Altitude Target program which funds potential prime contractor studies and issuance of a solicitation for full scale engineering development. In addition, $1.5 million will be used to determine the feasibility of scaling down the FIREBRAND ramjet engine for use by candidate Supersonic Low Altitude Target vehicles.

(U) For FY 1984 it is planned to evaluate the contractor proposals and select a contractor for a target development contract to be awarded in FY 1985.

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

(U) Project W0612, Surface Targets Development: This project provides for the development of required surface target systems in support of air-to-surface and surface-to-surface weapons test and evalation and Fleet training.

(U) In FY 1982 development continued on a C-band command/control system for seaborne targets and on the development of Floating Automatic Scorable Target.

(U) The FY 1983 program consists of:

- Completion of FAST development.
- Procurement of preproduction FAST targets.
- Test the C-band command/control system.

(U) For FY 1984 it is planned to:

- Initiate the requirements definition for Seaborne Towed Targets.
- Initiate development of improved Unmanned Seaborne Targets command/control.
- Develop alternatives/systems definition for Cruise Missile Targets and augmentation kits.

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

(U) Project W0613, Target Auxiliary Systems: This project provides for the development, test, and evaluation of control, augmentation, and scoring systems/equipments needed aboard Navy targets to represent current threats in support of Weapons Test and Evaluation and Fleet training.

(U) In FY 1982 initiated development of DSQ-(X) non-cooperative scaler scorer to replace DSQ-37; began test and evaluation of DLQ-3 electronic countermeasures set; initiated evaluation of infrared augmentation for TDU-34 tow targets and BQM-74C.

Program Element: 64258N Title: Targets Systems Development

(U) The FY1983 program consists of:

- o Issue the solicitation for the DSQ-X.
- o Procure preproduction models of DLQ-3.
- o Continue infrared device evaluation.
- o Evaluate bullet quadrant scorer.
- o Test C-band command control equipment.
- o Measure radar cross section of QF-86 and Fleet VANDAL (MQM-8X).

(U) For FY 1984 it is planned to:

- o Test and evaluate the AN/DSQ-X scorer.
- o Develop C-band and G-band surface threat radar simulators.
- o Develop deceptive jamming capabilities for the AN/DLQ-3.

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

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

(U) Project W0610, Weapon System Test and Evaluation Targets

1. (U) DESCRIPTION: (Requirement and Project): Test and evaluation of new Naval weapons systems requires targets which closely replicate current and projected threats. This project provides the required threat representative targets for weapons system test and evaluation. These targets change over time as the emerging threat changes. Targets currently provided include drone converted QF-4 and QF-86 aircraft which provide full scale aircraft targets; the MQM-8G VANDAL targets, a converted TALOS missile, which provides full scale anti-ship missile threat replication; and specially configured AQM-37 targets replicating high altitude, high speed anti-ship missile threats. New targets to be provided in the near term include: a derivative of the Air Force developed AQM-81 FIREBOLT target; a reuseable high altitude (100,000 feet), high speed (Mach 4.0) target; a new subsonic target (BQM-P1) which provides performance similar to the BQM-34S targets (altitudes from sea level to 50,000 feet, airspeeds up to Mach 0.9). Target augmentation provided includes the DLQ-3S electronic warfare equipment, the DPT-1 active emitter equipment, DSQ-37 scorers and infrared augmentation devices, and special target equipments.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Convert 54 AQM-37C to support SM-2 New Threat Upgrade and AEGIS programs. Procure 30 MQM-8G/VANDALS. Expand VANDAL performance capability at White Sands Missile Range to support SM-2 testing. Procure 12 AQM-81 FIREBOLT targets and initiate development of AQM-81 derivative for Navy use. Conduct survey of East Coast to establish VANDAL operating site. Initiate design of VANDAL modification to extend range and provide low altitude (50 feet) operation. Modify F-4 and F-86 aircraft for target drone operations.

b. (U) FY 1983 Program: Test AQM-37C targets. Procure 22 MQM-8G/VANDALs. Convert four F-4 and 13 F-86 aircraft for drone operations. Initiate establishment of East Coast VANDAL site. Develop VANDAL modifications for extended range and low altitude operation to support AEGIS/SM-2 testing. Continue AQM-81 FIREBOLT derivative development and procure FIREBOLT support equipment. Prepare and issue BQM Product Improvement (PI) solicitation. Procure C-band control equipment.

Program Element: 64258N Title: Targets Systems Development

c. (U) FY 1984 Planned Program: Initiate procurement of 56 AQM-37C targets. Convert four F-4 and 13 F-86 aircraft for drone operations. Procure 30 VANDALs. Flight test extended range VANDAL. Initiate East Coast VANDAL operations. Flight test AQM-81N FIREBOLT. Initiate procurement of 10 FIREBOLT targets. Conduct BQM-PI flight demonstrations. Initiate procurement of 10 BQM-PI preproduction models. Procure DLQ-3B ECM equipment, DSQ-37 scorers and Surface Threat Radar Simulators for use in weapon system test and evaluation.

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

e. (U) Milestones: This is a continuing program to provide threat replication for weapons system test and evaluation. The following milestones represent initial availability of new or expanded capability.

MILESTONE	DATE
1. AQM-37C operational	January 1983
2. All altitude QF-4 operational	April 1983
3. AQM-81N operational	January 1984
4. Extended Range VANDAL operation	September 1984
5. East Coast VANDAL operations	September 1984

360

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64703N
DoD Mission Area: 430 - Non-System Training Devices

Title: Training and Personnel System Development
Budget Activity: 6 - Defensewide Mission Support

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	10,429	6,551	5,703	6,560	Continuing	Continuing
X0783	Naval Wargaming System Development	2,138	0	0	0	0	19,523
W0784	Simulated Avionics Maintenance Trainer	281	0	0	0	0	3,229
Z0789	Class A Electronic Equipment Maintenance Simulator	746	99	0	0	0	4,821
S0791	Synthetic Firefighting Training	1,218	1,040	0	0	0	5,511
S0999	Weapons Delivery Simulation	398	0	0	0	0	3,387
S1003	Air Cushion Vehicle Operator Trainer System	363	666	462	488	0	2,680
S1017	Expendable Mobile ASW Training Target	1,802	1,783	1,175	977	0	6,230
X1328	Battle Group Tactical Trainer (Formerly Battle Group Interactive Gaming System)	3,368	2,963	2,823	4,057	Continuing	Continuing
W1344	Fixed Pipper Gunnery Simulator (ex-W0786)	115	0	0	0	0	165
Z1385	Computer Adaptive Testing (from PE 64709N)	0	0	1,243	1,038	5,967	8,957

(U) The above funding profile includes out-year escalation and encompasses all work and development phases now planned or anticipated through FY 1985 for project X1328 and through completion for all other projects.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: Meets requirements of the Chief of Naval Operations, Fleet Commanders in Chief, and Chief of Naval Education and Training for: more efficient manpower and personnel planning, and the acquisition, retention and utilization of personnel; more efficient and effective training activities ashore and afloat, reducing cost of operational technical training, and increasing the proficiency of training; general-purpose use of simulation in training, reducing training costs and increasing effectiveness for individual and team training, and improving job proficiency; improved crew and work station design and evaluation, human performance assessment and prediction techniques for air combat maneuvering, human factors baseline support for emerging systems, and improvements of crew-system interface.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Changes between the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: FY-1982 - Project X0783, Naval War Gaming System Development program decreased by 80 due to cost decrease. Project W0784, Simulated Avionics Maintenance Trainer program funding increased by 11 due to minor cost growth. Project Z0789, Class A Electronic Equipment Maintenance Simulator program funding decreased 2 due to minor cost decrease. Project S0791, Synthetic Firefighting, program funding increased 780 due to expansion from seven training fires to 14. Project S0999, Weapons Delivery Simulation, decreased by 4 due to minor cost decrease. Project X1328, Battle Group Tactical Trainer, program decreased by 30 due to revised cost estimates. Project W1344, Fixed Pipper Gunnery Simulator, increased 115 due to cost growth in Approval for Service Use requirements prior to procurement. W1345, Movable Pipper Gunnery Simulator program decreased by 772 due to cancellation for lack of need. FY 1983 - X1328, Battle Group Tactical Trainer, decreased by 20; due to revised estimates. FY 1984 - Project S1003, Air Cushion Vehicle Operator Trainer, decreased by 270 due to constraints in developing FY 1984 Budget. Project X1328, Battle Group Tactical Trainer, program increased by 1,011 due to initiation of Phase II prototype development. Project Z1385, Computer Adaptive Testing, has been transferred from PE 64709N in order to dedicate that program element to efforts of value to all services. Project X1328, Battle Group Tactical Trainer, changed

Program Element: 64703M Title: Training and Personnel System Development

from a specific development to continuing support of tactical training because of expected changes in weapons capabilities of potential U.S., friendly and enemy forces; associated tactical changes; and changes in simulator 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	13,899	10,361	6,575	3,743	Continuing	Continuing
W0291	Automated Air Intercept Controller Training	504	0	0	0	0	1,835
X0783	Naval Wargaming System Development	4,013	2,218	0	0	0	19,006
W0784	Simulated Avionics Maintenance Trainer	257	270	0	0	0	3,218
W0788	Aviation Weapon Systems Simulation	576	0	0	0	0	2,098
Z0789	Class A Electronic Equipment Maintenance Simulator	1,068	748	99	0	0	4,748
S0791	Synthetic Firefighting Training	985	438	1,040	0	0	4,731
Z0953	Advanced Submarine Electro-Optical/Visual Trainer (Transferred to Program Element 64716N)	513	0	0	0	0	1,113
S0999	Weapons Delivery Simulation	835	402	0	0	0	3,391
S1003	Air Cushion Vehicle Operator Trainer	701	363	670	732	758	3,226
S1017	Expendable Mobile ASW Training Target	493	1,802	1,783	1,199	0	5,077
X1328	Battle Group Interactive Gaming System	3,520	3,398	2,983	1,812	2,489	14,502
W1344	Fixed Pipper Gunnery Simulator (ex W0786)	50	0	0	0	0	1,473
W1345	Movable Pipper Gunnery Simulator (ex W0786)	384	722	0	0	0	1,106

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

F. (U) RELATED ACTIVITIES: 62757N, Human Factors Engineering and Simulation Technology, 63733N, Training Device Technology directly support this program as well as 62763M, Personnel and Training Technology and 63707N, Manpower Control System Development. Other related programs are: 64714M, Aviation Warfare Training Devices; 64715M, Surface Warfare Training Devices; 64716N, Submarine Warfare Training Devices; 62726A, Non-System Training; 63216A, Synthetic Flight Simulation Development; 63738A, Non-Systems Training Devices Engineering; 62205F, Training and Simulation Technology; 63227F, Advanced Simulator Development; and 64227F, Flight Simulator Development.

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Training Equipment Center, Orlando, FL; Navy Personnel Research and Development Center, San Diego, CA; Naval Underwater Systems Center, Newport, RI; Naval Surface Weapons Center, Dahlgren, VA; Naval Air Test Center, Patuxent River, MD; Naval Ocean Systems Center, White Oak MD; Naval Ocean Systems Center, San Diego, CA. OTHERS: N/A CONTRACTORS: Logicon, Inc., San Diego, CA; Advanced Technology Systems, Fairlawn, NJ; Applied Science Associates, Valencia, PA; Data General, Orlando, FL; Electtech Associates, North Stonington, CT.; Computer Sciences Corporation, Falls Church, VA.; University of Southern California Behavioral Technology Laboratory, Redondo Beach CA.; Cubic Corporation, San Diego, CA.; Applied Physics Laboratory, University of Washington, Seattle, WA.; Mystech Inc., Mystic, Conn; Pacer Systems, Inc. Arlington, VA. Bolt, Beranek and Newman, Inc., Cambridge, MA; McDonnell-Douglas Corp., St. Louis, Mo., WICAT Systems, Inc., Orem, Utah.

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

(U) Project S1003 Air Cushion Vehicle Operator Trainer System: This project develops and evaluates candidates prototype training systems for Air Cushion Vehicle Operators.

(U) In FY 1982 simulator requirements and operator task listing were completed. An evaluation of the use of small air cushion vehicles for training was completed and a training equipment survey distributed.

Program Element: 64703N Title: Training and Personnel System Development

(U) The FY 1983 Program develops:

- o Training Device Functional Requirements.
- o Lesson Specifications.
- o Develop Training Device Design and Engineering Specifications.

(U) For FY 1984 it is planned to:

- o Develop definition of prototype procedures trainer.
- o Provide recommendation for total Air Cushion Landing Craft operator training program.

(U) Program to completion will complete development of needed devices.

(U) Project S1017 Expendable Mobile ASW Training Target: This project develops an open-ocean Anti-Submarine Warfare target. The target requires no specialized range, simulates returns from all fleet sonar equipment, and is compatible with fleet magnetic anomaly detection equipment, and is usable by surface and airborne units.

(U) In FY 1982 a contract was awarded and the preliminary design review completed.

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

- o Approve Test and Evaluation Master Plan.
- o Conduct Surface Launch Test.
- o Complete Air Launch Certification Tests.
- o Deliver First 20 Prototypes.
- o Conduct Critical Design Review.
- o Establish Engineering Development Model Baseline.

(U) For FY 1984 it is planned to:

- o Start Engineering Development Model Fabrication.
- o Complete Prototype Testing.
- o Deliver Engineering Development Model First Unit.
- o Complete Safety Test.
- o Complete Reliability Demonstration.
- o Start Technical Evaluation.

Program Element: 64703M Title: Training and Personnel System Development

(U) In the outyears development will be completed.

(U) Project X1328, Battle Group Tactical Trainer: This project develops the capability for providing an interactive, computer-based tactical simulation training system to provide realistic Battle Group Level training for senior Naval officers in force-level tactical decision making, operational planning, and Command and Control.

(U) In FY 1982, an interim Battle Group Tactical Training Computer Support Facility was developed and evaluated by the Naval Ocean Systems Center. As a result, a decision was made by the CNO to enhance the previously developed Naval War Gaming System at the Naval War College to provide this training.

(U) The FY 1983 program consists of:

- o Having the baseline Naval Warfare Gaming System in operation at the Naval War College.
- o Making the interim system available for use by the Tactical Training Group, Pacific, in January, 1983.
- o Beginning the development of the Enhanced Naval Warfare Gaming System.

(U) For FY 1984 it is planned to continue development of software and hardware.

(U) Outyear plans include completion of the system in December 1985 and further evolutionary development to meet refined operational requirements.

(U) Project Z1385, Computer Adaptive Testing: This joint service project will develop and evaluate a computerized testing system that adapts to the aptitude level of the examinees. This system will replace existing paper-and-pencil Armed Services Vocational Aptitude Battery (ASVAB) tests used for enlisted personnel selection and classification.

(U) EXPECTED PAYOFF: The new system will have many advantages over the present testing procedures. Testing time will be cut by 50 percent, thus saving over a million examinee man-hours and 90,000 test administrator man-hours each year. Compromise of test security will be eliminated. Erroneous enlistments and assignments of a result of clerical errors will be eliminated. Accuracy of aptitude measurement will be improved, with the potential for reducing enlisted personnel attrition. Costs associated with test printing, distribution, and manual operations will be reduced. A preliminary estimate is that the automated system will save $5,000,000 each year in operating costs.

(U) In FY 1982 design and development analysis were conducted and three different designs selected for evaluation.

(U) The FY 1983 program develops and evaluates alternate designs.

(U) For FY 1984 it is planned to conduct field suitability tests of production models.

(U) Program to completion will develop and test a prototype system.

I. (U) PROJECT OVER $10 MILLION IN FY 1984. N/A

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 64709N
DoD Mission Area: 440 - Technical Integration/Studies and Analyses
Title: Joint Manpower/Personnel Prototypes
Budget Activity: 6 - Defense Wide Mission Support

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	4,937	2,152	7,281	7,153	Continuing	Continuing
Z1252	Attrition Control	89	176	0	0	0	491
Z1302	Officer Career Models	91	0	0	0	0	356
Z1496	Tri-Service Manpower Management	4,757	1,976	7,281	7,153	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: By the late 1980s, the military total force (including reserve components) will need to recruit a large proportion of the qualified males in the population. The cost implications of this are enormous. Individual Service efforts in Exploratory and Advanced Development now permit the reaction of a highly sophisticated system capable of greater effectiveness and efficiency in recruiting, training, testing, accessioning and retaining qualified personnel. Since many of the problems addressed are common to the other services, this program will be a DoD-wide effort addressing problems common to two or more services.

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 the element as a whole, a net reduction of 60 in FY 1982 resulted from a Navy budget reduction. For 1984, the program was increased by 3,298 to emphasize those efforts of joint service interest. Projects Z1252 and Z1385 were transferred to PE 64703N in FY 1984 to permit this program element to be dedicated to joint service R&D carried out in Z1496.

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	979	4,997	2,152	3,983	Continuing	Continuing
Z1039	Navy Personnel Accessioning System	345	0	0	0	0	1,271
Z1252	Attrition Control Systems	126	149	176	174	197	822
Z1302	Officer Career Models	85	91	0	0	0	266
Z1385 *	Computerized Adaptive Testing	423	0	0	1,368	3,721	7,838
Z1496	Tri-Service Manpower Management	0	4,757	1,976	2,441	Continuing	Continuing

* FY 1982 funds are in PE 63707N.

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

F. (U) RELATED ACTIVITIES: None

G. (U) WORK PERFORMED BY: IN-HOUSE: Navy Personnel Research and Development Center, San Diego, CA; Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA; Air Force Human Resources Laboratory, San Antonio, TX. CONTRACTORS supporting this element include: McDonnell Douglas Astronautics, St Louis, MO; Texas Instruments, Dallas, TX; Calue Corp., San Diego, CA; Denver Research Institute, Denver, CO.

Program Element: 64709N Title: Joint Manpower/Personnel Prototypes

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

(U) Project Z1496, Tri-Service Manpower Management: In FY 1982, research was initiated on critical manpower, personnel and training product developments that will benefit two or more of the services. One prototype product, the Manpower, Personnel and Training Research Information System was successfully demonstrated and transitioned to the Defense Technical Information Center as a new organizational function.

(U) The FY 1983 program consists of:

- o Development of a portable electronic aid for maintenance.
- o Joint Service validation of computer adaptive testing.
- o Development of a multi-service prototype instructional delivery system.
- o Design and preliminary evaluation of a mechanism to measure distribution of military-related skills on the civilian population.

(U) For FY 1984 it is planned to:

- o Test and evaluate several prototype products under development.
- o New starts will be initiated based on recommendations of the Joint Service R&D Program Steering Committee.

(U) This is a continuing program.

I. (U) PROJECTS MORE THAN $10 MILLION IN FY 1984: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65153M
DoD Mission Area: 440 - Technical Integration/Studies and Analyses

Title: Studies and Analysis Support, Marine Corps
Budget Activity: 6 - Defensewide Mission Support

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	1,723	2,000	1,815	2,095	Continuing	Continuing
C0030	Studies and Analysis Marine Corps	1,723	2,000	1,815	2,095	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: Provide for studies and analyses to be conducted by research organizations and DoD agencies in support of Marine Corps programs and requirements.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The decrease of 1053 in FY 1982 is the result of incremental funding and a reduction in previously scheduled work, the decrease for FY 1983 of 148 is the result of Congressional actions, and the FY 1984 estimate has been reduced by 804 as a result of internal DoD budget reviews, and inflation adjustments.

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	2309	2776	2148	2619	Continuing	Continuing
C0030	Studies and Analysis Support, Marine Corps	2309	2776	2148	2619	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: PE 65153M, Marine Corps Operations Analysis Group, Center of Naval Analyses, funds the Marine Corps Operations Analysis Group, which provides supplementary analysis capability.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA; Naval Weapons Center, China Lake, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD: Contractors: Stanford Research Institute International, Menlo Park, CA; Potomac General Research Group, McLean, VA; B.K. Dynamics Inc; Rockville, MD; Quantics Inc., Wayne, PA; Falcon, Buffalo, NY; Calculon, Arlington, VA; CACI, Arlington, VA; Computer Science Corp., Falls Church, VA; BDM Corp, Norfolk, VA; ORI, Silver Springs, MD; Battelle, Columbus, OH; Booze Allen & Hamilton, Bethesda, MD; Science Application Inc., McLean, VA.

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

(U) Project C0030, Studies and Analysis, Marine Corps. This program will provide an analytic basis for planning, programming, decision making, and concept development. All studies are based on validated Marine Corps requirements for new or improved capabilities to accomplish assigned missions and to validate or identify specific requirements for the allocation of resources (e.g., weapons systems, or organizational needs).

367

367

Program Element: 65153M Title: Studies and Analysis Support, Marine Corps

FY 1982 initiatives were: (1) Amphibious Lift Factors: To identify those factors most significantly affecting the amphibious lift requirements of the Marine Amphibious Force/Brigade; (2) Force Service Support Group Structure for Storage and Distribution of Water, Bulk Fuel, and Ammunition: To redefine the mission and structure of Combat Service Support units involved in these functions for the 1984-1993 time frame; (3) Communications Structure in the Marine Amphibious Force: To redefine the mission and structure for the communications units within the Marine Amphibious Force for the 1984-1993 time frame; (4) Minority Officer Selection/Retention in the Marine Corps: To determine appropriate media and techniques to reach qualified minorities; (5) Determination of Ammunition Training Rates for Marine Forces: To develop a methodology for the preparation of training allowances for ammunition which maintain proficiency at lowest costs; (6) Combat Service Support of the Marine Air Ground Task Force in Future Operation: To evaluate logistics models used by other DoD components for potential adaptation for Marine Corps use; (7) Energy Conservation Programming: To evaluate constraints impacting upon energy conservation in the Marine Corps; (8) Aircraft Battle Damage Repair in the Amphibious Objective Area and at Theater Air Bases: To identify methods and equipment that would enhance the capability of Marine Air Ground Task Force aviation elements to accomplish rapid repair of battle damaged aircraft as a means to increase wartime aircraft availability; (9) Class V(W) Combat Planning Factors Update for Program Objective Memorandum-84: To revise methodologies previously developed to accomodate new weapons systems and structure and develop combat factors for Marine Corps ground systems; (10) High Power to Weight Ratio Engine Comparison Study: To identify and assess the potential technologies for a lightweight, high horsepower engine, addressing Reliability and Maintainability and logistical impacts. (11) Concepts of Operations for Aviation Maintenance and Supply Support Ship: To develop concepts of operations for the proposed aviation maintenance support ship.

(U) For FY 1983, eight of the ongoing studies will continue. In addition, the following new studies are planned for initiation:

- o Utilization of Distributed Data Processing Equipment in the Tactical Command and Control Environment.
- o Air Defense Requirements for Mechanized Operations.
- o Operational concept for the Marine Corps Expeditionary Airfield (EAF) System 1985 - 1995.
- o Determination of Chemical Warfare Munitions Requirements for the Marine Amphibious Force.

(U) For FY 1984, several of the FY 1983 studies will continue and the following new initiatives are planned:

- o Aviation Combat Element Deployability Study.
- o Marine Corps Tactical Air Lift Mission Area Analysis (MA 261.1)
- o Concept of Employment Armored Amphibious and Landing Craft Air Cushion System in the 1986-2000 Time Frame.
- o Marine Air Ground Task Force Containerized Supply, Employment and Management System Study.
- o Marine Corps Mechanical Maintenance Repair Technology and Concept of Employment Study (1985-1995).

