FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: June 2001

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603782N
PROGRAM ELEMENT TITLE: Mine and Expeditionary Warfare Advanced Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R2917 Mine and Expeditionary Warfare Advanced Technology	**	**	48,279
R2226 Shallow Water MCM Demos	48,294	45,200	0
R2720 Ocean Modeling Mine/Su	8,783	2,972	0
TOTAL	57,077	48,172	48,279

** The Science and Technology Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 & 2001 was funded in PE(s) 0603782N, 0603792N.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Navy program element (PE) demonstrates technologies for naval Mine Countermeasures (MCM), U.S. Naval sea mines, Naval Special Warfare, and Department of Defense (DOD) Explosive Ordnance Disposal (EOD). It is strongly aligned with the Joint Chiefs of Staff Joint Warfighting Capabilities through the demonstration of technologies to achieve military objectives (Power Projection from the Sea) with minimal casualties and collateral damage. The PE supports the Joint Littoral Warfare Mission Area by demonstrating technologies that will provide the Naval Force with the capability to dominate the battlespace, project power from the sea, and support forces ashore with particular emphasis on rapid MCM operations. The MCM component concentrates on the development and demonstration of technologies for organic mine countermeasures and Future Naval Capabilities supporting Ship to Objective Maneuver. These include technologies for clandestine minefield surveillance and reconnaissance, organic self-protection, organic minehunting, neutralization/breaching and clearance. The sea mining component emphasizes offensive sea mining capabilities. Emphasis is on development of fieldable prototypes, components and systems necessary to demonstrate and validate concepts and techniques previously developed in 6.1 and 6.2 or developed and suggested by industry/academia.

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(U)MCM Technology: Third-world nations have the capability to procure, stockpile and rapidly deploy all types of naval mines, including new generation mines having sophisticated performance characteristics, throughout the littoral battlespace. “Desert Storm” demonstrated the U.S. Navy’s needs to counter the projected third world mine threat. Advanced technologies are required to rapidly detect and neutralize all mine types, from deep water through the beach.

(U) This research directly supports the Department of Defense Joint Warfighting Science and Technology Plan and the Defense Technology Area Plans.

(U) The Navy Science and Technology program includes projects that focus on or have attributes that enhance the affordability of warfighting systems.

(U) Due to the number of efforts in this PE, the programs are representative of the work included in this PE.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the ADVANCED TECHNOLOGY DEVELOPMENT Budget Activity because it encompasses design development, simulation, or experimental testing of prototype hardware to validate technological feasibility and concept of operations and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

(U) PROGRAM CHANGE FOR TOTAL PE:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget	57,393	45,618	48,300
Appropriated Value:			
Adjustments from FY 2001 President's Budget:			
SBIR/STTR Transfer	-739		
Execution Adjustment	+653		
Congressional Plus-up		+3,000	
Federal Technology Transfer	-5		
Congressional Recission	-225	-446	
Non-Pay Inflation			+44

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603782N
PROGRAM ELEMENT TITLE: Mine and Expeditionary Warfare Advanced Technology

NWCF Rates			-6
Program Adjustment			-59
FY 2002 PRESBUDG Submission	57,077	48,172	48,279

The Science and Technology Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 & 2001 was funded in PE(s) 0603782N, 0603792N.

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

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DATE: June 2001

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PROGRAM ELEMENT TITLE: Mine and Expeditionary Warfare Advanced Technology

(U) COST: (Dollars in thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROJECT NUMBER/PROJECT TITLE										
R2917	**	**	48,279	44,679	43,929	43,498	44,366	43,091	CONT.	CONT.

** Due to the Science and Technology Program Element restructuring in FY 2002, funding levels are unavailable, however, the work described in FY 2000 & 2001 was funded in PE(s) 0603782N (R2226), 0603792N (R2721).