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65152N Title: Studies and Analysis Support, Navy
DoD Mission Area: 440 - Technical Integration/Studies and Analyses Budget Activity: 6 - Defense Wide Mission Support

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	7,771	5,000	6,261	8,091	Continuing	Continuing
M0106	Naval Medical Support Capability	129	117	119	146	Continuing	Continuing
Z0830	Director of Navy Laboratories Studies and Analyses	637	446	619	728	Continuing	Continuing
R0132	CNO Program Analysis and Evaluation	2,212	1,355	1,739	2,172	Continuing	Continuing
R0133	National Academy of Sciences Naval Studies Board	759	470	545	821	Continuing	Continuing
R0147	Operational and Strategic Analysis	1,963	1,249	1,586	2,093	Continuing	Continuing
R0145	Advanced Naval Studies	2,071	1,363	1,653	2,131	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 continuing program provides analytical support to the Secretary of the Navy and the Chief of Naval Operations as a basis for major policy and planning decisions.

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 decreases of 20 in FY 1982, 2,889 in FY 1983 and 2,030 in FY 1984 directed by Congress and the Office of Management and Budget to reduce planned obligations for consulting services, studies, and other management support services.

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	6,422	7,791	7,889	8,291	Continuing	Continuing
M0106	Naval Medical Support Capability	83	129	137	142	Continuing	Continuing
Z0830	Director of Navy Laboratories Studies and Analyses	414	637	703	731	Continuing	Continuing
R0132	CNO Program Analysis and Evaluation	1,815	2,213	2,169	2,284	Continuing	Continuing
R0133	National Academy of Sciences Naval Studies Board	388	744	741	748	Continuing	Continuing
R0147	Operational and Strategic Analysis	1,662	1,962	1,989	2,150	Continuing	Continuing
R0145	Advanced Naval Studies	2,060	2,106	2,150	2,236	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 65154N, Center for Naval Analyses, Navy; Program Element 65153M, Marine Corps Operations Analysis Group; Program Element 65151M, Studies and Analysis Support, Marine Corps.

G. (U) WORK PERFORMED BY: IN-HOUSE: Laboratory support to this program is provided by the Navy laboratories and centers including: The Naval Air Development Center, Warminster, PA; Naval Coastal Systems Center, Panama City, FL; Naval Electronics Laboratory Center, San Diego, CA; Naval Surface Weapons Center, Silver Spring, MD; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; and Naval Research Laboratory, Washington, DC CONTRACTORS: Approximately fifty contractors including: The National Academy of Sciences, Washington, DC; PRC System Sciences Company, McLean, VA; D. H. Wagner Associates, Paoli, PA; Presearch, Inc., Arlington, VA; Systems Planning and Analysis Corp., Arlington, VA; B. K. Dynamics, Inc.,

Program Element: 63152N Title: Studies and Analysis Support, Navy

Rockville, MD; Summit Research Corp., Gaithersburg, MD; TRW, Redondo Beach, CA; Administrative Sciences Corp., Alexandria, VA; Advanced Technology, Inc., McLean, VA; Flight Systems, Inc., Newport Beach, CA; Mathtech, Inc., Bethesda, MD; Planning Systems, Inc., McLean, VA; Rancor, Inc., Vienna, VA; SPC, Arlington, VA; Watron Inc., Arlington, VA; and the Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

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

(U) Project MO106, Naval Medical Support Capability: This project provides the Naval Medical Command and Navy/Marine field activities with studies of health care delivery systems, including productivity of medical personnel, organizational factors influencing efficiency, and criteria employed in resource (manpower and funds) allocation.

(U) In FY 1982: Developed a career ladder for Medical Service Corps officers; identified critical career decision points for Navy health care professionals; designed and developed software for the Medical Resource Allocation and Planning System.

(U) The FY 1983 program consists of:

- o Determining the utility of Diagnostic-Related Group Classification Procedures for developing standards for length of hospital stay within Navy teaching hospitals.
- o Completing analysis of organizational staffing patterns, work environments, job performance, and attitudes of Navy health care professionals in primary care and family practice outpatient facilities.
- o Evaluating the validity of the Navy Medical Patient Classification System and Staffing Allocation Plan.

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

- o Develop a model of organizational factors that influence patient retention decisions made by health care providers.
- o Complete study of patient illness acuity as a determinant of length of hospital stay.
- o Evaluate the improved Navy medical classification system.

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

(U) Project ZO830, Director of Navy Laboratories Studies and Analyses: This project provides for integrated Laboratory/Center efforts in R&D and for inputs to future systems by bringing together the technical talent of in-house labs, systems commands, Office of the Chief of Naval Operations, and the Fleet in conducting systems architecture, operations research, and warfare analysis. Formulation of coordinated programs, plans, and policy for the laboratory community by applying technology, intelligence, and operational requirements. Conduct studies and analysis for the application of new technologies for the enhancement of the productivity, output, and efficiency of Navy RDT&E activities.

(U) In FY 1982 the program completed study and analysis for optimization of Aircraft Carrier Weapons Loads required to counter a variety of scenarios and threats; completed Electronic Warfare Five-Year Plan; initiated Navy Long Range Explosives Requirements Study; initiated a study to utilize new computer processing technology and existing laboratory/center equipment to provide computer-aided design capability to all laboratories; analyzed alternatives to reduce the acquisition process lead time.

(U) The FY 1983 Program consists of:

- o Completing Electronic Warfare Long Range Facilities Plan.

Program Element: 65152N Title: Studies and Analysis Support, Navy

- o Determining Fleet concerns and lessons learned from the Falklands War with respect to electronic warfare.
- o Completing studies and analyses of long range Navy explosives requirements.
- o Completing application of new computer processing technology for providing computer aided design capability to all laboratories.
- o Study and analysis of Command, Control, and Communications Countermeasures.

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

- o Emphasize solution of Fleet operational deficiencies through coordinated R&D activity efforts.
- o Study applications of new technologies for enhancement of the productivity output and efficiency of Navy RDT&E activities.
- o Conduct studies and analysis to improve the systems acquisition process.
- o Conduct studies and analysis fostering the coordination of the technical expertise of Navy RDT&E activities for the efficient solution of operational, systems acquisition, and readiness problems.

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

(U) Project R0132, CNO Program Analysis and Evaluation: Provides analytical support to CNO and SECNAV in evaluation of overall balance within total Navy programs.

(U) In FY 1982 the following analyses were conducted: EA-6B Fleet Defense; Alternative Force Structure; ASW Analysis; Fleet ASW Operational Procedures; Navy Manpower and Training Programs; Health Care System; Navy Non-Nuclear Ordnance Requirements; Cost Analysis of Missiles; Ship Costing Model.

(U) The FY 1983 program consists of:

- o Analysis of the Costs of the Navy of the Future; Base Readiness; Ship Resources to Readiness Relationship; Attainability of Selected Reserve
- o Evaluation of Navy Manpower Mobilization Requirements Planning System
- o Medical Reserves Study
- o Study of Backfire Threat in a Realistic Operational Environment

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

- o Analysis of the Navy Requirements and Capabilities
- o Cost Analyses of Developing Systems
- o Analyses of Alternatives for Development and Procurement Programs

Program Element: 65152N Title: Studies and Analysis Support, Navy

- o Force Capability Evaluation
- o Navy Research and Development Guidance; and Navy Program Planning.

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

(U) Project R0133, National Academy of Sciences Naval Studies Board: As mutually agreed upon between the Chief of Naval Operations and the President of the National Academy of Sciences and with appropriate attention to the influence of the domestic economy, national objectives, social imperatives and anticipated military requirements, the Board for Naval Studies will conduct and report upon surveys and studies in the field of scientific research and development applicable to the operation and function of the Navy. Reports consist of a briefing to the Assistant Secretary of the Navy (Research Engineering and Systems) and the Chief of Naval Operations and staff, and written technical reports at the conclusion of each stage of the study (at least annually) as an archival contribution of the Board.

(U) In FY 1982 the following study was conducted: The Panel on the Implications of Future Space Systems for the U.S. Navy.

(U) The FY 1983 Program consists of:

- o The Panel on the Implications of Future Space Systems for the U.S. Navy (Study Continuation).
- o The Panel on Research and Development for Undersea Operations (New Topic for Standing Panel).
- o The Panel on the Implications of the relationship between Platforms and Sensor Design Technology (New Study).
- o The Panel on Advanced Navigation Technology (New Topic for Standing Panel).
- o Administrative support for:
  - — The Charles M. Davis Lecture Series.
  - -- The International Conference on Numerical Methods in Fluid Dynamics.

(U) The following FY 1983 program efforts will be performed contingent on Chief of Naval Operation's decision.

- o The Oversight Committee on Navy Technical Intelligence (Advisory Group).
- o The Panel on the Implications on Advancing Technology for Naval Aviation (Study Continuation).

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

- o The Panel on the Implication of Future Space Systems for the U.S. Navy (Study Continuation).
- o The Panel on Research and Development for Undersea Operations (Study Continuation).
- o The Panel on the Implications of the Relationship between Platform and Sensor Design Technology (Study Continuation).
- o The Committee on Navy Scientific Engineering Literature (Study and Survey Continuation).

- Administrative support for:
  - -- The Charles M. Davis Lecture Series.
  - -- The 15th Symposium on Naval Hydrodynamics.

(U) The following activities will be performed contingent on the Chief of Naval Operation's decision in FY 1983:

- The Panel on Advanced Navigation Technology (Study Continuation).
- The Panel on the Implications of Advancing Technology for Naval Aviation (Study Continuation).
- The Oversight Committee on Navy Technical Intelligence (Advisory Group Continuation).

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

(U) Project R0147, Operational and Strategic Analysis: This provides the Chief of Naval Operations capability to perform high priority studies; most are responsive to DoD and JCS.

(U) In FY 1982 the following studies were conducted: Sea Launched Nuclear Land Attack Missiles; Ocean Surveillance Anti-Air Warfare Capabilities Analyses; Alternative Battle Groups; Navy Net Assessment; Deep Sea Floor Mission Requirements; FCS Funding Cutback; and Naval Escort Requirements.

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

- Nuclear Air Launched Standoff Weapons Submarine Wartime Employment Option and Effectiveness.
- Readiness to Resources for U.S. Naval Aircraft.
- Technology and Naval Strategy.
- Future Direction of the U.S. Navy.
- Navy Net Assessment.
- Conceptual Planning Studies.
- Munition Requirement.

(U) For FY 1984, it is planned to do studies such as:

- Analysis of Naval Requirements and Capabilities.
- Cost Analyses of Developing Systems.
- Analysis of Alternatives for Development and Procurement Programs.
- Force Capability Evaluation.

Program Element: 5'4528 Title: Studies and Analysis Support, Navy

Navy Research and Development Guidance.

- Navy Program Planning.
- Navy War Assessment.

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

(U) Project RD145, Advanced Naval Studies: This project develops new methodology to improve the scientific quality of studies and analyses. It emphasizes mathematical models and operations research techniques to meet Navy needs for reliable performance measures in real-world problems of Navy planning, investment, and fleet operations such as ASW detection and tracking and command-control.

(U) The FY 1982 accomplishments include a powerful computer technique to produce a much wider range of the "ambiguity surface" used in analyzing sonar's capability to resolve conflicting evidence about submarine tracks. Another result in ASW showed that certain limited or "myopic" search plans are close approximations to those produced by much more complex globally optimal algorithms. A report on methods for estimating Soviet Naval intentions received wide interest.

(U) The FY 1983 program consists of [illegible] search areas including:

- Statistical algorithms and [illegible]ulation methods for multi-sensor, multi-target search and tracking
- Organization of command-control functions at the Composite Warfare Commander level
- Use of quantitative risk analyses and subjective probabilities in modeling Navy system performance

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

- Command-control and system design issues will be examined using new techniques from decision and risk analysis that require specific risk-tracking measures and subjective judgment.
- New work on the fundamental assumptions underlying strategic planning will be based on recent work on deception and rationality postulates in game theory.
- Detection and tracking work will be reduced.

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

I. (U) PROJECT OVER $10 MILLION IN FY 1984. Not Applicable.

374

1163

374

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65153M
DoD Mission Area: 440 - Technical Integration/Studies and Analyses

Title: Marine Corps Operations Analysis Group (MCOAG), Center for Naval Analyses
Budget Activity: 6 - Defensewide Mission Support

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	2,482	2,754	2,679	3,058	Continuing	Continuing
C0031	Marine Corps Operations Analysis Group	2,482	2,754	2,679	3,058	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 Marine Corps Operations and Analysis Group conducts operations research, systems analysis and cost effectiveness studies in the areas of field exercises, operations, tests, weapons systems, tactics, equipments and manpower utilization.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The reduction in FY 1982 of 1 is due to refinement of cost estimates and the reduction in FY 1984 of 196 is a result of internal DoD budget reviews.

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	2,020	2,481	2,754	2,877	Continuing	Continuing
C0031	Marine Corps Operations Analysis Group	2,020	2,481	2,754	2,877	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: PE 65153M, Studies and Analysis Support Marine Corps, which provides funding for contract support for studies and analyses.

G. (U) WORK PERFORMED BY: Contractors: Marine Corps Operations Analysis Group, Center for Naval Analyses, University of Rochester, NY.

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

(U) Project C0031, Marine Corps Operations Analysis Group: This program provides operations research, systems analysis and cost effectiveness study support; furnishes objective and timely evaluation of Marine Corps operations, exercises and deployments; and tests of weapons, tactics, and equipment.

(U) In FY 1982, eight studies/analytical efforts were completed, and eight more in process. Areas of investigation include manpower requirements, weapons systems analyses and evaluations of cost effectiveness of major development programs.

Program Element: 63153M

Title: Marine Corps Operations Analysis Group (MCOAG), Center for Naval Analyses

(U) The FY 1983 program consists of:

- o Armed Services Vocational Aptitude Battery Analysis.
- o Analysis of Marine Corps Missions.
- o Cost and Operational Effectiveness Analysis for the Landing Vehicle Tracked (Experimental) Weapon Station.
- o Anti-Armor Operations in the Mid-Range.
- o Amphibious Warfare Model Improvements.
- o Zero Based Tactical Wheeled Vehicle Requirements Analysis.
- o Control of Marine Aviation in Joint Operations.
- o Marine Air Ground Task Force Lift Analysis.
- o Analysis of Tactical Command and Control Systems.

(U) In FY 1984, the pattern of support reflected in prior years will continue. Typical support will be in the form of cost benefit analysis, weapons test and evaluation, and doctrine/organization/tactics evaluation. It will continue to provide a representative at Fleet Marine Force Atlantic and Pacific Headquarters and the Marine Aviation Weapons Training Squadron. Funding reflects the amounts necessary to maintain the vital analytic support at the present level of effort.

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

376

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65154N Title: Center for Naval Analyses, Navy
DoD Mission Area: 440 - Technical Integration/Studies and Analyses Budget Activity: 6 - Defense Wide Mission Support

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	11,351	12,445	12,672	15,162	Continuing	Continuing
R0148	Center for Naval Analyses, Navy	11,351	12,445	12,672	15,162	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 is a continuing program to provide independent, expert analyses of Naval warfare concepts and doctrine, force composition, weapon system performance, operational tactics, readiness, manpower utilization, etc. Additionally, the program provides on-site assistance to Navy operating forces world-wide in improving tactics and readiness of existing systems and in analyzing operational test and evaluation of new 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: The FY 1984 amount is reduced by 709 to reflect 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	10,393	11,351	12,445	13,381	Continuing	Continuing
R0148	Center for Naval Analyses, Navy	10,393	11,351	12,445	13,381	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 65153M, Studies and Analysis Support, Marine Corps; Program Element 65152N, Studies and Analysis Support, Navy. This program element, 65154N, funds the Navy research at the Center, for Naval Analyses, the Federal Contract Research Center sponsored by Navy. Research by this university-operated center provides an independent, objective complement to the program of in-house and contractor research funded by Program Element 65152N.

G. (U) WORK PERFORMED BY: IN-HOUSE: CONTRACTORS: The Center for Naval Analyses is administered under contract to the University of Rochester, the office is situated in Alexandria, VA.

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

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

1. (U) DESCRIPTION (Requirement and Project): The Department of the Navy maintains the Center for Naval Analyses to provide independent, professional analyses and evaluations to complement its program of in-house and contractor research and development. The Center conducts a wide range of projects that provide two fundamental services to the Navy: (1) on-site analysis for fleet commanders to improve tactics and readiness of existing systems and (2) support of operational test and evaluation of new systems.

Program Element: 65154N Title: Center for Naval Analyses, Navy

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Conducted studies in all areas of naval activity and provided analytical support to operational fleet and force commanders, as well as other Naval commands in the United States and overseas.

(U) Examples are: Amphibious Assault Fire Support; Maritime Patrol Aircraft Cost-Effectiveness; Wartime Spares Policy; Comprehensive Compensation and Supply; Countering New Soviet Submarines; Concepts for Amphibious Operations; 1990 and beyond; Navy Enlistment Supply; Battleship Modernization; Assault-90; Capability Assessment of Middle East Operations; Manpower Availability; Long Range Military Implications of Petroleum Availability for Navy Planning; Naval Integrated Attack Planning; Shipboard Parts Allowance; and Ship Overhaul Effectiveness.

b. (U) FY 1983 Program: Studies include Future Arctic Systems Technology; Naval Application of Space Technology; Space Contribution to Naval Warfare; Anti-Air Warfare Effectiveness; Future Assault Landing Craft Mix; Aviation Parts Allowance Policy; Non-Nuclear Threat Ordnance; and Development of Resource and Readiness Indicators.

c. (U) FY 1984 Planned Program: Proposed studies for FY 1984 will be reviewed prior to the start of FY 1984 by the Chief of Naval Operations (OP-090) to establish priorities and to coordinate the Center for Naval Analyses program with other Navy research. Studies are selected for Center for Naval Analyses based on importance to the Navy and on the requirements for an innovative and independent point of view. The largest single Center for Naval Analyses activity in FY 1984 will be support of fleet activities. Longer range studies of strategic and tactical warfare, logistics issues, support and manpower questions, etc. will be directed to problems arising in the development of the Navy program for FY 1984. The increase in FY 1984 funding level over that of FY 1983 is to maintain a stable program by offsetting cost increases.

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

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65156M
DoD Mission Area: 454 - Other Test and Evaluation

Title: Marine Corps Operational Test and Evaluation
Budget Activity: 6 - Defensewide Mission Support

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	966	2,848	2,527	2,384	Continuing	Continuing
C0033	Operational Test and Evaluation Support	696	2,497	2,160	1,986	Continuing	Continuing
C1076	Operational Test and Evaluation Activity	270	351	367	398	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 supports the mission of the Director, Marine Corps Operational Test and Evaluation Activity which is to act as manager and field representative for the Commandant of the Marine Corps for Marine Corps Operational Test and Evaluation. It includes support for the operational test and evaluation tasks performed by the designated Fleet Marine Force Commanders and Technical Support Activities.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) Operational Test and Evaluation Support: The FY 1982 decrease of 190 is due to the reduction in support required for previously scheduled operational tests which have been rescheduled to FY 1983. The FY 1983 decrease of 502 is due to a Congressional undistributed reduction. The increase of 662 in FY 1984 is a revised estimate of the funding necessary for the Marine Corps Operational Test and Evaluation Activity to meet the increased operational test and evaluation requirements in support of the expanded Marine Corps systems acquisition program. Operational Test and Evaluation Activity: The FY 1982 decrease of 40 is due to rescheduling of certain operational tests, thereby requiring less administrative expenditures, the FY 1984 decrease of 9 is due to refinement of 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	1,184	1,205	3,350	1,874	Continuing	Continuing
C0033	Operational Test and Evaluation Support	1,032	886	2,999	1,498	Continuing	Continuing
C1076	Operational Test and Evaluation Activity	152	319	351	376	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: In-house: Marine Corps Operational Test and Evaluation Activity, MCDEC, Quantico, VA and various Naval Laboratories. Contractors: Potomac General Research Group, McLean, VA.

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

Program Element: 65156M

Title: Marine Corps Operational Test and Evaluation

(U) Project C0033, Operational Test and Evaluation Support: This project provides a separate and distinct source of funds for use in the operational test and evaluation of systems being considered for procurement by the Marine Corps. The project provides funds for the test planning, operational testing and preparation of independent evaluation reports as required by current directives.

(U) The FY 1982 program consisted of:

- Test plans for the Operational Test II of the Modular Universal Laser Equipment, Airborne Radio Detection Finding System, AN/UTQ-4 Direct Air Support Control, Unit Level Circuit Switch, Digital Communications Terminal, and the Position Location Reporting System.
- Supporting Operational Test and Evaluation Force regarding testing of the CH53E Helicopter, and AV-8B Aircraft.
- Independent Evaluation Reports on the M-198 Howitzer, Joint Tactical Information Distribution System, LVT7A1 amphibious vehicle, and items of TRI-TAC equipment.

(U) The FY 1983 program will include Operational Test and Evaluation on the Light Armored Vehicle, Tactical Air Operations Central - 1985 and the Marine Integrated Fire and Air Support System.

(U) The FY 1984 Operational Test and Evaluation will be conducted on the Electronics Maintenance Complex, NAVSTAR Global Positioning System, Mobile Protected Gun System, 8" Laser Homing Ordnance, Unit Level Circuit/Message Switch and Marine Integrated Fire and Air Support System.

(U) Project C1076, Operational Test and Evaluation Activity: This project funds the management and support of the RDT&E effort assigned to Marine Corps Operational Test and Evaluation Activity with emphasis on test planning and independent evaluation of the test results. The project provides five civilian employees and the administrative support of 37 military and civilian personnel not otherwise provided to support the Operational Test and Evaluation activities of the Marine Corps.

(U) The FY 1982/1983 programs will continue to provide administrative data analysis support for ongoing operational test programs conducted by the Marine Corps.

(U) The FY 1984 program consists of:

- Supporting operational test requirements.
- Expanding internal test planning/preparation effort.
- Increase of four civilian employees due to an anticipated increase in operational tests.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65804N
Title: Technical Information Services
DoD Mission Area: 440 - Technical Integration/Studies and Analyses
Budget Activity: 6 - Defensewide Mission Support

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	1,392	1,665	4,507	7,928	Continuing	Continuing
Z0835	Technical Information Services	1,196	1,409	1,873	2,364	Continuing	Continuing
Z1343	Manpower, Personnel and Training Research and Development Info System	196	256	0	0	0	819
T1805	Navy Automated Publishing System	0	0	2,634	5,564	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: Supports Navy Technical Information Program to provide: (a) transfer of Navy technology to business and local governments for civil use; (b) Navy planning and requirements information for industry and small business; (c) Navy technical information to DoD and other government agencies; and (d) technical information support to Navy managers and scientists. Statutes, government policy and regulations such as Public Law 96-480 and Office of Management and Budget Circular A-109 require the Navy to provide information and promote technology transfer. Expands Navy use of industry research results. Develops systems such as the Manpower, Personnel & Training R&D Information System to coordinate, avoid duplication and maximize benefits from RDT&E.

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 includes a decrease of 64 in FY 1982 (Z0835 (-5), Z1343 (-59)) as a result of refined cost estimates. FY 1984 exceeds the previous estimate for Project Z0835 by 138 reflecting a strengthening of the industry Independent Research and Development Technical Evaluation and Review Program to increase information flow to industry and the use of industry R&D and 2634 in order to start project T1805.

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	1,188	1,456	1,665	1,735	Continuing	Continuing
Z0835	Technical Information Services	1,001	1,201	1,409	1,735	Continuing	Continuing
Z1343	Manpower, Personnel and Training Research and Development Info System	187	255	256	-	-	-

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

F. (U) RELATED ACTIVITIES: The Army, Air Force, Defense Technical Information Center and Department of Commerce major information sources and services are related. Office of the Under Secretary of Defense for Research & Engineering coordinates the DoD Technical Information Program of which Project Z0835 is a part. Ad hoc committees established by representatives of the three services and counterparts at other organizations actively and cooperatively seek better techniques and products by sharing useful systems and technology, transferring defense technology to the civil sector, eliminating duplicate or marginal functions and services, and improving essential DoD-wide services. The Navy, Army and Air Force jointly operate Tri-Service Industry Information Offices, potential contractor programs and other services for industry and small business. Policy guidance and procedures are formalized in DoD directives and instructions. PE 63727N, Navy Technical Information Presentation System and PE 62760N, Logistics Technology.

Program Element: 65804N Title: Technical Information Services

G. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, and Navy Personnel R&D Center, San Diego, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Surface Weapons Center, Dahlgren, VA; Naval Underwater Systems Center, New London, CT; and Naval Air Development Center, Warminster, PA.

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

(U) Project Z0835, Technical Information Services: This project supports the goals of the Office of Management and Budget Circular A-109 and national policy for improving research and development and acquisition, and also supports the goals of Public Law 96-480 (the Stevenson-Wydler Technology Innovation Act of 1980) to further technology transfer from Federal laboratories to the civil sector. The project provides information and services that reduce duplication in research and development, maximize the use of advanced technology in weapon systems and increase the base of contractors qualified to participate in technology development and weapon systems acquisition. The project also fosters Navy use of industry independent research results to complement Navy-funded research and development programs and increased industry resources on work which helps Navy.

(U) In FY 1982, the Navy Domestic Technology Transfer Program expanded, including cooperative efforts with the Department of Commerce and the Federal Laboratory Consortium for Technology Transfer. The Navy Acquisition, Research and Development Information Center offices provided Navy planning and requirements information to over 600 industry and small business representatives, and information exchange with industry expanded to ensure greater Navy benefits from industry research results.

(U) The FY 1983 program:

- o Funds technology transfer information exchange and demonstration projects.
- o Continues making Navy requirements information available to industry to ensure that industry research and development programs meet Navy needs.
- o Improves information services for industry and small business.

(U) For FY 1984 it is planned:

- o To hold regional meetings to provide domestic technology transfer information to state and local governments and to local businesses.
- o To continue making Navy requirements information available to industry.
- o To strengthen the industry Independent Research and Development technical evaluation and review program to increase Navy use of results.

(U) Project Z1343, Manpower, Personnel and Training Research and Development Information System: This project established a system and data base that provides comprehensive, timely information on Navy (and DoD) Manpower, Personnel and Training R&D so that useful R&D work can be identified by bench level scientists and systematic priorities can be established for completing research objectives. Also, high level planners can obtain an overall picture of resource allocations and relationships among program elements and task areas.

(U) In FY 1982, the Research Through Engineering Development components of the data base were maintained and data collection studies began. Technical consultation on development of the new DoD Information System was provided to the Defense Technical Information Center and the Logistics Management Institute.

(U) The FY 1983 program consists of:

- o Developing a data base of R&D versus requirements developed by the Logistics Management Institute

382

- Continuing consultation with the Defense Technical Information Center and Logistics Management Institute.
- The project will be completed in FY 1983 and responsibility for the information system and data base will be transferred to the Defense Logistics Agency.

(U) Project T1605, Navy Automated Publishing System: (NEW START) Exploratory Development has been carried out on automated publishing since FY 1980. These efforts in the Navy Automated Publishing System over the past two years have been focused in the following areas:

(a) Navy Printing on Demand - technology to permit printing of specifications and standards on a real-time as required basis to eliminate costly and obsolescent shelf inventory.

(b) Technical Document Storage & Retrieval System - technology to store and retrieve technical drawings and specifications quickly and efficiently through use of advanced storage and retrieval equipment. These areas and several other Navy Automated Publishing System areas will require test and evaluation of integrated networks for the source data entry, transmission and reproduction of data both at the local level and over a wide area. Procurement of the various media for processing and transmitting data will be required.

(U) A totally integrated Navy Automated Publishing System network will improve the efficiency and productivity of the Navy publication process in two key ways. First, printed documents would be made available on demand to Navy units. Ultimately, users will be able to request printed documents on Cathode Ray Tube terminals and, almost instantaneously, have the requested document disbursed and/or printed-on-demand at the requesting activity or other designated locations. When telecommunication costs are lowered, electronic printing will be distributed to Navy Publications and Printing Service plants throughout the country. An automated keywork search and "menu" system will also facilitate the location of the required documents. Second, management data will become available to permit reassignment of printing workload, improving personnel utilization and scheduling control of normal and expected actions. Responsiveness to all types of publication needs will be improved, certain administrative burdens of the operating fleet will be reduced, printing costs will be lowered, and overall productivity will be enhanced.

(U) For FY 1984 it is planned to:

- Initiate Project effort to evaluate full system characterized by highly interactive work stations, high speed communication links to integrate multiple computer with large data bases.
- Test increased use of high-resolution graphic display screens, integration of text and graphics, increased use of optical disk and digitized magnetic storage devices, standardized higher-level programming languages.
- Exercise standardized vendor protocols, covergence of office and graphics arts systems, and the ability to operate virtually any output device from any work station.

(U) In the outyears continuation of test and evaluation of the integrated Navy Automated Publishing System design will be carried out employing an increasing number of various media types to determine the most efficient system configuration. Then the system will be implemented.

I. (U) PROJECT OVER $10 MILLION IN FY 198 : Not applicable.

383

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 63852N
DoD Mission Area: 451 - Major Ranges and Test Facilities

Title: Atlantic Undersea Test and Evaluation Center
Budget Activity: 6 - Defense Wide Mission Support

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	37,320	43,658	49,197	51,587	Continuing	Continuing
W0541	Atlantic Undersea Test and Evaluation Center	37,320	43,658	49,197	51,587	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 Atlantic Undersea Test and Evaluation Center is one of five (Navy) Department of Defense Major Range and Test Facility Base activities under the command of and receiving primary support from the Commander, Naval Air Systems Command. This program provides the operational maintenance support, on a continuing basis, for the Navy's only secure and fully instrumented Anti-Submarine Warfare Test and Evaluation Range which is located on Andros Island in the Bahamas. The mission of this facility is to provide technical and scientific assistance for the developmental and operational testing and evaluation of anti-submarine systems undergoing research and development; alignment of electronic, optical, acoustic and navigational systems; and measurement of noise signatures of submarines and surface ships for both tactical and research and development applications. Because of its unique instrumentation and location, U.S. and NATO Anti-Submarine Warfare Forces make use of this facility to conduct surface, air, and subsurface Anti-Submarine Warfare Readiness Training. This fleet usage permits test and evaluation effort to be conducted simultaneously with fleet readiness training allowing maximum range utilization, improved test and training realism and reduced testing costs chargeable to anti-submarine warfare development 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 that shown in this Descriptive Summary are as follows: a net increase of 2,170 in FY 1982 results from a reprogramming action to accommodate increased costs of improvement and modernization efforts for Range Data Processor and Power Generators (+1,300) and revision of cost estimates applied to other operating cost areas (+870). Both FY 1983 and FY 1984 costs decreased as a result of refined estimates for inflation and operating costs.

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	28,553	35,150	45,658	50,334	Continuing	Continuing
W0541	Atlantic Undersea Test and Evaluation Center	28,553	35,150	45,658	50,334	Continuing	Continuing

E. (U) OTHER FY 1984 APPROPRIATION FUNDS: The facility is operated under the DoD uniform funding policy for major test ranges, wherein direct costs incurred in support of range users are reimbursed by the user. The Fleet, as a user of the Atlantic Undersea Test and Evaluation Center, annually reimburses the activity approximately $5.0 million from the Operations and Maintenance, Navy, appropriation for scheduled use of Atlantic Undersea Test and Evaluation Center ranges and facilities.

F. (U) RELATED ACTIVITIES: The Atlantic Undersea Test and Evaluation Center is the principal test and evaluation support activity for anti-submarine warfare systems. Support is provided for the development, test and evaluation of ship and submarine sonars, torpedoes, fire control systems, countermeasure systems, and the submarine silencing program. The range also supports fleet training and the development of submarine and anti-submarine tactics.

Program Element: 65852N Title: Atlantic Undersea Test and Evaluation Center

G. (U) WORK PERFORMED BY: IN-HOUSE: Technical services performed by the Naval Underwater Systems Center, Newport, RI; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Naval Electronics Laboratory Center, San Diego, CA; and Naval Oceanographic Office, Suitland, MD. CONTRACTORS: The maintenance and operation of the Atlantic Undersea Test and Evaluation Center is being performed by RCA Service Co., Cherry Hill, NJ, under a cost plus award fee contract. Imperial Aviation, West Palm Beach, FL, as a subcontractor to RCA Service Co., provides aircraft and maintenance services.

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

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

(U) Project WO541, Atlantic Undersea Test and Evaluation Center

1. (U) DESCRIPTION (Requirement and Project): The requirement for the concept of the Atlantic Undersea Test and Evaluation Center was formulated in 1958. In 1963, an international agreement was executed between the United States and the United Kingdom that provided the use of the Atlantic Undersea Test and Evaluation Center facilities to the United Kingdom in exchange for leased land and operating privileges on Andros Island, Bahamas, in areas contiguous to the Tongue of the Ocean. The Atlantic Undersea Test and Evaluation Center became an Operational Test and Evaluation facility in 1966, and included three distinct ranges: Weapons Range, Fleet Operational Readiness Accuracy Check Site, and Acoustic Range. The Weapons Range provided three-dimensional (undersea, surface, air) precision tracking capability in support of Anti-Submarine Warfare Development Test and Evaluation and Operational Test and Evaluation. The Fleet Operational Readiness Accuracy Check Site provides the Fleet with the capability to accurately calibrate and align electronic, optical, acoustic and navigational systems installed on submarine and surface ships. The Acoustic Range provides a highly accurate qualitative and quantitative measurement of the noise signature of submarine and surface ships and other hydroacoustic phenomena. All range facilities including data processing, display, control and communications are located on Andros Island. A Naval Underwater Systems Center detachment at West Palm Beach, Florida, provides logistic support and test planning and scheduling liaison with range users. Program management is performed by the Naval Underwater Systems Center, Newport, Rhode Island.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded level of effort necessary to provide support for Development Test and Evaluation and Operational Test and Evaluation programs. Funding for improvement and modernization was applied to design and fabrication (Phase I) of an improved Underwater Acoustic Array to measure TRIDENT signature noises. Continued procurement of power generators and the updating of the Range Central Data Processing System initiated the repair of the pier and wharf.

b. (U) FY 1983 Program: Continue level of effort to provide range support and data analysis for Research, Development, Test and Evaluation, Technical/Operational programs; i.e., MK 48 Training Certification Program, Proficiency Trials, Weapon System Accuracy Trials, submarine acoustic trials and detectability tests. Continue range instrumentation and City/Life Support Systems Modernization and Improvements. Continue the update of the Central Data Processor and the Acoustic Range. Provides for the Bahamian Facility Rental Charge, when required.

c. (U) FY 1984 Planned Program: Continue level of effort previously described. Funding for improvement and modernization will initiate the Communication Modernization Program and Weapon Range Improvement and Modernization Program. Install Tracking System on Acoustic Measurement Range. Provide for the Bahamian Facility Rental Charge, when required.

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

e. (U) Milestones: Not Applicable

385

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65854M
DoD Mission Area: 440 - Technical Integration/Studies and Analyses

Title: Development Center Support
Budget Activity: 6 - Defensewide Mission Support

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	4,422	3,598	3,712	3,893	Continuing	Continuing
C0032	Management Support, Marine Corps	2,752	3,598	3,712	3,893	Continuing	Continuing
C1664	M/C Technical Support of Command and Control Systems	1,670*	*	*	*	*	*

* Funded in Program Element 26627M, Marine Corps Technical Support of Command and Control Systems in FY 1983 and subsequent years.

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 supports the mission of the Commanding General, Marine Corps Development and Education Command which is in part to act as the developer and field representative for the Commandant of the Marine Corps in Research, Development, Test and Evaluation.

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: Management Support, Marine Corps: FY 1982 decrease of 70 is due to share of Congressional undistributed reductions. The FY 1984 decrease of 92 is an inflation adjustment. Marine Corps Technical Support of Command and Control: FY 1982 decrease of 930 was due to initial overestimation of civilian salaries.

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	3,510	5,422	3,598	3,804	Continuing	Continuing
C0032	Management Support, Marine Corps	3,510	2,822	3,598	3,804	Continuing	Continuing
C1664	M/C Technical Support of Command and Control Systems	0	2,600	*	*	*	*

* Funded in Program Element 26627M, Marine Corps Technical Support of Command and Control Systems in FY 1983 and subsequent years.

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

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: In-House: Marine Corps Development and Education Command, Quantico, VA; Contractors: Potomac General Research Group, Incorporated, Baileys Crossroads, VA.

Program Element: 65854M Title: Development Center Support

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

(U) Project C0032, Management Support, Marine Corps: This project provides salaries for 75 civilian (administrative) employees; the administrative support of 715 military and civilian personnel not otherwise funded; the procurement of supplementary (general) developmental and technical services; and certain initial efforts; symposium and travel, preceding Exploratory Development. The Commanding General, Marine Corps Development and Education Command is the field representative of the Commandant of the Marine Corps for all phases of Marine Corps Research and Development and is responsible for the development of tactics, techniques, doctrine and equipment for use/employment of Marine (and other) forces in amphibious operations.

(U) The FY 1982/1983 programs continued to support military and civilian personnel at the Marine Corps Development and Education Command, Quantico, VA engaged in various phases of the research and development effort.

(U) The FY 1984 program will continue to support personnel engaged in various research and development phases.

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

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65857N Title: International Research, Development, Test and Evaluation Support
DoD Mission Area: 460 - International Cooperative RDT&E Budget Activity: 6 - Defense Wide Mission Support

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	1,351	1,935	2,095	2,197	Continuing	Continuing
R0115	Supreme Allied Commander, Atlantic, Anti-Submarine Warfare Research Centre	806	863	947	912	Continuing	Continuing
R0149	International Cooperative RDT&E	545	1,072	1,148	1,285	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: Supports effort within the free world to establish and conduct cooperative research, development, test and evaluation of defense weapons and equipment. Supports effort toward achieving standardization and interoperability of naval weapons systems with North Atlantic Treaty Organization and other allies. Provides U.S. share of support for North Atlantic Treaty Organization Agency; Supreme Allied Commander, Atlantic, Anti-Submarine Warfare Research Centre, La Spezia, Italy.

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 R0115 (+79 in FY 1982 and -79 in FY 1984) and for Project R0149 (-407 in FY 1982 and -147 in FY 1984) are the net result of refined cost estimates including changes in number of international cooperative R&D programs supported, travel cost escalation, inflation and U.S. dollar fluctuations internationally.

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	966	1,679	1,935	2,264	Continuing	Continuing
R0115	Supreme Allied Commander, Atlantic, Anti-Submarine Warfare Research Centre	516	727	863	969	Continuing	Continuing
R0149	International Cooperative RDT&E	450	952	1,072	1,295	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Program Element 65111D, Foreign Weapons Evaluation. Evaluation of foreign weapon systems identified as the result of efforts put forth under this program.

G. (U) WORK PERFORMED BY: IN-HOUSE: Chief of Naval Operations, Washington, D.C.; Office of Naval Research, Arlington, VA; Office of Naval Research Branch Office, London, England; Supreme Allied Commander, Atlantic, Anti-Submarine Warfare Research Centre, La Spezia, Italy; and various elements of the Department of the Navy as appropriate. CONTRACTOR: Techplan Corporation, Map' Shade, N.J.

388

Program Element: 65857N Title: International Research, Development, Test and Evaluation Support

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

(U) Project R0115, Supreme Allied Commander, Atlantic, Anti-Submarine Warfare Research Center: This project provides salaries and administrative support for U.S scientific personnel assigned to Centre, a NATO international scientific research organization, located in La Spezia, Italy.

(U) In FY 1982, continued to provide scientific and technical advice and assistance to Supreme Allied Commander, Atlantic, on anti-submarine warfare.

- Scientific and technical assistance also given to NATO nations.
- Carried out numerous ASW research projects as approved by Supreme Allied Commander, Atlantic.

(U) The FY 1983 program consists of:

- Continuation of R&D in detection, classification and localization of submarines with major emphasis on underwater acoustics.
- Research in oceanography and submarine geophysics, operations research and signal processing.
- Sound propagation and ambient noise studies.

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

- Research begun in prior years.
- Deep water propagation in the Mediterranean, shallow water ASW and towed array.
- Continue in developing specification for modification of replacement research vessel.
- Commence new research projects as proposed by participating NATO nations and approved by Supreme Allied Commander, Atlantic.

(U) Project R0149, International Cooperative RDT&E: This project provides for management, direction and execution of Navy's programs for cooperation in international research and development. Provides for exchange of technical information and participation in cooperative bilateral, multilateral and North Atlantic Treaty Organization research, development, test and evaluation programs in support of mutual requirements and in furtherance of standardization of weapon systems and equipment among allies.

(U) In FY 1982, participation continued in joint international programs aimed at harmonized requirements that meet U.S. Navy technical or operational needs. Program permitted U.S. Navy to work closely with NATO allies in setting and supporting specific direction for NATO's defense effort. Close cooperation with other friendly nations in developing and implementing these programs resulted in best possible use of available resources and helped to eliminate duplication of effort. Some specific activities:

- 187 Data Exchange Agreements with 16 countries.
- Participation in the NATO Naval Armaments Group and 30 related subgroups and/or project groups.

Program Element: 65857N Title: International Research, Development, Test and Evaluation Support

- Expanded participation in NATO Tri-Service Groups.
- Cooperative R&D programs with Canada, United Kingdom, France and Federal Republic of Germany.
- Participation in NATO Long Term Defense Program.
- Support of 12 bilateral/multilateral cooperative R&D projects.
- Scientist/engineer exchange programs with Germany and Republic of Korea.
- Investigated commencement of similar programs with Australia, Egypt, Israel, Spain and Turkey.

(U) The FY 1983 program consists of:

- Continued support of cooperative research, development, test and evaluation programs with allied countries.
- Increase in level of effort in NATO armaments cooperation to bring together interested countries in development of specific equipment.
- Expanded cooperative R&D initiatives with emphasis on Memoranda of Understanding and encouragement of co-production and organization of research under family of weapons.
- Expanded activities in Scientist/Engineer Exchange Program to include additional countries.
- Support of NATO efforts to improve standardization and interoperability.

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

- Cooperative RDT&E programs with NATO and other friendly foreign nations.
- Expanding participation in exchange of technology and on-site examination of R&D efforts of allies.
- Seek new areas for closer cooperation to reduce redundant expenditures of RDT&E resources.
- Foster maximum practicable standardization/interoperability of equipment through early harmonization of requirements.

(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: 65859N
DoD Mission Area: 454 - Other Test and Evaluation Support

Title: Mobile Sea Range
Budget Activity: 6 - Defensewide Mission Support

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	3,229	2,778	6,698	Continuing	Continuing
WO169	Mobile Sea Range	6,924	3,229	2,778	6,698	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 Mobile Sea Range Program, formerly the Anti-Ship Missile Defense Test Range Program, will provide the Navy with an open ocean mobile range capability to conduct improved Fleet Readiness Training; evaluate Fleet Tactics and Techniques; and test and evaluate prototype weapon systems in a realistic combat environment. The Mobile Sea Range Project is being accomplished in four separate phases. Air, surface and subsurface participants to be simultaneously exercised. This Mobile Sea Range will also support the development and evaluation of tactics and operational procedures.

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 (-2,268 in FY 1984) is the result of an adjustment by Navy to cover higher priority programs and defer initiation of development of ASW operations and submarine interplay as well as expansion for War-at-Sea scenarios in Mobile Sea Range Fleet readiness exercises until FY 1985. The minor adjustment in FY 1982 (-100) is the result of better estimation of costs and 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	5,171	7,024	3,229	5,046	Continuing	Continuing
WO169	Mobile Sea Range	5,171	7,024	3,229	5,046	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	697	851	21,700	5,066	Continuing	Continuing
WPN	3,100*	0	7,195	2,060	Continuing	Continuing
Procurement Qty (Target Augmentation Equip)	31	0	75	20	Continuing	Continuing
APN	0	4,500	4,660	1,446	Continuing	Continuing
Procurement Qty (Airborne Participant Instrumentation Packages)	0	40	31	7	Continuing	Continuing

* Includes Engineering Change to BQM-74C target.

F. (U) RELATED ACTIVITIES: Not Applicable

391

31

Program Element: 65859N Title: Mobile Sea Range

G. (U) WORK PERFORMED BY: IN-HOUSE: Development of the Data Collection System for the Mobile Sea Range is at the Fleet Analysis Center, Corona, CA; OTHERS: Pacific Missile Test Center, Pt Mugu, CA; Naval Underwater Systems Center, Newport, RI; Naval Air Test Center, Patuxent River, MD. CONTRACTORS: General Dynamics Electronics Division, San Diego, CA, is the prime contractor for the Cooperative Tracking System. OTHERS: SRI, International, Menlo Park, CA; Systems Engineering Technology Associates Corporation, Falls Church, VA; VSE Corporation, Arlington, VA; MITRE Corporation, McLean, VA; Systems Development Corporation, Santa Monica, CA.

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

(U) Project WO169, Mobile Sea Range: This project provides for the development of instrumentation and techniques to support realistic, open-ocean Battle Group exercises and to provide a means of assessing the readiness of Naval Forces. In FY 1982, development was completed on the first Data Collection System and Cooperative Tracking System and the first two at-sea development tests were successfully conducted.

(U) The FY 1983 program consists of:

- Further development tests and limited support of fleet exercises
- Upgrading the transponder design for the Cooperative Tracking System
- Preparing for procurement of a second set of instrumentation in FY 1984 OPN funds

(U) The FY 1984 program is planned to:

- Define requirements and prepare a development plan for initiation of instrumentation development to include ASW and realistic submarine interplay in Mobile Sea Range Readiness exercise evaluations
- Continue upgrade development of the Cooperative Tracking System transponder
- Review and evaluate requirements for further expansion and upgrade of the Mobile Sea Range capabilities

(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: 65861N
DoD Mission Area: 471 - General Management Support

Title: RDT&E Laboratory and Facilities Management Support
Budget Activity: 6 - Defense Wide Mission Support

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	52,520	62,499	64,827	68,882	Continuing	Continuing
M0104	Naval Medical Management Support	4,166	4,878	5,867	6,133	Continuing	Continuing
R0129	Office of Naval Research R&D Technical Support	20,893 1/	0	0	0	0	0
R0135	Office of Naval Research Management Support	11,554	35,248	37,749	38,632	Continuing	Continuing
R0150	Independent Research and Development Evaluation	43 2/	0	0	0	0	0
Z0150	Independent Research and Development Evaluation	37	80	41	43	Continuing	Continuing
S0351	Naval Sea Systems Command Management and Support	734	1,120	1,145	1,186	Continuing	Continuing
Z0362	Energy Research and Development Support	1,400	1,539	1,639	1,767	Continuing	Continuing
W0546	Naval Air Systems Command Management Support	1,630	980	1,707	1,011	Continuing	Continuing
Z0832	Director of Naval Laboratories Management Support	10,618	16,598	14,745	17,966	Continuing	Continuing
X1368	Naval Space Systems Activity Management Support	224	300	295	296	Continuing	Continuing
R1547	Research and Development Plans Support	900 3/	0	0	0	0	0
T1547	Research and Development Plans Support	321 4/	5/	5/	5/	5/	5/
T1786	Naval Support Management Support	4/	436	473	503	Continuing	Continuing
R1801	R&D Management Support	0	1,320	1,166	1,345	Continuing	Continuing

1/ This project is included in R0135 in FY 1983.
2/ Transfers to Z0150 in FY 1983.
3/ Included in PE 65873N in FY 1983 and outyears.
4/ From PE 65862N.
5/ Funded under Project R1801 in FY 1983 and subsequent years.

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 is a continuing program which provides for certain programwide management and operational costs at specified Research and Development laboratories and other facilities.

C. (U) COMPARISON WITH FY 1983 DESCRIPTIVE SUMMARY: (Dollars in Thousands) The changes in the funding profile shown in the FY 1983 Descriptive Summary and that shown in this Descriptive Summary are as follows: Overall increases of 361 in FY 1982 and 3,398 in FY 1983 were due to refinement of cost estimates and inflation. The decrease of 1,410 in FY 1984 is due to refinement of cost estimates. Project R0129 was transferred to R0135 in FY 1983 resulting in an increase of 21,954 in FY 1983 and 23,153 in FY 1984 in Project R0135.

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

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	48,844	52,159	59,101	66,237	Continuing	Continuing
M0104	Naval Medical Management Support	3,196	4,237	4,649	5,086	Continuing	Continuing
R0129	Office of Naval Research, Research and Development Technical Support	19,934	19,353	21,932	24,157	Continuing	Continuing
R0135	Office of Naval Research Management Support	11,394	13,215	13,294	14,596	Continuing	Continuing
R0150	Independent Research and Development Evaluation	44	44	*	*	*	*
Z0150	Independent Research and Development Evaluation	0	32	80	86	Continuing	Continuing
R0351	Naval Sea Systems Command Management and Support	1,261	734	823	1,304	Continuing	Continuing
R0362	Energy Research and Development Support	1,306	1,400	1,539	1,644	Continuing	Continuing
W0546	Naval Air Systems Command Management and Support	720	2,402	2,678	3,496	Continuing	Continuing
Z0832	Director of Naval Laboratories Management Support	10,003	10,518	13,844	15,357	Continuing	Continuing
X1368	Naval Space Systems Activity	200	224	262	311	Continuing	Continuing
R1547	R&D Plans Support	566	0	0	0	0	566

* Transfers to Project Z0150 in FY 1983.

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

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) WORK PERFORMED BY: Various RDT&E laboratories and facilities.

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

(U) Project M0104, Naval Medical Management Support: This project provides for management support of the U.S. Naval Medical Research Unit No. 2; U.S. Naval Medical Research Unit No. 3; Naval Health Research Center, Naval Dental Research Institute, Naval Medical Research and Development Command; Naval Medical Research Institute Detachment, Lima, Peru; U.S. Naval Medical Research Unit No. 2 Detachment, Jakarta, Indonesia; as non-overhead distributing laboratories for overhead-type charges such as general administrative expenses including salaries, centralized technical services, common support costs under host-tenant agreements, routine maintenance and repair of buildings and costs of laboratory support provided by other agencies/commands. Limited support is also provided the Naval Submarine Medical Research Laboratory and the Naval Aerospace Medical Research Laboratory.

(U) In FY 1982, provided support to non-overhead-distributing Navy Medical RDT&E laboratories for general administrative expenses including salaries of support personnel, centralized technical services, common support costs under host-tenant agreements, routine maintenance and repair of buildings and cost of laboratory support by other agencies.

(U) The FY 1983 program consists of:

- Supporting initial outfitting and commissioning of Navy Medical Research Institute Detachment in Lima, Peru.
- Providing increased support for U.S. Naval Medical Research Unit No. 3, Cairo, Egypt, to replace loss of special foreign currency and for use of Military Airlift Command transportation support.
- Providing increased support to the U.S. Naval Medical Research Unit No. 2, Manila, RP, to return to full research operations after relocation from Taiwan.

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

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

- Support of efforts in the FY 1983 program, outlined above.

(U) Project 20150, Independent Research and Development Evaluation: This project funds travel costs of Naval personnel engaged in the technical evaluation and on-site review of contractors' Independent Research and Development programs. DoD Instruction 5100.66 outlines responsibilities for triannual on-site review of Independent Research and Development programs.

(U) In FY 1982, Naval personnel traveled to contractor sites for purpose of technical review of Independent Research and Development.

(U) In FY 1983 program consists of:

- On-site reviews of more contractor R&D programs.

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

- Participation of Naval personnel in review of Contractor Independent Research and Development programs.

(U) This is a continuing program.

(U) Project 80351, Naval Sea Systems Command Management Support: This project supports civilian labor, minor equipment and other overhead type expenses (travel, training, constructional services, etc.) at the Naval Ordnance Missile Test Facility, White Sands Missile Range, NM. It also supports a small capital equipment maintenance program at the Applied Physics Laboratory, Pennsylvania State University, State College, PA.

(U) In FY 1982 provided funds for recurring operations and maintenance costs, minor construction and alterations at Naval Ordnance Missile Test Facility, White Sands Missile Range, NM., inspected and tested high pressure vessels and made improvements to the government-owned facilities at Pennsylvania State University.

(U) The FY 1983 program consists of:

- Support of the Naval Ordnance Missile Test Facility, White Sands, NM, operation and the capital equipment maintenance program at the Applied Physics Laboratory, Pennsylvania State University, State College, PA.

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

- The support of Naval Ordnance Missile Test Facility, White Sands Missile Range, NM, operation and the capital equipment maintenance program at the Applied Physics Laboratory, Pennsylvania State University, State College, PA.

(U) This is a continuing program.

(U) Project 20362, Energy Research and Development Support: This project provides management and analytical support to the Navy Energy Research and Development Program and consequently provides the foundation for the planning of the Naval Energy Program. Because of the extremely diverse nature of the energy problem as it impacts Navy operations, extensive investigations of energy use and assessment of the potential impact of energy supply and conservation technologies must be conducted as a prelude to the development of detailed program and budgeting plans for the total Navy program. Projects with the highest payback potential are identified for possible implementation in the exploratory, advanced or engineering, development energy research and development programs.

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

(U) In FY 1982, assessments of energy consumption and usage in specific Navy industrial-type processes were conducted. The Navy Energy R&D Program Plan and Summary were updated. Energy R&D program direction and guidance were formulated integrating all aspects of the current energy situation and considering future assessments of the problem. Alternate energy technologies were evaluated for applicability to Navy usage.

(U) The FY 1983 program consists of:

- Assessing the impact of new crude sources, both synthetic and conventional, on the availability and quality of military ship and aircraft fuels.
- Defining the current and probable trends within the energy environment which influence the ability of the Navy to obtain the energy resources required for its mission.
- Investigating the impact of natural resource supply problems.
- Conducting assessments of the Navy Energy R&D Program on a semi-annual basis.
- Continuing to evaluate new energy technologies for applicability to Navy use.
- Updating the Navy Energy R&D Program Plan and Summary.

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

- Assessments of new and alternate energy supply technologies.
- Updating energy usage and supply projections for use in development of an overall Navy energy policy.
- To assess the total Navy Energy R&D Program on a semi-annual basis.
- Investigation of the impact of natural resource supply problems on Navy operations.
- Updating the Navy Energy R&D Program Plan and Summary.

(U) Program to Completion: Provide regular updates of Navy Energy R&D Program Plans, assessments of the Energy R&D Program, evaluations of new energy technologies and energy supply problems. Long term natural resources supply problems and the possible impact on the Navy will be investigated.

(U) Project W0546, Naval Air Systems Command Management and Support: This a continuing project which provides non-mission related recurring support at the Naval Weapons Evaluation Facility, Albuquerque, NM, such as support for military personnel facilities, routine maintenance, and repair, administration, supply and fiscal services, security and fire protection. Provides funding for the Navy's share of dredging the Channel Island Harbor at the Pacific Missile Test Center, Point Mugu, CA. on a biannual basis. Supports the Geophysics Weather Station at the Pacific Missile Range Facility, Hawaii. Also, provides funds for investigations to provide better and more economical and efficient methods of energy saving proposals and Occupational Safety and Health requirements for the Research, Development, Test and Evaluation community.

(U) In FY 1982, this is a continuing program and provided support as described above including the Navy's share of dredging the Channel Island Harbor at the Pacific Missile Test Center, Point Mugu, CA.

(U) In FY 1983 program will continue to provide support as described above.

(U) In FY 1984 program will continue to provide support as described above and provide the Navy's share for the dredging of the Channel Island Harbor at the Pacific Missile Test Center, Point Mugu, CA.

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

(U) This is a continuing program.

(U) Project X1368, Naval Space Systems Activity Management Support: This project provides for the Navy Space Systems Activity, Los Angeles, CA, for the conduct of its mission and functions in its role as primary field support for the Navy Space Project.

(U) In FY 1982, provided for salaries of five civilians utilized for management support, including security, financial systems analysis, computer services and other related administrative support not otherwise chargeable directly to a specific RDT&E,N project, including travel, material and contract services.

(U) In FY 1983 program consists of:

- Providing continuation of FY 1982 efforts. In addition two additional positions will be filled to ensure that new technologies and space concepts being developed by various offices in the Los Angeles vicinity and which appears to be Navy shared interest, are quickly identified.

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

- Similar support at the same level of effort as in FY 1983.

(U) This is a continuing program.

(U) Project T1786, Naval Supply Systems Command Management Support: This project provides for Inter-Service Support Agreement common services, rent, utilities; laboratory management and operation; and maintenance of the Navy Clothing and Textile Research Facility, Navy tenant activity, colocated at the Army Natick Laboratories, Natick, MA.

(U) In FY 1982, continued support for common services, utilities and maintenance was provided by the U.S. Army Natick Laboratories. Thermal manikin acceptance tests were completed. One laboratory technician was added.

(U) The FY 1983 program consists of:

- Providing continuation of 1982 efforts.

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

- Utilize services of one laboratory manager and four laboratory technicians to manage, operate, and perform laboratory functions.

- Inter-Service Support Agreements will be made with Army, Navy, and DoD activities to cover common services.

(U) This is a continuing program.

(U) Project R1801 R&D Management Support: Provides funds for operations and management support costs of the Office of the Chief of Naval Operations programs. The project provides administrative support for the CNO Executive Board, the Office of Technology Assessment and the Office of R&D Planning.

(U) In FY 1982 the program was not funded.

(U) In FY 1983 it is planned to:

- Continue to provide operations and management support of R&D related planning and information management/resource analysis efforts.

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

(U) In FY 1984 it is planned to:

- Continue to provide level of effort support as in FY 1983.

(U) This is a continuing program.

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

(U) Project R0135, Office of Naval Research Management Support:

1. (U) DESCRIPTION (Requirement and Project): This project provides funding support for the operations and management of the Office of Naval Research Headquarters, the Navy-wide Field Patent Program, Office of Naval Research Branch Offices/Field Detachments, the Naval Ocean Research and Development Activity, the Underwater Sound Reference Division of the Naval Research Laboratory, and certain other miscellaneous costs not identified specifically with any operational category such as expenses connected with the Naval Research Advisory Committee and Morale, Welfare and Recreation activities at the Naval Research Laboratory. Functions performed include: (a) scientific and technical administration of research and exploratory development programs conducted by the Office of Naval Research, primarily with colleges and universities and the Naval Research Laboratory; (b) coordination of the research and exploratory development for the Navy; (c) financial management of the Research Development, Test and Evaluation, Navy appropriation for the Assistant Secretary of the Navy (Research, Engineering and Systems); (d) contract negotiation of research programs of the Navy and related programs funded by the Defense Advanced Research Projects Agency with colleges and universities; and (e) administration and control of effort within, or on behalf of, the Department of the Navy relating to patents, inventions, trademarks, copyrights, and royalty payments, and coordination of such efforts with research, development, and procurement activities of the Navy.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Provided for operations and management of the Office of Naval Research Branch Offices/Field Detachments, the Underwater Sound Reference Division of Naval Research Laboratory, Naval Ocean Research and Development Activity, and certain other costs, such as Naval Research Advisory Committee and Morale, Welfare and Recreation activity expenses. In FY 1982, support of the Office of Naval Research Headquarters and the Navy-wide Field Patent Program was funded under Program Element 65861N, Project R0129 (Office of Naval Research R&D Technical Support).

b. (U) FY 1983 Program: In addition to continuing to provide support for operations and management of the Office of Naval Research Branch Offices/Field Detachments, the Underwater Sound Reference Division of Naval Research Laboratory, Naval Ocean Research and Development Activity, and certain other costs such as Naval Research Advisory Committee and Morale, Welfare and Recreation Activity expenses, this project also provides funding for the support of the Office of Naval Research Headquarters and the Navy-wide Field Patent Program which were previously funded under Program Element 65861N, Project R0129 (Office of Naval Research Technical Support) in FY 1982 and prior.

c. (U) FY 1984 Planned Program: Continue to provide support as outlined above. The increase in funds requested in FY 1984 over FY 1983 (4 percent) is due to normal increases in operational costs.

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

e. (U) Milestones: Not applicable.

(U) Project Z0832, Director of Navy Laboratories Management Support:

1. (U) DESCRIPTION (Requirement and Project): Project provides management support to R&D project and tenant effort at the Research and Development Centers of the Chief of Naval Material. Functions supported: (a) Military Support - covers the cost associated with military personnel at the Center; maintenance and repair of military support facilities such as Unattached

Program Element: 65861N Title: RDT&E Laboratory and Facilities Management Support

Enlisted Personnel Housing, Unattached Officer Personnel Housing, chapels and recreational facilities; (b) Tenant Support - provide common services such as personnel, accounting, cyclical maintenance, security and firefighting free of charge to tenants; (c) supports centrally-managed inter-laboratory systems such as the Navy Laboratory Computer Committee; the Navy Laboratory Interactive Graphics Systems Support Group, and the Navy Engineering Software Support Group; (d) funds headquarters-paid functions such as leased lines; (e) start-up, shakedown and certification costs for new technical facilities; (f) residual costs resulting from closures or disestablishments and from reduction-in-force actions (severance pay/relocation costs).

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: A serious funding deficiency in this project resulted in reduced funding support for the military/tenant support area causing deferral of maintenance and repair of facilities.

b. (U) FY 1983 Program: Funding support continued for all areas noted in "Description." Increase of FY 1983 funding meets the essential needs for this project particularly military/tenant support costs.

c. (U) FY 1984 Planned Program: Funding will be provided for all areas noted in "Description." The FY 1984 funding level reflects a funding reduction in the military/tenant support area due to budgetary constraints and not a drop in funding requirements.

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

e. (U) Milestones: Not applicable.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65862M
DoD Mission Area: 471 - General Management Support

Title: RDT&E Instrumentation and Material Support
Budget Activity: 6 - Defense Wide Mission Support

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	45,462	36,066	24,921	25,367	Continuing	Continuing
M0105	Naval Medical R&D Command Instrumentation and Material Support	2,583	4,530	4,351	4,326	Continuing	Continuing
R0137	Office of Naval Research Instrumentation and Material Support	12,029	8,729	4,401	4,641	Continuing	Continuing
S0353	Naval Sea Systems Command Instrumentation and Material Support	797	989	1,478	987	Continuing	Continuing
T0423	Naval Supply Systems Command Instrumentation and Material Support	482	164	151	152	Continuing	Continuing
W0566	Naval Air Systems Command Instrumentation and Material Support	3,375	3,606	3,883	4,136	Continuing	Continuing
X0799	Naval Electronic Systems Command Material Support	442	247	254	266	Continuing	Continuing
X0800	Radiological Control	1,087	1,266	1,312	1,400	Continuing	Continuing
Y0811	Military Construction and Military Personnel Support Equipment	3,239	3,318	2,751	2,589	Continuing	Continuing
Z0833	Director of Naval Laboratories Instrumentation and Material Support	21,428	13,217	6,340	6,870	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 is a continuing program which funds all investment costs and certain support costs at Navy Research, Development, Test and Evaluation Laboratories and other 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: (1) The increase of 1,951 in FY 1982 is due to cost escalation (except 473 which was reprogrammed from Program Element 65861N, Project W0546, to cover urgent unfunded minor construction projects). (2) M0105 - an increase of 1,843 for FY 1983 and 1,450 for FY 1984, respectively, due to relocation of laboratory from Taipei to Manila and establishment of new lab in Lima, Peru; S0353 - increase of 100 for FY 1983 and 370 in FY 1984 due to cost escalation; R0137 - decrease of 1,418 and 4,303 for FY 1983 and FY 1984 respectively; T0423 - decrease of 375 and 417 for FY 1983 and FY 1984, respectively; X0799 - decrease of 14 for FY 1983 and 20 for FY 1984; Z0833 - increases by 2,995 in FY 1983 and decreases by 3,602 in FY 1984 due to policy change in funding of Navy Industrial Fund equipment from appropriated funds to customer surcharge compensated in FY 1983 by a Congressional addition of 3,293 to continue development of the facility at Wallops Island. W0566 - increases of 978 for FY 1983 and 1,102 for FY 1984, respectively, due to reprogramming from Program Element 65861N, Project W0546, to cover costs associated with the Flight Test Instrumentation Pool. X0800 - a decrease of 24 in FY 1984; Y0811 - an increase of 250 in FY 1983 due to revision of cost estimates and a decrease of 945 in FY 1984 due to policy change in funding of Navy Industrial Fund equipment from appropriated funds to customer surcharge.

400

Program Element: 65862N Title: RDT&E Instrumentation and Material Support

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	38,305	43,511	31,707	30,710	Continuing	Continuing
M0105	Naval Medical R&D Command Instrumentation and Material Support	2,149	2,529	2,687	2,901	Continuing	Continuing
R0137	Office of Naval Research Instrumentation and Material Support	9,814	11,048	10,147	8,704	Continuing	Continuing
S0353	Naval Sea Systems Command Instrumentation and Material Support	776	797	889	908	Continuing	Continuing
T0423	Naval Supply Systems Command Instrumentation and Material Support	470	482	539	568	Continuing	Continuing
W0566	Naval Air Systems Command Instrumentation and Material Support	2,887	2,948	2,628	2,781	Continuing	Continuing
X0799	Naval Electronic Systems Command Material Support	230	233	261	274	Continuing	Continuing
X0800	Radiological Control	1,102	1,107	1,266	1,336	Continuing	Continuing
Y0811	Military Construction and Military Personnel Support Equipment	3,002	2,939	3,068	3,296	Continuing	Continuing
Z0833	Director of Naval Laboratories Instrumentation and Material Support	17,885	21,428	10,222	9,942	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) WORK PERFORMED BY: IN-HOUSE: Various Research, Development, Test and Evaluation laboratories.

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

(U) Project M0105, Naval Medical R&D Command Instrumentation and Material Support: This project provides for the purchase of new and replacement general purpose analytical and support equipment and for minor construction and alterations at Naval Medical Research and Development Command laboratories.

(U) In FY 1982, general purpose laboratory equipment was purchased by and minor alterations performed at Naval Medical Research and Development Command laboratories.

(U) The FY 1983 program consists of:

- o Initiating the replacement of out-moded general purpose laboratory equipment with state-of-the-art scientific instruments.
- o Continuing the minor construction and alteration.

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

- o The upgrading of laboratory general purpose scientific equipment.
- o Minor construction and alterations especially at the Naval Medical Research Institute Detachment, Lima, Peru.

Program Element: 65862N Title: RDT&E Instrumentation and Material Support

(U) This is a continuing program.

(U) Project R0137, Office of Naval Research Instrumentation and Material Support: This continuing program has provided for general purpose instrumentation and laboratory equipment, and for structural alterations, additions and equipment rearrangements at the Naval Research Laboratory which, under Navy Industrial Fund regulations, may not be financed for recovery as part of operation costs. Beginning in FY 1983, Navy Industrial Fund regulations will permit the purchase of general purpose equipment from customer funds. By this approved change in financial procedure costs of capital equipment purchase by the Industrial Fund activities will be recovered through rates charged to Industrial Fund customers. This program also provides for research equipment, support equipment, minor construction and alterations and equipment installation at the Naval Ocean Research and Development Activity; and for Automatic Data Processing equipment related to the Research and Development Management Information System at the Office of Naval Research Headquarters.

(U) In FY 1982, procure and install machine tools and scientific equipment, accomplish minor construction, and continue installation of Central Target Simulator and system analysis and design, material fabrication, hardware/software necessary for required special electromagnetic internal building capabilities and associated instrumentation for new electromagnetic Development Laboratory at the Naval Research Laboratory. Naval Ocean Research and Development Activity program supports modernization and adaptation of existing NASA laboratory spaces at National Space Technology Laboratories for specific Naval Ocean Research and Development applications. Purchase of automatic data processing equipment related to the Research and Development Management Information System at the Office of Naval Research Headquarters.

(U) The FY 1983, program consists of:

- o Continue installation of Central Target Simulator and accomplish minor construction associated with Morale, Welfare and Recreation Activities at the Naval Research Laboratory.
- o At the Naval Ocean Research and Development Activity continue acquisition of research and support equipment which enables the Ocean Science and Technology Laboratory to conduct a broad spectrum R&D program in Numerical Modeling, Oceanography, and Geodesy.
- o Purchase of automatic data processing equipment related to the Research and Development Management Information System at the Office of Naval Research Headquarters.

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

- o Accomplish minor construction associated with Morale, Welfare, and Recreation Activities at the Naval Research Laboratory.
- o Acquisition of scientific equipment to outfit Naval Ocean Research and Development Activity's new laboratory building, and specialized state-of-the-art instrumentation for the collection and processing of oceanographic, geophysical, acoustic and Mapping, Charting and Geodesy data and replacement of instruments and equipment which are worn out, lost at sea, or obsolete.
- o Purchase of Automatic Data Processing equipment related to the Research and Development Information System at the Office of Naval Research Headquarters.

(U) This is a continuing program.

(U) Project S0353, Naval Sea Systems Instruments and Materials Support: This project provides for the purchase of general purpose equipment associated with the missions of the Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD, and the Naval Ordnance Missile Test Facility, White Sands, NM. Equipment specifically designed for use by a project is paid for by that project. This item is for general-purpose, multi-user equipment. This project also provides funding for Naval Sea Systems RDT&E,N First Destination Transportation Costs.

Program Element: 65862N Title: RDT&E Instrumentation and Material Support

(U) In FY 1982, this line supported the general purpose Explosive Ordnance Disposal equipment requirements at the Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD, and the First Destination Transportation costs.

(U) The FY 1983 program consists of:

- o General purpose Explosive Ordnance Disposal equipment for the Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD.
- o First Destination Transportation costs.
- o An additional 100K for general purpose equipment at the Naval Ordnance Missile Test Facility, White Sands, NM.

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

- o General purpose Explosive Ordnance Disposal equipment for the Naval Explosive Ordnance Disposal Technology Center, Indian Head, MD.
- o First Destination Transportation costs.
- o The additional 900K is for a one-time requirement which is the upgrading of computer facilities at the "Desert Ship" complex at Naval Ordnance Missile Test Facility, White Sands, NM. The current equipment is seriously out of date, and a wholesale improvement will facilitate testing requirements through the 1980's.

(U) This is a continuing program.

(U) Project T0423, Naval Supply Systems Instrumentation and Material Support: This project provides for laboratory update and service alterations and minor construction at the Navy Clothing and Textile Research Facility, Navy tenant activity, colocated at the Army Natick Laboratories, Natick, MA.

(U) In FY 1982, a small (2,000 square feet) addition to laboratory for storage of patterns and housing of patterns and prototype branch will be completed. Improvements to laboratory flammability test area being made.

(U) The FY 1983 program consists of:

- o Acquiring new equipment to evaluate thermal, optical, laundering, and dyeing properties of materials being obtained.
- o Expanding building to erect additional housing to accommodate an Engineering Systems laboratory.

(U) For FY 1984, it is planned to continue to update and maintain laboratory instrumentation and equipment in a systematic manner.

(U) This is a continuing program.

(U) Project W0566, Naval Air Systems Command Instrumentation and Material Support: This is a continuing project that supports energy conservation related projects at various Research, Development, Test and Evaluation activities. It supports instrumentation/equipment and minor construction/alteration at the Naval Weapons Evaluation Facility; as well as first destination transportation costs for shipment of R&D material; it also supports the costs for the Special Flight Test Instrumentation Pool, which is maintained as an economical equipment inventory of aeronautical equipment for use by R&D projects in test work.

(U) In FY 1982 continued support as described above.

403

413

Program Element: 65862M Title: RDT&E Instrumentation and Material Support

(U) The FY 1983 program consists of continuation of support as above.

(U) For FY 1984 it is planned to continue support of efforts as described above.

(U) This is a continuing program.

(U) Project X0799, Naval Electronic Systems Command Material Support: This project provides for shipping of newly procured research and development materials to first destination.

(U) In FY 1982 continued support as above.

(U) In FY 1983 it is planned to continue support as described.

(U) For FY 1984 it is planned to continue support as described above.

(U) This is a continuing program.

(U) Project X0800, Radiological Control: Present radiac instruments are old, bulky, costly to repair and use outmoded electronics. Most radiac equipment is nearing obsolescence, does not have comprehensive integrated logistics support, and is unreliable. This program corrects present design problems, provides laboratory and contractor support for design of new radiac equipments, and develops cost reducing diagnostic maintenance approaches. Variance of funding in the out-years is to adjust for inflation in a level funded program.

(U) In FY 1982, the development of the IM-239 Radiacmeter continued with the start of technical evaluation. Development continued of the low and high range survey meters, and was completed for tritium models.

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

- o Complete IM-239 Radiacmeter Technical Evaluation to attain Approval for Service Use.
- o Continue development of low and high range survey meters.
- o Initiate tritium, alpha, diagnostic, and beta counting systems development.

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

- o Low and high range survey meters.
- o Tritium, alpha, diagnostic, and beta counting systems.

(U) This is a continuing program.

(U) Project Y0811, Military Contruction and Military Personnel Support Equipment: This program finances the procurement, installation and/or relocation of equipment and furnishings required to initially outfit facilities/structures being constructed or modernized under the Navy Military Construction Program at RDT&E activities. The program also manages and finances the replacement and/or augmentation of furniture, furnishings and equipment (military personnel support equipment) for unaccompanied personnel at all RDT&E activities under the Chief of Naval Material.

(U) In FY 1982 provided support as described above.

Program Element: 65862N Title: RDT&E Instrumentation and Material Support

(U) The FY 1983 program consists of:

- o Providing support as described above.

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

- o Providing support as described above.

(U) This is a continuing program.

(U) Project Z0833, Director of Naval Laboratories Instrumentation and Material Support: This project provides funds to the non-industrial funded Chief of Naval Material R&D activities for general purpose equipment and equipment installation costs along with minor construction projects (up to $100K). Project also funds minor construction projects for military support at all Chief of Naval Material R&D Centers and equipment needs associated with military support requirements. First destination transportation costs are also funded by this project.

(U) FY 1982 was the last year that the Navy Industrial Funded R&D Centers received funding under this project for general purpose equipment/instrumentation, minor construction, equipment installation projects and general collateral equipment.

(U) In FY 1983 with the implementation of the equipment capitalization program at the Navy Industrial Funded activities, funding under this project will be in support of:

- o Non-Navy Industrial Funded R&D Centers as noted above.
- o Funding support for the Acoustic Research Center recently transferred by DARPA to the Naval Ocean Systems Center, San Diego, California.
- o Procurement of automatic data processing equipment required by the central design agent for the RDT&E,N Standard Automated Financial System.

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

- o Support of the non-Navy Industrial Funded Centers.
- o Acoustic Research Center support at Naval Ocean Systems Center.
- o Support of the demolition of two off-shore range towers at the Naval Coastal Systems Center, Panama City, FL.
- o Minor construction and equipment needs of all R&D Centers associated with military support.

(U) This is a continuing program.

I. (U) PROJECT OVER $10 MILLION IN FY 1984: None.

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65863N
Title: RDT&E Ship and Aircraft Support
DoD Mission Area: 454 - Other Test and Evaluation Support
Budget Activity: 6 - Defensewide Mission Support

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	55,329	69,353	74,538	78,417	Continuing	Continuing
S0354	RDT&E Ships Support	13,931	15,622	22,342	21,016	Continuing	Continuing
W0568	RDT&E Aircraft Flight Hours	13,945	17,672	17,625	19,849	Continuing	Continuing
W0569	RDT&E Aircraft Support	27,453	36,059	34,571	37,552	Continuing	Continuing

As this is a continuing program, the above funding profile includes out-year escalation and encompasses all aircraft reworks, ship overhauls and flight hours planned or anticipated through FY 1985 only.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This continuing program provides support for ships and platforms required to accommodate Research and Development equipment to be tested, support for aircraft at field activities, not operating under the Uniform Funding Policy, to accomplish scheduled Research and Development project testing, and the depot level rework of aircraft, engines, components for the entire Navy inventory of Research, Development, Test and Evaluation aircraft. Aircraft support also includes aircraft bailed to contractors for accomplishment of Navy Research, Development, Test and Evaluation projects. Costs covered under this element include: fuel, supplies, equipment, repair, modification and overhaul of ships and aircraft as well as organizational, intermediate, and depot maintenance of ships and aircraft in the Research, Development, Test and Evaluation, Navy inventory.

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 decrease of 5,444 in FY 1982 resulted from Navy reprogramming action to cover deficiencies outside of this program but within the overall DoD mission area. The decrease of 494 in FY 1983 is the result of revised estimates for cost growth. The decrease of 4,997 in FY 1984 results from revised estimates for cost growth in all projects 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	52,425	60,773	69,847	79,535	Continuing	Continuing
S0354	RDT&E Ships Support	13,960	14,471	15,722	25,256	Continuing	Continuing
W0568	RDT&E Aircraft Flight Hours	11,775	15,237	17,866	19,096	Continuing	Continuing
W0569	RDT&E Aircraft Support	26,690	31,065	36,259	35,183	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: The ships and aircraft funded by this element provide support for all projects requiring afloat or airborne development and operational test and evaluation.

G. (U) WORK PERFORMED BY: IN-HOUSE: Navy Ship Research and Development Center, Annapolis MD; Naval Weapons Systems Engineering Station, Port Hueneme, CA; Naval Ocean Systems Center, San Diego, CA; CINCPACFLT (POL), Navy Shipyards, TENDERS, Naval Air Development Center, Warminster, PA; Naval Coastal Systems Center, Panama City, FL; Pacific Missile Test Center (Non-range), Point Mugu, CA; Naval Research Laboratory, Washington, DC; Naval Air Engineering Center, Lakehurst, NJ; and Naval Air Rework Facilities at Alameda, CA; North Island, San Diego, CA; Pensacola, FL; Cherry Point, NC; Jacksonville, FL; and Norfolk, VA.

Program Element: 65863N Title: RDT&E Ship and Aircraft Support

CONTRACTORS: Aero Corporation, Lake City, FL; Hayes International Corporation, Birmingham, AL; Army Depot, Corpus Christi, TX; Rockwell International Corporation, Columbus, OH; Sikorsky Aircraft Division, Stratford, CT; Vought Corporation, Dallas, TX; Lockheed Aircraft Corporation, Burbank, CA; Grumman Aerospace Corporation, Bethpage, Long Island, NY; and Calspan Corporation, Buffalo, NY.

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

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

(U) Project SO354, RDT&E Ships Supports

1. (U) DESCRIPTION (Requirement and Project): This project provides for operation and maintenance of ships used solely in support of the Navy RDT&E program. The major component of the costs associated with this project are those of regularly scheduled ship overhauls. The magnitude of these costs varies from fiscal year to fiscal year depending upon the number and types of ships scheduled for this cyclically required major maintenance. In years when overhauls are scheduled, they constitute the major cost of that year. The remainder of related funds are used for purchase of supplies and equipage, fuel and petroleum products, repairs and supporting modifications. Part of these costs are fixed and are associated with simply having these ships in the inventory, while a lesser portion varies with the tempo and type of ship operations. The nature of the operations is, in turn, determined by the overall Navy R&D testing program itself.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Completed restricted availabilities for USS NORTON SOUND (AVM-1), USS DOLPHIN (AGSS-555), HIGH POINT (PCH-1), Floating Instrumentation Platform and the Oceanographic Research Buoy. Conducted Technical Evaluation and Operational Evaluation of vertical launched Standard Missiles aboard USS NORTON SOUND. Completed USS DOLPHIN installation and tested passive ranging techniques, parametric sonar, stars and non-acoustic ASW (GUDGEON ve back up submarine). HIGH POINT participated in the development of high speed minesweeping equipment and high speed anti-submarine warfare systems.

b. (U) FY 1983 Program: Continue required support. Restricted availability for USS NORTON SOUND (AVM-1). Extended restricted availability for USS DOLPHIN (AGSS-555). As the next step in weapons development, the Battle Group Anti-Air Warfare Coordination System will continue to be tested on USS NORTON SOUND. Vertical launch of standard missiles will also continue. USS DOLPHIN will participate in TRIDENT performance testing. Prepare plans for possible support of USS PEGASUS (PHM-1).

c. (U) FY 1984 Planned Program: Continued required support. Conduct major overhaul of the USS NORTON SOUND (AVM-1).

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

e. (U) Milestones: Not Applicable

(U) Project WO568, RDT&E Aircraft Flight Hours

1. (U) DESCRIPTION (Requirement and Project): This project provides funding for fuel, oil, lubricants, other consumables, and organizational and intermediate level maintenance and material for Research, Development, Test and Evaluation aircraft, and station flying aircraft supporting the Navy's Research and Development, Test and Evaluation effort. This project supports the aircraft flight hours flown only at those Navy Research Development, Test and Evaluation activities which are not under the Department of Defense Uniform Funding Policy. The funds provide for pilot training/qualification and support of individual Research, Development, Test and Evaluation projects which require aircraft at these activities. Funding provided each activity is based on flight hour requirements generated by these projects. In contrast, project flight hours flown at test and evaluation activities under the Department of Defense Uniform Funding Policy are reimbursed directly to the activity by the individual project requiring the flight support. Funds are expended based on an average cost per flight hour determined for each type of aircraft.

407

Program Element: 65863N Title: RDT&E Ship and Aircraft Support

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funding support for Research, Development, Test and Evaluation flight hours as detailed above provided for approximately 10,800 flight hours.

b. (U) FY 1983 Program: Continue Research, Development, Test and Evaluation flight hour support for a planned total of 11,311 flight hours. The increase in project funding is the number of flight hours to be flown, increased costs for materials and the continued replacement of military personnel by contractor labor for organizational and intermediate level maintenance. This project effort will support only the planned flight hour program of 11,311 hours.

c. (U) FY 1984 Planned Program: Continue Research, Development, Test and Evaluation flight hour support for a planned total of approximately 12,612 hours.

d. (U) Program to Completion: Continue Research, Development, Test and Evaluation flight hour support for the weapons systems being developed, which will require flight time for test and evaluation at activities not funded under the Department of Defense Uniform Funding Policy.

e. (U) Milestones: Not Applicable

(U) Project WO569, RDT&E Aircraft Support

1. (U) DESCRIPTION (Requirement and Project): This project provides for depot level rework and repair of Naval Air Systems Command Research, Development, Test and Evaluation aircraft, and Station Flying Administrative Aircraft; rework of engines and other repairable components for these aircraft and material support of aircraft bailed to contractors to support Navy Research, Development, Test and Evaluation effort. Engine and component overhaul costs are based on flight hours flown. The overhaul activities are reimbursed for replacement engines and other aircraft components required for aircraft operations. Presently, there are 254 aircraft in three support categories under Commander, Naval Air Systems Command, custody. They are: 154 in the general test catagory; 51 in the station flying category; and 49 bailed aircraft for special test work. These aircraft are located at 10 field activities and 16 contractor sites and are utilized for test, evaluation and development of aircraft, aircraft weapons systems, and missiles requiring an airborne platform or static airframe test.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: This is a continuing project to fund recurring overhaul and rework of airframe and major components (e.g., engines). In FY 1982 funds were expended for the rework of 37 aircraft. Engine and other major component overhauls were provided when required as well as material support to 49 bailed Research, Development, Test and Evaluation aircraft.

b. (U) FY 1983 Program: The rework of 41 aircraft is programmed. Engine and other major component overhaul and material support of bailed Research, Development, Test and Evaluation aircraft will continue at approximately the same level as in FY 1982. Due to the requirement to schedule aircraft rework in advance and the need to maintain a level inventory of flyable aircraft, this work is accomplished at a steady rate throughout the fiscal year.

c. (U) FY 1984 Planned Program: In FY 1984 the rework of approximately 39 aircraft is required. Engine and major component overhaul and material support of bailed Research, Development, Test and Evaluation aircraft will continue as required.

d. (U) Program to Completion: Continue the rework of approximately 40 aircraft as required. Engine and major component overhaul and material support of bailed Research, Development, Test and Evaluation aircraft will continue as required.

e. (U) Milestones: Not Applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65864N
Title: Test and Evaluation Support
DoD Mission Area: 451 - Major Ranges and Test Facilities
Budget Activity: 6 - Defensewide Mission Support

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	244,170	263,362	287,212	303,938	Continuing	Continuing
W0653	Pacific Missile Test Center, Point Mugu, CA	95,711	100,965	113,891	118,978	Continuing	Continuing
W0654	Naval Air Test Center, Patuxent River, MD	82,475	87,258	91,683	96,387	Continuing	Continuing
W0655	Naval Air Propulsion Test Center, Trenton, NJ	15,952	21,640	22,085	26,183	Continuing	Continuing
W0657	Naval Weapons Center Ranges, China Lake, CA	50,032	53,459	59,553	62,390	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 annual institutional funding for the operation, maintenance and test instrumentation and systems improvements at four of the six (Navy) Department of Defense Major Range and Test Facility Base Activities designated by DoD is provided by this program element. The four major range and test facility base activities within this program are the Pacific Missile Test Center, Point Mugu, CA; Naval Air Test Center, Patuxent River, MD; Naval Air Propulsion Test Center, Trenton, NJ; and the Naval Weapons Center, China Lake, CA. These four Major Range and Test facilities possess the capability and capacity to perform developmental and operational test and evaluation on prototype weapon systems undergoing the Research and Development phase of the Navy's Acquisition Process.

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 +3,850 in FY 1982 which was reprogrammed to cover unbudgeted civilian pay raise costs in all projects, -10,744 in FY 1983 reflecting a Congressional decrease of 9,106 plus revision of cost estimates including inflation, and -14,401 in FY 1984 resulting from refined estimates of costs for inflation and from 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	215,579	240,320	274,106	301,613	Continuing	Continuing
W0653	Pacific Missile Test Center, Point Mugu, CA	89,354	94,736	104,703	115,672	Continuing	Continuing
W0654	Naval Air Test Center, Patuxent River, MD	67,373	80,100	89,358	98,015	Continuing	Continuing
W0655	Naval Air Propulsion Test Center, Trenton, NJ	16,670	15,702	23,286	26,034	Continuing	Continuing
W0657	Naval Weapons Center, China Lake, CA	42,182	49,782	56,759	61,892	Continuing	Continuing

409

Program Element: 65864N Title: Test and Evaluation Support

E. (U) OTHER FY 1984 APPROPRIATION FUNDS:

Project No.	Title	FY 1982 Actual	FY 1983 Actual	FY 1984 Estimate	FY 1985 Estimate	Additional to Completion	Total Estimated Cost
	Military Construction, Navy	8,720	0	16,480	9,870	Continuing	Continuing

F. (U) RELATED ACTIVITIES: Strategic weapon systems test support is provided to the Western Space and Missile Center, White Sands Missile Range, Kwajalein Missile Range and the Satellite Control Facility. Parachute test support of U.S. Air Force and National Aeronautics and Space Administration projects, and support of Army turboprop and turboshaft engine environmental testing is also provided. Other Navy Major Range and Test Facility Base activities are shown in Program Element 65852N (Atlantic Undersea Test and Evaluation Center) and 24571N (Atlantic Fleet Weapons Training Facility). The test activities supported under this program are essential for the test and evaluation of all weapons being developed and procured by the Navy. They also support other services weapons testing, as required.

(U) Project W0653, Pacific Missile Test Center, provides interrange support to the Western Space and Missile Center, White Sands Missile Range, Kwajalein Missile Range and the Satellite Control Facility on major strategic missile and space programs.

(U) Project W0654, Naval Air Test Center, Naval Aviation Squadrons VX-1 and VQ-4 involved in testing development aircraft; Surface Effects Test Facility supporting development of surface effects vehicle projects, Naval Electronic Systems Command Detachment, Naval Surface Weapons Center.

(U) Project W0655, Naval Air Propulsion Test Center, supports engine testing for TOMAHAWK Cruise Missile, F-14 aircraft and Army turboshaft engine environmental testing program.

(U) Project W0657, Naval Weapons Center, supports TRIDENT rocket static firing tests; tests of major naval aircraft weapons systems, electronic warfare systems and ground-controlled missile systems. Also, serves as the National Range Facility for test and evaluation of aerodynamic decelerators.

G. (U) WORK PERFORMED BY: W0653, Pacific Missile Test Center: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Air Station, Point Mugu, CA (including outlying field, San Nicholas Island). CONTRACTOR: Dynalectron Corporation, Santa Barbara, CA; Computer Sciences Corporation, Los Angeles, CA; Litton Industries, Los Angeles, CA; Sperry Univac, New York; Triga, Camarillo, CA.

(U) W0654, Naval Air Test Center: IN-HOUSE: Pacific Missile Test Center, Point Mugu, CA; Naval Air Propulsion Test Center, Trenton, NJ; Naval Weapons Center; China Lake, CA; Naval Research Laboratory, Washington, DC; CONTRACTORS: Southern Maryland Electric, Hughesville, MD; Dynalectron Corporation, Santa Barbara, CA; Grumman Corporation, St Louis, MO; Universal Fuel, Lexington Park MD; M.C. Avano, Incorporated, Huntington, NY.

(U) W0655, Naval Air Propulsion Test Center: IN-HOUSE: Naval Air Test Center, Patuxent River, MD; Naval Air Development Center, Warminster, PA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. CONTRACTORS: A-Z Maintenance Corporation, Trenton, NJ; Public Services Gas and Electric Company, Trenton NJ; Baron Information System, New York, NY.

(U) W0657, Naval Weapons Center: IN-HOUSE: Naval Weapons Center, China Lake, CA; Naval Air Facility, China Lake, CA. CONTRACTORS: VITRO, Ridgecrest, CA; Raytheon, Ridgecrest, CA; IBM, Los Angeles, CA; General Dynamics, San Diego, CA; Kentron, Mission Beach, CA; General Electronic Corporation, Los Angeles, CA; Computer Sciences Corporation, Ridgecrest, CA.

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

Program Element: 65864N Title: Test and Evaluation Support

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

(U) Project W0653, Pacific Missile Test Center

1. (U) DESCRIPTION (Requirement and Project): The Pacific Missile Test Center is one of five (Navy) Department of Defense Major Range and Test Facility Activities under the command of and receiving primary support from the Commander, Naval Air Systems Command. The mission of the Pacific Missile Test Center is to provide range support for the Department of Defense and other designated government agencies for launching, tracking and collecting data in guided and ballistic missile, satellite and space vehicle research, development, test and evaluation and training programs. Range support provided includes: metric tracking of test objects, command, control and destruct for range safety purposes, range clearance, meteorological services, range scheduling, communications frequency interference control and analysis, and data reduction for all operations within the cognizance of the Pacific Missile Test Center, including all sea-based missile launches in the Pacific. The Pacific Missile Test Center encompasses the Headquarters, Point Mugu, CA; Naval Air Station, Point Mugu, CA; Missile Impact Location System at Midway Island. Other instrumentation sites include San Nicholas, Santa Cruz and San Miguel of the Channel Island group off the California coast, plus sites along the California coast. Special range aircraft provide airborne instrumentation platforms and communications and telemetry relay stations to augment shore installations.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded level of effort necessary to provide range support for test and evaluation of weapons systems. Major operational support was provided for: Tactical weapons systems including F-14/PHOENIX, TOMAHAWK Cruise missile, AEGIS and HARPOON missiles funding for improvement and modernization was applied to the continued development of Computer Centralization and Modernization Program; the Range Display and Control Center. Continued conversion of range data communication links to digital systems to permit future encryption.

b. (U) FY 1983 Program: Continued level of effort required to provide range support for test and evaluation of developmental weapons systems. The improvement and modernization program provides funding for continued support of Central Computer and Modernization Program, Digital Communications, and Range Display and Control Center; and two new-starts, Cast Glance and Frequency Surveillance Update.

c. (U) FY 1984 Planned Program: Continue level of effort required to provide range support. The increases in funding will support the improvement and modernization program for the completion of Central Computer and Modernization Program; initiate the procurement of a radar replacement for the obsolete ARSR-1 Radar at San Nicholas Island. This new radar will incorporate the latest state-of-art technology with easy to maintain electronics. Funding for Extended Area Test System has been transferred from PE 65870N, Strategic Systems Test Support, to this element.

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

e. (U) Milestones: Not Applicable

(U) Project W0654, Naval Air Test Center

1. (U) DESCRIPTION (Requirement and Project): The Naval Air Test Center is one of five (Navy) Department of Defense Major Range and Test Facility Base activities under the command of and receiving primary support from the Commander, Naval Air Systems Command. The mission of the Naval Air Test Center is to perform test and evaluation of the the total aircraft including: aircraft mission system, aircraft system, aircraft mission equipment, subsystems, components, related support systems, and integrated logistic support elements; to provide technical advice and assistance to the Naval Air Systems Command, the Board of Inspection and Survey, other government agencies and contractors; to assist other Research, Development, Test and Evaluation and Operational

Program Element: 65864N Title: Test and Evaluation Support

Test and Evaluation activities in fulfilling their mission requirements; and to conduct in-house technical projects and maintenance costs of the facility not chargeable to the user under the Test and Evaluation Uniform Funding Policy. Support costs chargeable include: (1) administration, air operations, communications, supply, public works, security, fire protection, comptroller, computer services, and industrial relations; (2) procurement of investment items essential to the test and evaluation mission of the facility. These items include general test equipment, range instrumentation and general support equipment, minor construction and alterations, and photographic equipment; (3) non-mission related recurring operational support for military personnel and tenants. Support includes military personnel facilities, intermediate maintenance, labor and utilities for fleet squadrons, routine maintenance and repairs, administration, air operations, supply and fiscal services, security, fire protection, and industrial relations service. In addition to the fleet aviation squadrons, VQ-4, VXN-8, VX-1, and reserve squadron VP-68, there are twenty-six tenants located at the center.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded level of effort necessary to provide support for test and evaluation of all aircraft related systems and provided funds for improvement and modernization of obsolete systems. Improvement and modernization funds will be applied to the continuing effort for the Chesapeake Range Computation and Control System/Tracking Radar, Central Scientific Computer and will initiate the Chesapeake Atlantic Tracking Range update.

b. (U) FY 1983 Program: Continue support to programs as described previously as well as support of the Research, Development, Test and Evaluation and Operational Test and Evaluation of both the F/A-18 and AV-8B aircraft. Continue to update the Tactical Computer and Software Test Lab portion of the Mission Systems Test Laboratories. Initiate the development of the Manned Flight Simulator.

c. (U) FY 1984 Planned Program: Continue level of effort to provide support for test and evaluation as previously described. Improvement and modernization funding will complete the Chesapeake Range Computation and Control System/Tracking Radar upgrade, continue the development of the Manned Flight Simulator, upgrade of the Mission Systems Test Laboratories, Chesapeake Atlantic Tracking Range and Central Scientific Computer.

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

e. (U) Milestones: Not Applicable

(U) Project WO655, Naval Air Propulsion Test Center

1. (U) DESCRIPTION (Requirement and Project): Naval Air Propulsion Test Center is one of five (Navy) Department of Defense Major Range and Test Facility Base Activities under the command of and receiving primary support from the Commander, Naval Air Systems Command. The mission of the Naval Air Propulsion Test Center is: (1) to test and evaluate air breathing gas turbine propulsion systems, their components and accessories and fuels and lubricants, and (2) to perform applied research and development leading to a new propulsion system and correction of design deficiencies and service problems. This is a continuing project which provides indirect support funds for: operations and maintenance costs of the facility not chargeable to the user under the Test and Evaluation Uniform Funding Policy. Support costs chargeable to this program element include: (1) administration, supply, public works, security, fire protection, resource management, and civilian personnel services and (2) procurement of investment items essential to the test and evaluation mission of the facility. These items include: general research equipment/instrumentation, test facility plant equipment, and materials and services for minor construction and alterations.

412

1117

Program Element: 65864N Title: Test and Evaluation Support

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded level of effort necessary to support test and evaluation of engine propulsion systems, their components and accessories and continue support of the fuel flexibility/synthetic fuels test and evaluation. Complete procurement/installation of Data Acquisition System for outdoor test site. Continue a preventative maintenance program to reduce backlog of maintenance and repair.

b. (U) FY 1983 Program: Continue level of effort as noted above. Initiate facility modernization program to update test facilities to meet new technology advances in aircraft propulsion systems and their fuels and lubricants.

c. (U) FY 1984 Planned Program: Continue level of effort as previously described. Continue facility modernization program to upgrade facilities.

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

e. (U) Milestones: Not Applicable

(U) Project W0657, Naval Weapons Center

1. (U) DESCRIPTION (Requirement and Project): Naval Weapons Center Range is one of five (Navy) Department of Defense Major Range and Test Facility Base activities under the command of and receiving primary support from the Commander, Naval Air Systems Command. The Naval Weapons Center Range is the principal Navy facility for the test and evaluation of air-to-air and air-to-ground weapons and parachute and aircraft escape systems. This range further provides the principal test facilities for electronic warfare, electronic countermeasures system in the Navy, and is equipped to simulate foreign air- and sea-based electronic warfare systems. This project pays for all test and evaluation costs which cannot be immediately and directly identified with a specific user program. It includes general purpose range instrumentation, minor construction, other investment costs, operating overhead, and general and administrative expenses.

2. (U) PROGRAM ACCOMPLISHMENTS AND FUTURE EFFORTS:

a. (U) FY 1982 Program: Funded level of effort necessary to support test and evaluation of weapons development and airborne weapons testing. Funding will be applied to Systems Rehabilitation and Modernization to continue to reduce backlog of essential maintenance and repair. Funding for improvement and modernization of on-going programs such as Range Control Center, on Axis Data Systems, Electronic Warfare Threat Environment Simulation Central Sites. Initiate the improvement and modernization of propulsion/warhead/environment facilities.

b. (U) FY 1983 Program: Continue level of effort described above. Continue to support on-going improvement and modernization programs and initiate the second buy of the Integrated Target Control System.

c. (U) FY 1984 Program: Continue level of effort and support of on-going improvement and modernization programs, such as On Axis Data Systems, Telemetry Data Acquisition and Electronic Warfare Threat Environment Simulation Central Site. Complete the Range Control Center and initiate the Slate Range Facility project.

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

e. (U) Milestone: Not Applicable

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65865N
Title: Operational Test and Evaluation Capability
DoD Mission Area: 454 - Other Test and Evaluation Support
Budget Activity: 6 - Defensewide Mission Support

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	5,231	6,772	6,949	7,309	Continuing	Continuing
R0831	Operational Test and Evaluation Force Support	5,043	5,950	6,949	7,309	Continuing	Continuing
R0841	Operational Test and Evaluation Capability	188	822*	0	0	0	0

*This project is incorporated into project R0831 in FY 1984

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: A continuing support effort to provide Commander Operational Test and Evaluation Force general project related support funding for: (a) Operational Test and Evaluation for report to the Chief of Naval Operations and the Chief of Naval Material for system acquisition/development decisions; and (b) Operational Test and Evaluation capability 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 (-539 in FY 1982 and +393 in FY 1984) are the result of refined estimates of costs including escalation and increases in the number and scope of planned FY 1984 projects.

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	5,231	5,770	6,772	6,556	Continuing	Continuing
R0831	Operational Test and Evaluation Force Support	4,955	5,587	5,950	5,770	Continuing	Continuing
R0841	Operational Test and Evaluation Capability	276	182	822	786	Continuing	Continuing

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

F. (U) RELATED ACTIVITIES: None.

G. (U) WORK PERFORMED BY: A continuing in-house effort performed by the Commander Operational Test and Evaluation Force staff with fleet unit support and limited contractor assistance. IN-HOUSE: Naval Underwater Systems Center, New London Laboratory, New London, CT; Naval Weapons Center, China Lake, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Ocean Systems Center, San Diego, CA; Naval Air Development Center, Warminster, PA; Fleet Analysis Center, Corona, CA. CONTRACTORS: Flight Systems, Inc., Newport Beach, CA; Lockheed Missiles and Space Co., Sunnyvale, CA; Value Engineering Co., San Diego, CA; Applied Physics Laboratory, Johns Hopkins University, Silver Spring, MD; ENSCO, Inc., Springfield, VA; Vector Research, Inc., Gaithersburg, MD; Cerberonics, Inc., Falls Church, VA; Delex Systems Inc., Vienna, VA; Mantech, Inc., Livingston, NJ; Analysis and Technology, Inc., N. Stonington, CT.

Program Element: 65865N Title: Operational Test and Evaluation Capability

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

(U) Project R0831, Operational Test and Evaluation Support: This project provides the necessary support for the Operational Test and Evaluation Force to conduct Operational Test and Evaluation. Costs include those associated with project planning, related travel, instrumentation, data analysis and reduction, reporting Operational Test and Evaluation results, and long range planning for improvements to conduct Operational Test and Evaluation of future weapons systems.

(U) In FY 1982, support for the Operational Test and Evaluation Force continued as outlined above.

(U) The FY 1983 program consists of:

- On-going Test and Evaluation of over 300 acquisition projects.
- Consolidation of Time-Space-Position initiatives.
- Increased scope and realism of testing in support of Department of Defense initiatives to improve the acquisition process.

(U) The FY 1984 program is planned to:

- Continue Operational Test and Evaluation.
- Continue Improvements in Test Scope and realism.
- Incorporate project R0841 into this project.

(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: 65870N
DoD Mission Area: 454 - Other Test & Evaluation Support

Title: Strategic Systems Test Support
Budget Activity: 6 - Defensewide Mission Support

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	17,746	17,508				
W1359	Strategic Systems Test Support	17,746	12,094				
W1647	Extended Area Test System	*	5,414	**			

* Funded in W1359 ** Transferred to PE 65864N, Test and Evaluation Support

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program supports the conversion of six existing Navy P-3 type aircraft. Two aircraft will serve as mobile instrumentation platforms capable of performing missile impact scoring in broad ocean areas as required to support testing TRIDENT, MX and other strategic weapons systems. Four aircraft will support tactical range requirements at the Pacific Missile Test Center, including HARPOON, TOMAHAWK, and Advanced Medium Range Air-to-Air Missile.

C. (U) EXPLANATION OF CANCELLATION OR DEFERRAL: This Extended Area Test System development effort will be transferred to the Improvement and Modernization program at Pacific Missile Test Center since its primary support function will be for the extended range system to support the testing of tactical weapons system. The strategic systems test support requirement will be terminated at the end of FY 1983 because the sonobuoy missile impact locating system aircraft will be complete and the specific requirements for multiple telemetry receiving has been eliminated.

416

FY 1984 RDT&E DESCRIPTIVE SUMMARY

Program Element: 65872N
Title: Productivity Improvement
DoD Mission Area: 471 - General Management Support
Budget Activity: 6 - Defense Wide Mission Support

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	7,490	4,410	4,304	1,611	Continuing	Continuing
Z1457	Productivity Improvement	7,490	4,410	4,304	1,611	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 provides for productivity enhancing capital investments at specified research and development laboratories. These investments are used to develop, purchase and/or implement improved equipment or procedures to enhance the productivity of the workforce at the research and development laboratories and other organizational components. Investments are expected to provide a payback in four years or less.

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 3,000 in FY 1982 and the decrease of 22 in FY 1983 were due to budgetary adjustments; and the increase of 1,954 in FY 1984 is to provide funds for programs which were deferred because of the FY 1982 and FY 1983 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	0	10,490	4,432	2,350	Continuing	Continuing
Z1457	Productivity Improvement	0	10,490	4,432	2,350	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 Underwater Systems Center, Newport, RI; Naval Weapons Center, China Lake, CA; David W. Taylor Naval Ship Research and Development Center, Bethesda, MD; Navy Personnel Research and Development Center, San Diego, CA; Naval Air Development Center, Warminster, PA; Naval Surface Weapons Center, Dahlgren, VA; Naval Sea Systems Command, Washington, DC; and the Naval Ocean Systems Center, San Diego, CA.

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

(U) Project Z1457, Productivity Improvement. This program provides for productivity enhancing capital investments at research and development laboratories. Where feasible, the Navy substitutes capital investments for labor costs in an effort to improve productivity. The Office of the Secretary of Defense Sponsored Productivity Investment Fund and the Navy's Cost of Ownership Reduction Investment Program provide an opportunity for the laboratories to achieve funding for high payback investment opportunities which can provide a substantial manpower savings and project a high return on investment.

Program Element: 65872N Title: Productivity Improvement

(U) In FY 1982, Automatic Testing and Calibration equipment has been installed and is operating at the Naval Air Development Center and cost savings are expected in FY 1983 and later years. Contracts to modernize the Integrated Circuitry Facility at the Naval Ocean Systems Center have been awarded. Procurement of Automated Office Equipment at the Naval Surface Weapons Center was initiated.

(U) The FY 1983 program consists of:

- o Completing the modernization of the Integrated Circuit Facility at the Naval Systems Center.
- o Supporting Labor Quality Enhancement programs at industrial facilities.
- o Supporting the Variable Payload Ship Productivity Program.
- o Acquisition of equipment and facility improvements at three additional Navy laboratories.

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

- o Completion of projects initiated in FY 1982 and FY 1983, with resulting investment savings.
- o Continued support of Labor Quality Enhancement and Variable Payload Ship Productivity programs.
- o Initiation of new investment projects with expected savings that provide a high return on investment.

(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: 65873N
Title: Long Range Planning Support
DoD Mission Area: 471 - General Management Support
Budget Activity: 6 - Defense-wide Mission Support

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	900	0	0	0	0	900
R1547	Research and Development Plans Support	100*	0	0	0	0	100
R1562	Warfare Planning Support	400*	0	0	0	0	400
R1694	Technology Assessment Support	400**	0	0	0	0	400

* FY 1982 funded in 65861N.
** FY 1982 funded in 65863N.

B. (U) BRIEF DESCRIPTION OF ELEMENT AND MISSION NEED: This program provides analytical support to the Chief of Naval Operations for developing long range planning goals and objectives and to the Chief of Naval Operations, Assistant Secretary of the Navy (Research, Engineering and Systems) and Director of Navy Program/Planning for Research and Development planning support.

C. (U) EXPLANATION OF CANCELLATION OR DEFFERAL: This program was terminated in FY 1983 as a result of deletion of all funds by Congressional action.

419
4298

SECTION II

CONSTRUCTION AT

RDT&E,N FACILITIES

421
4226

(421)

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

The data provided by this exhibit includes the following:

Part I - Utilization of Section 2353, Title 10 Authority - Specialized R&D Facilities and/or Equipment Constructed by or Furnished to Contractors

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected

NARRATIVE Statement for projects in excess of $1,000,000

Part II - Utilization of RDT&E for Facilities at Government-Owned/Government-Operated Installations

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected

NARRATIVE Statement for projects in excess of $500,000

Part I - Utilization of RDT&E Appropriation for Minor Construction

Project Data Sheets (DD-1391)

These data sheets are provided for all projects budgeted in FY 1984 and any item being included in the budget for the first time (FY 1982 through FY 1984) which requires building alteration or building of a facility for a contractor (Part I) or equipment installation (Part II).

DEPARTMENT OF DEFENSE, MILITARY
RDT&E, NAVY
MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART I. UTILIZATION OF SECTION 2353, TITLE 10 AUTHORITY

Specialized R&D facilities and/or equipment determined to be necessary for the performance of a contract for a Military Department for research and development may be constructed by or furnished to the contractor and funded from appropriations available for research, development, test and evaluation. The Congress enacted this legislation, now 10 USC 2353, in 1956. This policy is executed through DOD Directive 4275.5. Under this policy, the Secretaries of the Military Departments or their designees, and the Directors of Defense Agencies may approve facilities projects up to $3,000,000; the Under Secretary of Defense Research and Engineering approves projects exceeding $3,000,000. The Congress is notified in advance of starting any project involving construction, regardless of the dollar amount. The table below provides a summary listing of all such projects accomplished in FY 1982 and planned in FY 1983, FY 1984, and FY 1985.

FACILITY/EQUIPMENT	RDT&E,N Project Number	CONTRACTOR	LOCATION	TOTAL OBLIGATIONAL AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
SECTION I PROJECTS ACCOMPLISHED OR UNDERWAY							
Machine Tools and Test Equipment for TRIDENT II Development 1/	B0951	Lockheed Missiles and Space Company, Inc.	NIROP Sunnyvale, CA	2,897	-	-	-
SECTION II PROJECTS PLANNED OR PROJECTED							
Extremely Low Frequency Communications (ELFCOMM) Wisconsin Test Facility Alteration 1/	X0792	General Telephone and Electric (GTE)	Clam Lake, Wisconsin	-	4,400	-	-

424 (424)

FACILITY/EQUIPMENT	RDT&E,N Project Number	CONTRACTOR	LOCATION	TOTAL OBLIGATIONAL AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
Enhanced Modular Signal Processor (EMSP) Software Engineering Facility 1/	S01440	Western Electric "First User"	Whippang, NJ TBD	- -	- -	500 500	- -
Machine Tools and Test Equipment for TRIDENT II Development 1/	B0951	Lockheed Missiles and Space Co., Inc.	NIROP Sunnyvale, CA	-	6,553	6,037	7,016
Missile Data Center 1/	B0951	Lockheed Missiles and Space Co., Inc.	NIROP Sunnyvale, CA	-	-	3,995	-
Test Equipment Upgrades 1/ (Bridge Cranes, etc.)	B0951	Lockheed Missiles and Space Co., Inc.	Santa Cruz Test Complex, Santa Cruz, CA	-	1,028	-	-
Data Acquisition and Reduction Center 1/	B0951	Lockheed Missiles and Space Co., Inc.	Cape Canaveral, FL	-	-	9,563	4,116
Misc. Shop Equipment for Mission Support at the Eastern Test Range (ETR) 2/	B0951	Lockheed Missiles and Space Co., Inc.	Cape Canaveral, FL	-	-	-	2,492
Software Development/Data Test and Evaluation Center 1/	B0951	Interstate Electronics Corp.	Anaheim, CA	-	-	5,519	-
Upgrade Surface Launch Complex to Accommodate TRIDENT II Development 1/	B0951	Westinghouse Electric Corp.	Hunters Point Surface Launch Test Complex, San Francisco, CA	-	301	4,917	15,460
Engineering Test System Test Berth Modifications for TRIDENT II Development 1/	B0951	General Electric Company, Ordnance Systems	NIROP Pittsfield Pittsfield, MA	-	-	1,118	1,118

FACILITY/EQUIPMENT	RDT&E,N Project Number	CONTRACTOR	LOCATION	TOTAL OBLIGATION AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
Upgrade NIROP Magna to Accommodate TRIDENT II Development 2/	B0951	Hercules Incorporated, Aerospace Div.	Bacchus Works Magna, Utah	-	1,868	15,238	13,827
Upgrade Air Force Plant 78 to Accommodate TRIDENT II Development 2/	B0951	Morton Thiokol [illegible]ch Division	Brigham City, Utah	-	479	8,798	9,903
Upgrade Control Line Facility to Accommodate TRIDENT Development 2/	B0951	Union Carbide Corporation	Parma, Ohio	-	-	2,450	2,610
TOTAL, PART I				$2,897	$14,629	$58,635	$56,542

426

(426)

SUPPORTING NARRATIVE STATEMENT FOR EMSP SOFTWARE ENGINEERING FACILITY

This facility is an integral part of the development of the Enhanced Modular Signal Processor (EMSP). The prime contractor must not only design and build EMSP, but must also design and purchase the EMSP Software Facility which will be used to develop, test, and maintain the software which runs on EMSP. During development the Software Engineering Facility will be made transportable to any Machine Transferable ANSOLEX/SOLEX Support Software (MTASS) capable host computer. In the 86 time-frame other similar facilities will be usable by future users of EMSP.

This development is an integral part of the EMSP development program as a product to be defined in the development effort. As such the prime contractor is still refining the definition of the facility. Severe constraints would have been placed on the prime contractor if the facility had been specified and provided Government furnished equipment (GFE).

427

(427)

SUPPORTING NARRATIVE STATEMENT FOR TRIDENT II (D-5) MISSILE DEVELOPMENT FACILITIES
(MACHINE TOOLS AND TEST EQUIPMENT FOR TRIDENT II DEVELOPMENT)
(MISSILE DATA CENTERS)

The primary Fleet Ballistic Missile (FBM) Development Facilities are located at the U.S. Naval Industrial Reserve Ordnance Plant (NIROP) Complex, Sunnyvale, California and Santa Cruz Test Facility, California. The Lockheed Missiles and Space Company (LMSC) has been the operating contractor of these facilities while also providing technical and management support for the design, development, production, and maintenance of the POLARIS, POSEIDON, and TRIDENT I (C-4) Missile Systems. Because of the existing technical expertise which LMSC possesses and its proven performance, the corporation has been selected as prime contractor for design and development of the TRIDENT II (D-5) Missile System. The functions which must be performed at the facilities during the development phase of a missile program are advanced product development, limited development manufacturing, and associated testing and product assurance as they relate to formulating the various materials, components, and subsystems. Those functions are initiated during the basic parameters concept phase and carried through the tactical missile design approval. Most of the basic research facilities and many of the applied development facilities employed in D-5 missile development are LMSC-owned and located in close proximity to the Navy-owned facilities within the Sunnyvale and Santa Cruz complexes. It is essential to the fulfillment of program objectives that both LMSC and the Navy invest in additional nonseverable facilities on their own property, for successful accomplishment of the entire D-5 development program. LMSC is committed to large facilities investments for many items which apply new technology and which have general application but which will be largely used for D-5 development and production. The facilities included in this project are those vital to the successful accomplishment of the D-5 development program which the contractor is unwilling to furnish and for which direct Navy funds must be provided. They consist of nonseverable additions to government-owned facilities, modifications to existing government-owned severable facilities, and new severable equipment. Examples of the items involved are construction of a Post Boost Control System Test Cell, modification of the Bulk gas facility, modification of the Central Hydraulic Supply and modification of the Composites Fabrication area. Severable facilities involved are a Digital Acquisition System, a Materials Test System, a Materials Data Acquisition system, a Coordinate Measuring Machine, a Hydraulic Press, and a variety of machine tools and weight handling devices.

The approximate dollar breakdown is: (K$)

	FY1982	FY1983	FY1984	FY1985
Non-severable Facilities Additions and Modifications	$ 89	$1,944	$1,791	$2,081
Severable Equipment Additions and Modifications	2,808	4,609	4,246	4,935

(1/28) 428

Maximum use of existing Government and LMSC owned spaces and equipment is planned to minimize the need for new facilities acquisitions. However, many facilities especially fabricated for programs will now be inefficient or functionally inadequate. As state of the art technology advancements in materials composition and bonding, electronics miniaturization, sequencing and control techniques, and other areas important to missile system development will require that some more modern facilities be provided. The design parameters for D-5 (greater weight, thrust, altitude, range, flight duration, survivability) demand more extensive facilities capability, with wider performance ranges and even greater repeatability in testing and production, than presently exists at the NIROP. Alternate component manufacturing methods must be examined on a small scale during development for their impact upon hardware function, operating costs, and reliability before design options are narrowed. Many test requirements can and will be subcontracted for performance at other locations; the facilities included in this project at NIROP Sunnyvale and the Santa Cruz Test Facility represent only those for which no substitute capabilities exist or for which the cost or loss of time and/or reliability involved in subcontracting far outweighs the Navy facilities investment and LMSC operating costs. When viewing the costs of this facilities project in perspective relative to overall D-5 development scope, it becomes readily apparent that the facilities required represent only a small, but essential, portion of the total program. The facilities were needed beginning in FY 1982 in order to support the currently approved D-5 baseline development schedule.

Contract N00030-81-C-C097.

No nonseverable facilities are being provided on property not owned by the government.

429

(429)

SUPPORTING NARRATIVE STATEMENT FOR DATA ACQUISITION AND REDUCTION CENTER REPLACEMENT

The Data Acquisition and Reduction Center (DARC) is located at Cape Canaveral, Florida. The primary function of this system is to perform pre-launch checkout relating to the Fleet Ballistic Missile Program. The system also assists in flight telemetry data acquisition and performs preliminary analysis. The new DARC will replace a system which was originally designed for processing of data relating to the POSEIDON (C-3) and TRIDENT I (C-4) development test programs and remains in use on the continuing Demonstration and Shakedown Operations (DASO) and Operational Test/Follow-on Operational Test (OT/FOT) programs. The old system is not capable of handling TRIDENT II (D-5) requirements. The major subsystems of this system are: graphics, computer, time share terminals, microfiche, and image processing. The Lockheed Missiles and Space Company (LMSC) is operating contractor of this facility.

The facility/equipment items are severables.

Development of the D-5 missile requires that extensive, detailed preflight checkout be performed to verify hardware subsystem compatibility and function. Before the first live development missile is prepared for flight, an inert missile equipment test vehicle is assembled and thoroughly checked out utilizing the DARC to input flight simulation conditions and record system responses. The DARC evaluates real hardware performance against expected results and seeks to interpret any discrepancies. Prior to tests being run, the DARC calibrates and checks out on-board equipment so that out-of-tolerance control sequencing, hydraulic motor pressures, voltage levels, system synchronization and other parameters are readily apparent and hardware functioning is verified. Thus, DARC serves as a system analysis design tool to identify problem areas before design options are narrowed. For Development Flight Tests (DFTs), the DARC performs the same calibration and instrumentation checkout functions prior to flight and also performs telemetry data acquisition during flight. These data are compared with system test objectives, thereby providing the initial preliminary flight data analysis. More detailed analysis is performed by the Missile Data Center (MDC) at NIROP, Sunnyvale. The more complex guidance, re-entry, propulsion, and structural systems will double the number of instrumentation references to be analyzed during both pre-launch checkout and flight. State of the art technological advancements in materials bonding, electronic miniaturization, and sequencing and control techniques to be incorporated in the D-5 require thorough and reliable system analysis. The greater weight, thrust, altitude, range and flight duration of D-5 place an added telemetry data acquisition and analysis burden upon the DARC, which it is incapable of assuming in its present configuration. This factor plus the requirement to support continuing Fleet Ballistic Missile programs necessitate this replacement. Funding of this replacement system is required as scheduled in order to allow for equipment procurement and software development in time to support initial inert missile equipment test vehicle checkout. This must be completed prior to use of the system for live flights according to the present approved D-5 baseline test program.

N00030-81-C-0097

No non-severable facilities are being provided on property not owned by the government.

430 (430)

SUPPORTING NARRATVE STATEMENT FOR TRIDENT II TEST INSTRUMENTATION SYSTEMS DEVELOPMENT
(DATA TEST AND EVALUATION CENTER)

The Test Instrumentation Systems are unique to the Fleet Ballistics Missile (FBM) program. They are necessary to evaluate weapon system accuracy, performance, reliability and range safety. The test Instrumentation Systems planned for the TRIDENT II program are: (1) Submarine Test Instrumentation, (2) Flight Test Instrumentation, and (3) Support Systems. The primary functions of the Submarine Test Instrumentation are to gather, process, display and record weapons system performance data aboard TRIDENT submarines. The Flight Instrumentation will be installed aboard surface ships and at the Eastern Space and Missile Center and Pacific Missile Test Center land sites. These systems will provide the capability to track missiles in order to verify that no land mass is endangered by a test missile and to gather and record flight test evaluation data. The functions of the Support Systems are to edit and reformat field data tapes for efficient use in general purpose data processing centers and to provide "quick-look" print outs of performance data. Because of the existing technical expertise and proven performance, Interstate Electronics Corporation (IEC) was selected as the prime contractor for the Test Instrumentations System. This project is to provide a Development, Test and Evaluation Center (DTEC) for life cycle support of structured software development for instrumentation and range safety systems and for support of system and hardware design and development. Because of the large facility investments by IEC which are dedicated to TRIDENT II (D-5) development and because the (DTEC) will be dedicated solely to TRIDENT II requirements, the contractor is unwilling to provide this facility.

The facility items furnished for this project are all severable facilities.

The DTEC will replace an existing Programming Test Station (PTS) at IEC which was installed during the POSEIDON and TRIDENT I (C-4) programs. The PTS is limited in capability and processing power and is experiencing increased maintainability and reliability problems. All units were designed during the mid 60's to mid 70's and typically are based on technology and components that are obsolete. The central processors (computers) and other system units of the PTS are no longer in commercial production. In addition, the PTS batch processing systems are inefficient for software development and support. The increased complexity and expanded test requirements of the TRIDENT II (D-5) missile are such that the PTS system cannot support the program and the age of the system is such that it cannot be expanded to support the work. The DTEC is necessary to the development of application software for the various Test Instrumentation Subsystems; development of firmware for microprocessors that are embedded in functional units; sensitivity studies involving instrumentation error models, trajectory error models and reliability models; computer aided design analysis of structural design, heat flow, digital circuits, and RF circuits; and the analysis of field data concerning Test Instrumentation performance.

Contract N00030-81-C-0097.

No nonseverable facilities are being provided on property not owned by the government.

431 (1141)

SUPPORTING NARRATIVE STATEMENT FOR TRIDENT II MISSILE DEVELOPMENT FACILITIES (UPGRADE SURFACE LAUNCH COMPLEX)

The Hunter's Point Surface Launch Test Complex (HPSLTC) in San Francisco is a facility that has been developed to accommodate developmental, environmental and reliability testing of components of the FBM launching systems. The test complex was part of the Hunter's Point Naval Shipyard before it was deactivated in 1974. The test complex area was constructed at the yard in 1945 and was used as a regunning facility for Naval Surface Combatants. The regunning pier and other facilities were retained by the Naval Sea Systems Command (NAVSEA) upon deactivation of the yard. In 1957 the Strategic Systems Projects Office (SSPO) established the test complex to support POLARIS Missile and launcher development requirements. SSPO has an agreement with NAVSEA for exclusive use of the land and facilities within the test complex. Under this agreement, the maintenance and repair of existing facilities and the construction of new facilities within the test complex is the responsibility of SSPO.

Considering the large expenditure of funds required to retain existing capability at Hunter's Point and to construct facilities for TRIDENT II requirements, serious consideration was given to relocating this test effort to another site. However, the already overcrowded conditions at other sites, the explosive safety and environmental impacts, and the cost considerations have resulted in the selection of HPSLTC for launcher systems testing.

The existing technical expertise and proven performance has resulted in the selection of Westinghouse Electric Corporation (WEC) for launch subsystem development. WEC is the operating contractor at HPSLTC, and is the vehicle for capital maintenance and improvement of the test complex.

The complex must be upgraded to meet the needs of TRIDENT II development. A Data Acquisition Systems (DAS), an arrestment system, a number of operations buildings, a launch pad, and the sky catch system must be modified. In some cases new facilities must be provided.

All the project items covered by this report are non-severable.

Maximum use will be made of existing facilities. The TRIDENT II Missile, however, will be larger, heavier, and more complex than previous vehicles. More complex testing, monitoring, analysis, manufacturing, and handling equipment will be necessary. The arrestment, handling, launch pad, and a number of building

4/32

(1/32)

requirements are related to increased size. The more complex testing and monitoring make a new DAS and some new buildings necessary. The current DAS system is a patchwork of equipment which has neither the capacity nor reliability to meet the advance missile development requirements. A new building is required to house this system.

Navy contract N00030-81-C-0097

No nonseverable facilities are being provided on property not owned by the government.

433

(433)

SUPPORTING NARRATIVE STATEMENT FOR TRIDENT II (D-5) FIRE CONTROL FACILITIES (ENGINEERING TEST SYSTEM TEST BERTH MODIFICATIONS)

The primary Fleet Ballistic Missile (FBM) Fire Control development, production, and test facilities are located at the Naval Industrial Reserve Ordnance Plant (NIROP), Pittsfield, Massachusetts. General Electric Company, Ordnance Systems Division (GEOS) has been operating contractor of this facility since it was built in World War II, and has been active in the FBM Program there since the late fifties. GEOS is now tasked by the Navy to develop the fire control systems needed to operate the TRIDENT II (D-5) missile on both existing POSEIDON and TRIDENT submarines. The facilities discussed in this project are those identified as necessary for the performance of this development effort but which GEOS is unwilling to procure with corporate funds. These equipment items will provide the thorough and accurate test capabilities needed for timely and cost beneficial development of fire control systems which incorporate the latest "state of the art" electronics advancements. The items provided will provide for: circuit and sequential functional testing of memory modules (semiconductor random access memories, read only memories); testing of digital/logic modules for function, DC parameter performance in sequence or combination, high/low limit testing, time dependent interval and sychronization testing, programmable on magnetic tape; Motor Generator Sets which supply power to various engineering test stations and trainer stations for component and complete system development checkout and shipboard simulation; subsystem level design option testing of control and display, test and keyboard subsystems by simulating system operation and driving prototype display panels both prior to and during the test berth design phase; measuring and recording EMI of radiated or conducted emissions and radiated susceptibility in accordance wth Mil-Stds of the various switching power supplies, inverters, power display devices within the fire control system and in the submarine; environment to insure self and ship compatibility; simulation during development Standard Hardware Program and PROM modules which will control fire control system computer input and output, will save development time and dollars by simulating module functions rather than continually modifying and using actual modules during design phase.

The required facilities are all severable.

The design parameters set for the TRIDENT II (D-5) missile and submarine systems (greater number of missiles, range, accuracy, reentry functions, and survivability) place more demands upon the fire control system than have previous systems. The fire control system and its components must function efficiently if TRIDENT is to fulfill its basic objective of deterrence. GEOS will define the interfaces between the fire control system and its components, the missile test and readiness equipment, the missile guidance and reentry systems, and the shipboard navigation and launcher systems. Later development efforts will require GEOS to plan configuration and reliability management, support equipment, repair parts inventory, crew training, and shipboard installation plans. The fire control system must receive data input from the other systems concerning location, time, motion, flight readiness and perform computations which provide hardware checkout and targeting set data to the other systems in both the test and tactical operational sequences. Development efforts must define the basic functional parameters under which the fire control's major subsystem components -- TRIDENT Digital Control Computer, Magnetic Disk Files, Time of Day Subsystems, Analog to Digital Converters, Temperature Monitoring Power Supply, Master Clock and Timing Subsystems, Events Translater,

Digital Read in Subsystem, and Control Console -- will operate. These facility modifications will provide Test Berths necessary to completing fire control development.

N00030-81-C-0097

No non-severable facilities are being provided on property not owned by the government.

435

(435)

SUPPORTING NARRATIVE STATEMENT FOR TRIDENT II D-5 PROPULSION DEVELOPMENT FACILITIES
(UPGRADE NIROP MAGNA - UPGRADE AIR FORCE PLANT 78)

The primary TRIDENT II (D-5) Missile Propulsion Development Facilities are operated by the Joint Venture (JV) of Hercules Incorporated/Morton Thiokol Corporation. The Joint Venture was selected to perform full scale engineering development of the tactical design for two solid rocket motor stages of the D-5 because of their expertise in advanced cross-linked, double-based propellant technology. This technology will allow the D-5 motors to meet the high performance demands placed upon the missile system. These motor development efforts require the use of, and some additions and modifications to, existing contractor and government-owned severable and non-severable facilities at Magna, Clearfield, and Brigham City, Utah. A division of development effort functions between the Joint Venture sub-contractors has been established based upon the most cost effective allocation of available plant capabilities in order to preclude conflicts with existing NASA and DOD programs and to minimize new facilities requirements. The JV sub-contractors are investing substantial corporate capital for the severable and non-severable facilities necessary to D-5 development and needed on their own property. The facilities described by this exhibit include all the non-severable improvement required by the program at Air Force Plant 78 and NIROP operated by the contractors. Current regulations preclude authorizing a contractor to expend his funds for non-severable facilities on government property. The Navy-funded improvements to the two plants include modifications, additions, and new buildings for HMX drying and control, ingredient screening and weighing, lacquer solution preparation, cleaning, decontamination, quality analysis, explosive storage, machining, nozzle component and joint fabrication and assembly, and propellant mixing. In addition, supporting utility, fire protection and deluge, barricade, environmental control, remote control, and materials handling systems will be provided. Severable equipment includes Linatron X-Ray machines, a microspectrograph, propellent ingredient bins, machine tools, mix bowls, computer systems, and a gas chromatograph.

The approximate dollar breakdown is: (K$)

	FY1983	FY1984	FY1985
Non-severable facilities	$1,905	$10,606	$23,030
Severable facilities	442	13,430	700

The JV subcontractors are making maximum use of the existing facilities available for use on D-5 motor development, and many facilities are usable without extensive modification. The improvements described are necessary to provide the required capabilities, efficiency and explosive quantity distances which the program requires. The design parameters for D-5 (greater weight, thrust, range and reliability) have advanced the state-of-the-art in propulsion technology by development of new fuel, binder, and oxidizer ingredient combinations. These new propellant formulations have greater impulse and require greater care in processing than propellants now in production. To insure that the new propellants retain their characteristics when

436

436

subjected to full scale engineering motor development, and to facilitate safety, reliability, and lower manufacturing costs, modifications to the existing facilities to incorporate improved manufacturing and control methods are required. The changes made by this project are needed to achieve the capability to safely and repetitively blend solid and liquid explosives into consistently acceptable high energy propellant mixes.

Navy Contract N00030-81-C-0097

No non-severable facilities are being provided on property not owned by the government.

437

437.

SUPPORTING NARRATIVE STATEMENT FOR REENTRY BODY NOSE CAP DEVELOPMENT FACILITIES (UPGRADE CONTROL LINE FACILITY)

The primary TRIDENT II (D-5) Reentry Body Nose Cap Development Facilities will be operated by Union Carbide Corporation (UCC). The corporation has proprietary rights to an essential part of the fabrication process which is used in development, testing, and producing the Reentry Body Nose Cap. Union Carbide was involved in performing lab scale studies under government contract to recommend the optimum MK4 cap materials composition, process variables, and acceptance specifications. These conceptual studies on a lab scale were completed in late 1973 with Supplemental Flight Tests (SFTs) of laboratory prototype nose cap hardware for design evaluation beginning soon afterwards. UCC also was engaged in development and production of the Mark 3 Reentry Body Nose Cap used for the POSEIDON (C-3) missile. An independent dedicated facility with a tightly controlled process line was established for MK 4 production. This project created a new jointly owned contractor-operated (JOCO) plant to insure that vital C-4 program technical objectives are fulfilled. With the government providing the necessary severable and non-severable facilities, except land needed for MK 4 nose plug development and assuming the primary risk of program termination, overall MK 4 program costs were lower even though direct facilities costs were greater. The process used for fabrication of developmental nose caps will follow the sequence of raw material crushing and sizing, material mixing, molding, baking, machining, UCC proprietary impregnation, and coating, with some recycling of process stages. Tight process control and assorted destructive and non-destruction testing methods are employed throughout the sequence. The nonseverable facility items and related services required to create the new MK 4 dedicated process line will be used for the TRIDENT II (D-5) program. There will be some production equipment and an updated Data Processing analysis capability required for the TRIDENT II program.

The required items are all severable facilities.

The basic design parameters of the D-5 missile system (greater altitude, range, flight duration, temperature extremes, survivability) will place an increased demand upon reentry bodies and their noses as tactically required. It is mandatory that the extremely tight material composition and in-process fabrication specifications derived on a laboratory scale be maintained on an applied development scale. Previous experience with the nose cap process has indicated that severe technical problems will be encountered if scale-up is attempted utilizing the existing UCC commercial products processing capability. Flight test performance has been on occasion quite different from that achieved with laboratory made specimens. The dedicated facility has been designed from a size and process control standpoint specifically for MK 4 applied development and adaptable with slight modifications and additions to full scale production levels so that flight test disparities would not arise when the transition is made at some later date. The quality control parameters of grain size, temperature of grain size, temperature, pressure, percent moisture, gravimetric density, tensile strength, elongation, caloric exposure, resistivity, ash content, percent weight gain, physical billet and core size, permeability, thermal conductivity and porosity are closely monitored throughout the lengthy fabrication cycle to insure uniform compliance with specifications. Ultrasonic, X-ray and other non-destructive test methods are employed to facilitate earlier specimen rejection as necessary.

478 43

To aid in achieving consistency, safety, reliability, and to lower operational costs, the entire fabrication cycle will be highly mechanized utilizing the latest improvements in process recording, controlling and manufacturing methods. These projects are necessary to adapt the current successful process to the additional requirements of TRIDENT II (D-5).

N00030-81-C-0097

No nonseverable facilities are being provided on property not owned by the government.

439

(439)

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART II. UTILIZATION OF RDT&E APPROPRIATION FOR FACILITIES AT GOVERNMENT-OWNED/GOVERNMENT-OPERATED INSTALLATIONS

Chapter 251 of the DOD Budget Guidance Manual (which was approved by the GAO as DOD Instruction 7220.5) provides that RDT&E appropriations may finance the development, design, purchase, and installation (including directly related foundations, shielding, environmental control, weather protection, structural adjustments, utilities and access) of equipment or instrumentation required for research, development, test and evaluation activities. The table below provides a summary listing of all such projects for the installation of equipment, where the cost of installation is $100,000 or more, accomplished in FY 1982 and planned in FY 1983, FY 1984, and FY 1985.

FACILITY/EQUIPMENT	RDT&E PROJECT NUMBER	LOCATION	TOTAL OBLIGATIONAL AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
		SECTION I				
		PROJECTS ACCOMPLISHED OR UNDERWAY				
Electric Power Transfer System Bldg. 127, SNI (PMTC) 1/	W0653	Pacific Missile Test Center (San Nicolas Island) Point Mugu, CA	130	-	-	-
Air Conditioning System for CCMP/TRIDENT (PMTC) 2/	W0653	Pacific Missile Test Center Point Mugu, CA	-	490	-	-
Photo Lab, Bldg. 36 (PMTC) 2/	W0653	Pacific Missile Test Center Point Mugu, CA	-	278	-	-
Central Scientific Computer Communications Network Phase II (NATC) 1/	W0654	Naval Air Test Center Patuxent River, MD	400	-	-	-
Unabated Engine Test Facility (NATC) 1/	W0654	Naval Air Test Center Patuxent River, MD	120	-	-	-

440

(440)

FACILITY/EQUIPMENT	RDT&E PROJECT NUMBER	LOCATION	TOTAL OBLIGATIONAL AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
Uninterruptible Power Supply Computer Services Directorate (NATC) 2/	W0654	Naval Air Test Center Patuxent River, MD	-	330	-	-
Emergency Generator Range Control Center Bldg. 31455, (NWC) 2/	W0657	Naval Weapons Center China Lake, CA	-	105	-	-
Hydroshaker Installation (NWC) 1/	W0657	Naval Weapons Center China Lake, CA	-	150	-	-
600 HP Variable Speed Drive (NAPC) 2/	W0655	Naval Air Propulsion Center Trenton, NJ	-	200	-	-
Refrigeration System for Cruise Missile (NAPC) 1/	W0655	Naval Air Propulsion Center Trenton, NJ	326	-	-	-
Automatic System for Starter Test Stands (NAPC) 2/	W0655	Naval Air Propulsion Center, Trenton, NJ	-	468	-	-
Plant Automation System (NAPC) 2/	W0655	Naval Air Propulsion Center, Trenton, NJ	-	383	-	-
P-3 Facility Installation 1/	W1149	Naval Air Development Center, Warminster, PA	615	-	-	-
Install 50 Gallon Propellant Batch Mixer 1/	Z0833	Naval Weapons Center, China Lake, CA	379	-	-	-
Equipment Installation for Systems Control Lab 2/	Z0833	Naval Surface Weapons Center, Dahlgren, VA	305	-	-	-

441

(441)

FACILITY/EQUIPMENT	RDT&E PROJECT NUMBER	LOCATION	TOTAL OBLIGATION AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
Install CDC 6000 Computer 1/	Z0833	David W. Taylor NavShip R&D Center, Bethesda, MD	152	-	-	-
Install Computer Aided Design and Drafting Equipment 1/	Z0833	Naval Surface Weapons Ctr., Dahlgren, VA	275	-	-	-
Install Central Computer System Bldgs 107 & 1176 1/	Z0833	Naval Underwater Systems Center, Newport, RI	233	-	-	-
Install Central Computer System Bldg. 80 (NL) 1/	Z0833	Naval Underwater Systems Center, New London, CT	102	-	-	-
Install Integrated Circuit Equipment, Bldg. 560 2/	Z1457	Naval Ocean Systems Ctr., San Diego, CA	813	-	-	-
Install Anechoic Chamber, HARM Test Facility 2/	W0553	Naval Weapons Ctr., China Lake, CA	112	-	-	-
Install Environmental Conditioning & Electrical Power Lauritsen Lab 2/	Z1457	Naval Weapons Center, China Lake, CA	103	-	-	-
Install Electronic Warfare Systems Laboratory, Bldg. 37 2/	X0770	Naval Underwater Systems Center, Newport, RI	137	-	-	-
TRIDENT Submarine Land Based Evaluation Facility 1/	B0004-SB	Naval Underwater Systems Center, Newport, RI	335	365	440	440
Shielded Anechoic Chamber Installation and Special Laboratories, Bldg. 210C (MILCON P-080) 1/	R0137	Naval Research Laboratory, Washington, DC	1,158	-	-	-

442

(442)

FACILITY/EQUIPMENT	RDT&E PROJECT NUMBER	LOCATION	TOTAL OBLIGATION AUTHORITY ($ in thousands) FY 1982	FY 1983	FY 1984	FY 1985
Shielded Anechoic Chamber Installation and Special Laboratories, BLDG 210A (MILCON P-280) 1/	R0137	Naval Research Laboratory, Washington, DC	2,395	-	-	-
Central Target Simulation Facility Installation Bldg. 210B 1/	R0137	Naval Research Laboratory, Washington, DC	755	270	-	-
National High Energy Laser Systems Test Facility/High Power Optical Train; SEA LITE Beam Director; Mid-Infrared Advanced Chemical Laser 2/	F35-346	White Sands Missile Range, NM	1,900	7,500	4,000	-
SECTION II						
PROJECTS PLANNED OR PROJECTED						
Building Addition for ELF Message Input Segment 2/	X0792	K.I., Sawyer AFB, MI	-	-	175	-
TOTAL, PART II			$10,745	$10,539	$4,615	$440

1/ Previously listed in RDT&E Justification of Estimates for FY 1983
2/ Initial Listing

443

SUPPORTING NARRATIVE STATEMENT FOR THE NATIONAL HIGH ENERGY LASER SYSTEMS TEST FACILITY

(U)At The direction of Congress, the High Energy Laser Systems Test Facility (HELSTF) is bei established as a national test range capable of supporting Army, Navy and Air Force tests of high energy las systems. Title IV Military Construction, Defense Funds have been appropriated for this purpose. The Navy planned program, code name SEA LITE, will culminate with [tests] During SEA LITE, the experimental equipments developed under P.E. 62735N will be exercised against realist targets and scenarios; the results of these demonstrations are expected to show the feasibility of ship base High Energy Laser Weapons. These experimental equipments will have been fabricated and tested at t contractors' facilities prior to their shipment and installation at the HELSTF. The installation cos summarized above support the requirement to relocate and install the equipment at the test site. No oth facilities capable of handling the SEA LITE program exist. The activities being addressed are solely rela to the relocation and installation of experimental test equipments to allow their being tested in a realis environment unavailable elsewhere. None of the equipment is intended for permanent installation over service life of the facility.

444

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART III. UTILIZATION OF RDT&E APPROPRIATION FOR MINOR CONSTRUCTION

For in-house installations, construction projects in support of R&D for $100,000 or less are funded from the RDT&E appropriation. Such expenditures are authorized by 10 USC 2674 and the applicable provisions of the current DOD Appropriation Act. Under this procedure, project approval at this level is authorized by the Major Command concerned, or delegated to R&D installation commanders as appropriate. The table below provides a summary total of such minor construction accomplished in FY 1982 and the estimated amounts planned for FY 1983, FY 1984, and FY 1985. All minor construction must result in a complete and useable facility. In no event are two or more minor construction projects or minor and major construction projects to be contrived to form a useable facility.

SUMMARY OF MINOR CONSTRUCTION FUNDED BY RDT&E, NAVY
($ in thousands)

	FY 1982	FY 1983	FY 1984	FY 1985
TOTAL, Part III	$ 5,540	$ 5,714	$ 5,456	$ 3,943
GRAND TOTAL*	$19,182	$30,882	$68,706	$60,925

* Major Improvements to, and Construction of Government-Owned Facilities funded by Research, Development, Test and Evaluation

445

NAVY	FY 19 83 MILITARY CONSTRUCTION PROJECT DATA	2. DATE Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Enhanced Modular Signal Processor (EMSP) Software Engineering Facility (SEF)	Enhanced Modular Signal Processor

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
64507 N		S01440	$1,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
EMSP SEF				
Western Electric		1	500	500
"First User"		1	500	500
TOTAL				1,000

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Provide computer equipment to develop, test, and debug software for the Enhanced Modular Signal Processor. The computer will be installed in existing buildings.

11. REQUIREMENT: 1,000 ADEQUATE: 1,000 SUBSTANDARD: 500
PROJECT: This 1391 project documentation is submitted as an addendum to the FY 83 RDT&E budget request under the auspices of Title 10 USC 2353 with regard to using RDT&E funds for construction purposes. Provide computer facilities for developer, validator, and user; so that run-time software may be developed, tested, debugged, and loaded on EMSP.

REQUIREMENT: Provide new facilities to support the development and use of EMSP.
CURRENT SITUATION: New Start, facilities nonexistent.

IMPACT IF NOT PROVIDED: Navy will not make IOC as directed by the President.

24

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO.

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NIROP Sunnyvale Sunnyvale, CA	Civil Works in Support of TRIDENT II (D-5) Developement

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63371N		B0951	$1,791

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Civil Works to Support Equipment installation				1,698
NAVFAC				93
				1.791
Equipment (non-add)				(4,246)
				6,037

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide modifications and construction necessary for installation of various items of equipment.

Requirement: Development and manfacturing of the TRIDENT II (D-5) missile.

Current Situation: Current equipment does not have the capacity to handle the larger parts required for the increased size and complexity of the D-5 missile.

Impact If not Provided: Development and production of the D-5 missile will not be possible.

Pollution Prevention, Abatement & Controls: No additional air and water pollution is anticipated.

Flood Plain Management and Protection of Wetlands: Not Applicable

25

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION
NIROP Sunnyvale
Sunnyvale, CA.

4. PROJECT TITLE	5. PROJECT NUMBER
Civil Works in Support of TRIDENT II (D-5) Development	B0951

Environmental Impact: No environmental impact is generated by these projects.

International Balance of Payments Procedures: Not applicable

Preservation of Historical Sites and Structures: Not applicable

Design for Accessibility of Physically Handicapped Personnel: Provisions for the physically handicapped are incorporated where applicable.

Justification for Project: This project is needed to provide capability for the increased size and complexity of the TRIDENT II (D-5) missile.

26

DD FORM 1 DEC 76 1391c

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

PAGE NO.

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Hunter's Point Test Complex San Francisco, CA	Civil Works in Support of Trident II (D-5) Development

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63371N		B0951	$4,917

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Buildings				$2,207
Launch Pad Construction				231
Handling Systems Modifications				1,777
Hoist Proof Foundation				54
Sky Catch System Modification				392
				4,661
NAVFAC SIOH 5.5%				256
				$4,917

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide buildings and facilities necessary for missile and launcher surface testing to support development, reliability, environmental, and qualification requirements of the TRIDENT II (D-5) missile program.

Requirement: Development and manufacturing of the TRIDENT II (D-5) missile.

Current Situation: Current facilities do not have the capacity to handle the larger parts required for the increased size and complexity of the D-5 missile.

Impact If not Provided: Development and production of the D-5 missile will not be possible.

Pollution Prevention, Abatement, and Control: No additional air and water pollution is anticipated.

Flood Plain Management and Protection of Wetlands: Not applicable.

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
		Dec 1982

3. INSTALLATION AND LOCATION
Hunters Point Surface Launch Test Complex
San Francisco, CA

4. PROJECT TITLE	5. PROJECT NUMBER
Civil Works in Support of TRIDENT II (D-5) Development	B0951

Environmental Impacts: No environmental impact is generated by these projects.

International Balance of Payments Procedures: Not applicable

Preservation of Historical Sites and Structures: Not Applicable

Design for Accessibility of Physically Handicapped Personnel:
Provisions for the physically handicapped are incorporated where applicable.

Justification for Project: This project is needed to provide capability for the increased size and complexity of the TRIDENT II (D-5) missile.

DD FORM 1 DEC 76 1391c PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NIROP Pittsfield Pittsfield, Mass.	Civil Works in Support of TRIDENT II (D-5) Development

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63371N		B0951	$1,118

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Engineering Test System Test Berth Modifications				$1,060
NAVFAC SIOH 5.5%				58
				$ 1,118

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide production and testing capability for the Fire Control System. It is necessary for TRIDENT II missile development and production.

Requirement: Test Berths are used in the manufacturing and testing of the TRIDENT II missile Fire Control System.

29

DD FORM 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION

NIROP Pittsfield
Pittsfield, Mass.

4. PROJECT TITLE	5. PROJECT NUMBER
Civil Works in Support of TRIDENT II (D-5) Development	B0951

Current Situation: The existing test berths do not have the capacity to handle the requirements of the TRIDENT II missile.

Impact If not Provided: Development and production of the TRIDENT II missile would not be possible.

Pollution Prevention, Abatement & Control: No additional air and water pollution is anticipated.

Floodplain Management and Protection of Wetlands: Not applicable

Environmental Impact: No environmental impact is generated by these projects

International Balance of Payments Procedures: Not applicable

Preservation of Historical Sites and Structures: Not applicable

Design for Accessibility of Physically Handicapped Personnel: Provisions for the physically handicapped are incorporated in this facility..

Justification for Project: This project is needed to provide capability for the increased size and complexity of the TRIDENT II (D-5) missile.

30

(2) H

254

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 82

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NIROP Magna, UT	Civil Works in Support of TRIDENT II (D-5) Development

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63371N		B0951	$1,035

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Advanced NDT/Instrumentation Development Facility Modifications				$609
Security Modifications				372
				$981
NAVFAC SIOH 5.5%				54
				$1,035
(The balance of obligation authority listed below in the RD4 exhibit is for severable equipment unrelated to this civil works project.)				($14,203)
				($15,238)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide modification necessary for missile propulsion development, manufacturing and testing for the TRIDENT II (D-5) missile.

Requirement: Development and manufacturing of the TRIDENT II (D-5) missile.

Current Situation: Current facilities are not adequate to handle the work load generated or the larger size and increased complexity of the D-5 missile.

Impact If Not Provided: Development and production of the D-5 missile will not be possible.

Pollution Prevention, Abatement, and Control: No additional air and water pollution is anticipated.

Flood Plain Management and Protection of Wetlands: Not applicable

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	
NIROP, Magna, UT	
4. PROJECT TITLE Civil Works in Support of TRIDENT II (D-5) Development	5. PROJECT NUMBER B0951

Environmental Impact: No environmental impact is generated by these projects

International Balance of Payments Procedures: Not Applicable

Preservation of Historical Sites and Structures: Not Applicable

Design for Accessibility of Phsically Handicapped Personnel: Provisions for the physically handicapped are incorporated where applicable.

Justification for Project: This project is needed to provide capability for the work load generated and the increased size and complexity of the TRIDENT II (D-5) missile.

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Air Force Plant 78 Brigham City, UT	Civil Works in Support of Trident II (D-5) Development

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63371N		B0951	$4,838

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Binder Premix Building				$2,303
HMX Bin Storage Building				1,046
Production Control/Quality Control Building Addition				1,046
Building Barricade				189
				$4,586
NAVFAC SIOM 5.5%				252
				$4,838
(The balance of obligation authority listed in the RD4 exhibit is for severable equipment unrelated to this civil works project)				($4,960)
				$8,798

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide modifications necessary for missile propulsion development, manufacturing and testing the TRIDENT II(D-5) missile.

Requirement: Development and manufacturing of the TRIDENT II (D-5) missile.

Current Situation: Current facilities are not adequate to handle the work load generated or the larger size increased complexity of the D-5 missile.

Impact If Not Provided: Developments and production of the D-5 missile will not be possible.

Pollution Prevention, Abatement and Control: No additional air and water pollution is anticipated.

Flood Plain Management and Protection of Wetlands: Not applicable.

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 82

3. INSTALLATION AND LOCATION
Air Force Plant 78
Brigham City, Utah

4. PROJECT TITLE	5. PROJECT NUMBER
Civil Works in Support of TRIDENT II (D-5) Development	B0951

Environmental Impact: No environmental impact is generated by these projects

International Balance of Payments Procedures: Not Applicable

Preservation of Historical Sites and Structures: Not Applicable

Design for Accessibility of Physically Handicapped Personnel: Provisions for the physically handicapped are incorporated where applicable.

Justification for Project: This project is needed to provide for the work load generated and the increased size and complexity of the TRIDENT II (D-5) missile.

1. COMPONENT	FY 1983 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Pacific Missile Test Center Point Mugu	Air Conditioning System for CCMP/TRIDENT

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	310.33	W0653	490

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Air conditioning and humidity control back-up system	TON	97.4		490

10. DESCRIPTION OF PROPOSED CONSTRUCTION

The Computer Centralization and Modernization Program (CCMP) located in building 53C provides support for all Range Directorate users.

The operation of this computer equipment requires specific environmental back-up systems for uninterrupted service. The existing air conditioning system cannot maintain the required temperature without raising the dew point to the critical equipment shutdown temperature.

This project will assure uninterrupted computer operation.

35

457

(457)

DD FORM 1 DEC 76 1391

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

PAGE NO.

S/N 0102 LF-001-3910

1. COMPONENT	FY 19 85 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Pacific Missile Test Center Point Mugu, CA	Repairs, Equipment Installation & Alterations for Photo Bldg. 36

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	141-60	W0653	*278

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Photo Lab Repairs, Equipment Installation and Alterations for Bldg. 36	EA	1	--	278

36

(85)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Due to the increasing demands on photographic services, and the severe deterioration of the space occupied by the photographic facility in Building 36, the committed workload cannot be met. The present plan layout is fragmented causing unnecessary delays in productivity; the ventilation system does not meet minimum code requirements; toxic fumes emanating from chemicals cause hazardous work environment; and fluorescent light fixtures are mounted directly to very high ceilings, resulting in a diminished light intensity at the working level.

The solution to these deficiencies is to rearrange unsuitable functional areas so as to create a smooth work flow. This will significantly increase efficiency. The installation of new photographic equipment will enhance productivity. To support this equipment (and equipment on hand to be relocated), the required utilities will be installed and/or re-routed; abandoned utilities will be removed. Structural supports to elevate equipment above the existing floor slab to meet the level of raised flooring will be provided. Furred ceilings are included to limit the volume of space for conditioned air, and to lower the position of fluorescent light fixtures for improved light intensity. Modifications will be made to the ventilating system for more positive air exchanges and to dissipate noxious fumes. To accommodate female personnel, lockers, toilets toilet/shower facilities will be provided.

*Combination Project: Total Project Includes: Repair - $421 Construction - $171; Equipment Installation $278 TOTAL: $870

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO.

1. COMPONENT	FY 19 83 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Air Test Center Patuxent River, MD	Install Uninterruptible Power Supply, Computer Services Directorate

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	310-33	W0654	330

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Install uninterruptible power supply for the computer services directorate. Provide battery operated system to allow for a 15 minute continuous operation.	EA	1	--	330

10. DESCRIPTION OF PROPOSED CONSTRUCTION

The Naval Air Test Center Computer Services Directorate provides support for a wide range of important test and evaluation projects. This project provides for the installation of an uninterruptible power supply system which will supply uninterrupted power to allow continuous operation of computer equipment. No current system exists and power outages and power line disturbances cause expensive downtime and frequently includes damage to computer equipment.

37

4579

(454)

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO.

S/N 0102-LF-001-3910

1. COMPONENT	FY 19 83 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Weapons Center China Lake, CA 93555	Emergency Generator, Range Control Center Bldg. No. 31455

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	319-40	W0657	105

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Install 750 KVA Generator (Diesel Driven)	LS	--	--	105

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Installs a 750 KVA generator (diesel driven), concrete equipment pad, conduit and wiring to existing electrical service at Range Control Center.

Range Control Center is presently without a backup power supply for computer systems. During a power outage without emergency power available, a range test cannot be safely completed or terminated. In addition, slippage of tests will result in associated cost increases.

38

460

(1460)

DD FORM 1 DEC 76 1391

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

PAGE NO.

S/N 0102 LF-001-3910

1. COMPONENT	FY 19 83 MILITARY CONSTRUCTION PROJECT DATA	Dec 82
NAVY		

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Air Propulsion Center Trenton, NJ	Install 600 HP Variable Speed Drive

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	318-10	W0655	200

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Install 600 HP Variable Speed Drive	EA	1	--	200

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will provide the capability, in the Fuel Systems Test Facility, to perform closed-loop bench testing of all complete current and future fuel control and delivery systems.

39

194

194

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO.

S/N 0102-LF-001-3910

1. COMPONENT	FY 19 83 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Air Propulsion Center Trenton, NJ	Automatic System for Starter Test Stands

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65864N	318-10	W0655	468

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Automation Systems for Starter Test Stands in Rooms "A" and "B" of ATA installation Replacement Dynamometer for "B" Room.	EA	1	--	458

10. DESCRIPTION OF PROPOSED CONSTRUCTION

The test stands in Rooms "A" and "B" of the Accessory Test Area (ATA) are manually operated and monitored by test mechanics. This project will provide an automated control/data system in each of the rooms and, after both control/data systems become operational, make one ATA mechanic available for other assignments. The current dynamometer in use in Room "B" is a 1930 vintage design which utilized vacuum-tube technology. Although upgraded recently with solid-state devices, this unit is getting harder to maintain due to the nonavailability of parts and knowledgeable maintenance personnel. A new universal-type dynamometer that has the capability of being programmed for automatic cycling and that can reduce energy requirements will be purchased.

40

462

S/N 0102 LF 001-3010

1. COMPONENT	FY 1982 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Surface Weapons Center Dahlgren, VA	Equipment Installation for Systems Control Lab

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65862N	315-15	Z0833	$305

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Equipment Installation for Systems Control Lab				305

10. DESCRIPTION OF PROPOSED CONSTRUCTION

NSWC is the principal Navy lab for RDT&E in surface warfare. The Systems Control Lab will be testing for suitability of the computer systems for shipboard use and for conformance with design requirements. This project provides for equipment installation for the Systems Control Laboratory.

The Systems Control Lab will be installed in the existing high bay of Building 1500.

A shielded room with raised access floor and reflected ceiling will be installed for the computers and supported by a new system of steel beams and columns. The existing office will be enlarged to provide for a mechanical room to service computers in the shielded area with a demineralized water system. A complete CO_2 fire suppressant system with smoke and heat detectors for the equipment will be installed. The lab is designed for easy installation and removal of computer systems because it will be necessary to adapt and reconfigure this lab to meet several combat systems engineering programs.

1. COMPONENT	FY 1982 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Ocean Systems Center San Diego, CA	Install New Integrated Circuit Equipment in Bldg. 560

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65872N	317-20	Z1457	813

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Site Demolition				22
Concrete, Slab, Footings, Roof				17
Structural Steel				26
Insulation, Roofing, Flashings				13
Doors, Windows, Glass				32
Arch. Finishes				55
Mechanical, Heat Pump, Scrubber, etc.				220
Process Equip. Piping				263
Other				44
Electrical				68
Fire Protection				11
				771
5.5% SIOH				42
				813
Equipment Installed - $3.5M				

10. DESCRIPTION OF PROPOSED CONSTRUCTION

This project will install an improved large scale integrated circuit (LSI) wafer processing facility in the existing Micro-Electronics Laboratory, Bldg. 560. The installation of the 4-inch silicon wafer line will enable NOSC to maintain technical parity with the mainstream processes of industry and to utilize the output and technical exchange potential from DOD Very High Speed Integrated Circuits (VHSIC) Program.

42

DD FORM 1 DEC 76 1391

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

PAGE NO

1 COMPONENT	FY 1982 MILITARY CONSTRUCTION PROJECT DATA	2 DATE
Navy		Dec 1982

3 INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Weapons Center China Lake, California 93555	Inst. Anechoic Chamber, Harm Test Facility, Bldg. No. 31418

5 PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
64360	312-10	WO553	112

9 COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
*Equipment Installation				
Architectural/Civil work				
Excavation and slab removal	LS	—	—	8
New concrete	LS	—	—	14
Mechanical Work				
Air conditioning incl. ductwork	LS	—	—	38
Sprinkler system	LS	—	—	15
Electrical work total	LS	—	—	37
TOTAL				112

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Project provides the necessary space and utilities for the installation of a wide band anechoic chamber with associated test gear to support the High Speed Anti-Radiation Missile (HARM) Program.

Equipment provides in-house test evaluation capability for HARM seeker and Control Section Missile components. Facility will be used to test HARM second source components, evaluate engineering change proposals, performance verification testing, product improvement studies, production fleet support, follow-on test and evaluation (FOT & E) and simulation studies.

*Combination Project: Total project includes
(a) Alterations - 26
(b) Minor Construction - 2
(c) Equipment Installation - 112

Total 140

43

4165

(4165)

1. COMPONENT	FY 19 82 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
Navy		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
Naval Weapons Center China Lake, California 93555	Inst. Envir. Cond. and Elec. Power, Lauritsen Lab, Bldg. 01400

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
65872	310-33	Z1457	103

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
*Equipment Installation				
Architectural work				
Cut and seal openings in concrete block	LS	—	—	12
Prepare and install raised floor	LS	—	—	18
Concrete equipment slab	LS	—	—	4
Mechanical work				
Air conditioning units with ductwork	LS	—	—	47
Halon fire protection	LS	—	—	4
Electrical work total	LS	—	—	18
TOTAL				103

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Project provides computer facility space through alterations, installation of environmental conditioning and electrical power to existing rooms A-76 and A-77 in Lauritsen Laboratory, Bldg. No. 01400.

Installed computer equipment will provide a target recognition laboratory used to develop automatic target classification systems for air-to-air, air-to-surface and air-to-ground targeting. In addition, it provides critically needed two-dimensional signal processing and classification capability which is presently non-existent at the Naval Weapons Center.

*Combination project: Total project includes
(a) Alterations - 16
(b) Equipment installation - 103

Total 119

44

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO

1. COMPONENT	FY 19 82 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NAVAL UNDERWATER SYSTEMS CENTER NEWPORT LABORATORY, NEWPORT, RI	INSTALL ELECTRONIC WARFARE SYSTEMS LABORATORY, BLDG. 37

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
63522N	310-33	X0770	137

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Install Shielded Enclosure with Doors	SF	610	40.25	25
Install GFE Raised Flooring	SF	2,750	1.15	3
Environmental Control	LS	--	--	61
Fire Protection CO_2	LS	--	--	11
Plumbing/Ventilation	LS	--	--	3
Electrical	LS	--	--	34
				137

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Provides for the installation of all necessary raised flooring, environmental control, fire protection, special electrical distribution system and shielding required to provide on facility which will support NUSC's ongoing submarine electronic warfare programs in which the ability to work at the secret compartmented information (SCI) level required to fully discharge NUSC's responsibility for the next generation submarine electronic warfare support measures (ESM) systems.

DD FORM 1 DEC 76 1391 PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED PAGE NO

1. COMPONENT	FY 19_84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NAVAL UNDERWATER SYSTEMS CTR, NPT, RI.	TRIDENT SUBMARINE LAND BASE EVALUATION FACILITY (LBEF)

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
11228N		B0004-SB	440

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
TRIDENT SUBMARINE LAND BASED EVALUATION FACILITY				
Reroute and rebalance air conditioning			210	
Reroute cable trap			100	
Relocate bulkheads & change room configuration			110	
Relocate equipment cooling (pure water, etc.)			20	
TOTAL				440
Non-add equipment costs				(1980)
* Trainer Unique S/W Maintenance Capability		Various	Various	
* TRIDENT Support Complex Updates				

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Modifications to the Land Based Evaluation Facility (LBEF) and development Labs - Defensive Weapons System (DWS) Maintenance Lab, Data Processing Equipment Lab and the Monitor Subsystem Lab. This requires foundation installation, ventilation restructuring, implementation and installation of environmental controls. This includes the redesign, installation and check-out of equipments and systems within the labs.

11. Requirement:

PROJECT: The TRIDENT submarine Land Based Evaluation Facility (LBEF) is being used for system level testing and software certification for the TRIDENT Command and Control System.

REQUIREMENT: As the Defensive Weapons System (DWS) and Monitoring and other subsystems are modified within the Command and Control System, the Land Based Evaluation Facility (LBEF) and developmental labs must be changed to reflect the updates. Concurrent with any changes to a subsystem, the computer program must be reviewed and modified to assure that the hardware/software is compatible with the revised subsystem configuration. This in turn requires the equipment in the laboratory to be modified to the latest configuration.

IMPACT IF NOT PROVIDED: Unless modifications are made to the LBEF and associated labs, the TRIDENT CCS cannot be tested or integrated prior to delivery to the shipbuilder resulting in additional shipyard costs.

DD FORM 1391

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 82

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
HIGH ENERGY LASER SYSTEM TEST FACILITY WHITE SANDS MISSILE RANGE, NEW MEXICO	HIGH ENERGY LASER TECHNOLOGY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
62735N		F 35-346	4,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Installation of High Power Optical Train; SEA LITE Beam Director; Mid-Infrared Advanced Chemical Laser				4,000
Total Request				4,000

10. DESCRIPTION OF PROPOSED CONSTRUCTION

The equipments shown above are to be installed at the Congressionally-directed MILCON-funded High Energy Laser Systems Test Facility (HELSTF) at White Sands Missile Range, New Mexico. The installation costs support the requirement to relocate those systems from the fabricating contractors' facilities and install them at the test site. These equipments will be tested at the HELSTF in a realistic environment unavailable elsewhere, but are not intended for permanent installation over the service life of the facility.

DD FORM 1 DEC 76 1391

PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED

1. COST CENTER	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
EXTREMELY LOW FREQUENCY COMMUNICATIONS FACILITY (ELF TRANSFAC) K.I. SAWYER AFB, GWINN, MICH.	BUILDING ADDITION FOR ELF MESSAGE INPUT SEGMENT

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
11401N	131-20	EC1-83 (X0792)	175

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
Construct Building Addition for ELF Message Input Segment	SF	1,900	80	152
CONTINGENCY (5%)	--	-----	--	8
TOTAL CONTRACT COSTS	--	-----	--	160
DESIGN COST	--	-----	--	10
SUPERVISION, INSPECTION & OVERHEAD (3%) . .	--	-----	--	5
TOTAL REQUEST	--	-----	--	175
TOTAL REQUEST (ROUNDED)	--	-----	--	175
SUPPORT EQUIPMENT (NON-ADD)				(300)

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Construct single story concrete block addition on Bldg 726 for use as a Message Input Segment (MIS). Project design must include provisions for new electronic equipment to be procured and installed with other appropriations. In accordance with NAVMATINST 5430.21C development of a BESEP by NAVELEX may be required.

11. REQUIREMENT: 1900 SF, ADEQUATE: -0-SF, SUBSTANDARD: -0-SF.
PROJECT: This DD 1391 project documentation is submitted as an addendum to the FY84 RDT&E budget request under the auspices of Title 10 USC 2353 with regard to using RDT&E funds for construction purposes. Provides a facility to validate characteristics of newly developed ELF RDT&E equipment. Equipment is scheduled for delivery in Oct. 1984.

REQUIREMENT: Facilities at K. I. Sawyer AFB are necessary in order to support the message input equipment for the ELF Communication System. The MIS is the planned control point for the ELF Communication System and would be utilized in conjunction with existing communications equipment available thru the 410 SAC BMW command post.

CURRENT SITUATION: The Presidential decision expressed in the 8 October 1981 letter authorizes the construction of a small operational ELF system and the CNO requirements letter, Ser 941/5343153, of 17 December 1981 defines performance characteristics of this system. The currently installed system at WTF does not meet the operational specifications nor the desired capabilities. In order to prove the system performance and confirm design, the RDT&E configuration must reflect

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		Dec 1982

3. INSTALLATION AND LOCATION
EXTREMELY LOW FREQUENCY COMMUNICATIONS FACILITY (ELF TRANSFAC)
K. I. SAWYER AFB, GWINN, MICHIGAN

4. PROJECT TITLE	5. PROJECT NUMBER
BUILDING ADDITION FOR ELF MESSAGE INPUT SEGMENT	EC1-83 (X0792)

CURRENT SITUATION (continued)

an operational system. There are no facilities in the command post at K. I. Sawyer AFB which can be utilized for the installation of this equipment.

IMPACT IF NOT PROVIDED: NAVY will not meet an IOC of 1 Oct 1985 as directed by the President.

ADDITIONAL: This documentation is forwarded as an FY-84 budget addendum for use of RDT&E funds for construction under the auspices of Title 10 USC 2353 rather than as a request for MILCON funding. The construction effort contained herein is a valid use of RDT&E funds. Construction is being accomplished separately from the FY-84 MILCON Proj. P001 because of physical site separation and different equipment delivery dates.