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops and demonstrates prototype Mine Warfare (MIW) system components that support a range of capabilities enabling Naval Expeditionary Forces to influence operations ashore. Third-world nations have the capability to procure, stockpile and rapidly deploy all types of naval mines, including new generation mines having sophisticated performance characteristics, throughout the littoral battlespace. “Desert Storm” demonstrated the U.S. Navy’s needs to counter the projected third world mine threat. Advanced technologies are required to rapidly detect and neutralize all mine types, from deep water through the beach. This project supports the advanced development and integration of sensors, processing, warheads and delivery vehicles to demonstrate improved MIW capabilities. The Thrust Areas in this project are: (1) Surveillance and Reconnaissance; (2) Breaching and Neutralization; and 3) Sea Mining. The Mine Countermeasures (MCM) Thrust Areas support the Organic MCM Future Naval Capability.

(U) The Surveillance and Reconnaissance Thrust Area focuses on developing and demonstrating technologies to detect, classify, and identify mines and obstacles through out the Littoral Penetration Area. Efforts within this thrust includes: remote sensing techniques to survey threat mining activities and mine/obstacle field locations; advanced acoustic/non-acoustic sensors and processing technologies for rapid minefield reconnaissance and determination of the location of individual mines and obstacles. A major current focus is the development of technologies that provide rapid, surveillance and reconnaissance, specifically in the very shallow water, surf zone, beach zones, craft landing zones, and beach exit zones (VSW,SZ,BZ,CLZ,BEZ), that enable Ship to Objective Maneuver.

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(U) The Breaching and Neutralization Thrust Area focuses on developing and demonstrating technologies for stand-off breaching of mines and obstacles in the SZ/BZ/CLZ/BEZ and precision neutralization of individual mines. Efforts within this thrust includes: influence sweeping technologies for influence minefield clearance, explosive and non-explosive technologies for mine/obstacle field breaching, and advanced technologies to rapidly neutralize shallow water (SW) sea mines. A major current focus is the development of technologies that provide rapid detection and stand-off breaching of mines and obstacles, specifically in the VSW/SZ/BZ/CLZ/BEZ) that enable Ship to Objective Maneuver.

FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: Mine and Expeditionary Warfare Advanced Technology PROJECT NUMBER: R2917 PROJECT TITLE: Mine and Expeditionary Warfare Advanced Technology

(U)The Sea Mining thrust area focuses on developing and demonstrating technologies for a wide area sea mine. The requirements for improved sea mine technologies has changed due to the reduced threat of the traditional submarines and surface ships. The elevated threats today are the third world submarines and surface ships, which may be encountered in the littoral waters of regional conflicts. Despite the diminished sophisticated threat, it is imperative that the US Navy maintains a broad-based and robust sea mining capability to replace aging in-service mines. Emphasis is placed on potentially high payoff advanced sensors for target detection and discrimination and on low cost, wide area sea mine system concepts, including positive command/control mechanisms and expanded weapon effectiveness.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Surveillance/ Reconnaissance	**FY00**	**FY01**	**FY02 ($29,279)**
Initiate	**Vectored Thrust Ducted Propeller (VTDP) Compound Helicopter** • Initiated Advanced Technology Demonstration to enhance helicopter performance and safety/survivability • Initiated critical path hardware acquisition and fabrication	**Advanced Airborne Mine Detection** • Development of advanced electro-optic technologies for detection of minefields from a maritime Unmanned Airborne Vehicle (UAV)	**Data Fusion** • Multi-platform, multi-sensor data fusion • Common Tactical Picture to support maneuver planning

Continue	**Advanced Surveillance** • Continued algorithm refinement of critical environmental parameters; Transitioned critical battle space products to the naval oceanographic office **Modeling and Simulation** • Continued concept based assessment of technologies for Organic Mine Countermeasures **Very Shallow Water (VSW)/Explosive Ordnance Disposal (EOD) Reconnaissance** • Continued development of Unmanned Underwater Vehicle (UUV) based optimized search strategies for VSW reconnaissance • Continued development of sensing technologies and capability to conjunctively employ sensed information	**VTDP Compound Helicopter** • Design flight control system based on piloted simulation. Design H-60 airframe structural modifications. **Advanced Surveillance** • Transition of critical battle space products to the naval oceanographic office **Modeling and Simulation** • Concept based assessment of technologies for Organic Mine Countermeasures **VSW/EOD Reconnaissance** • Development of Unmanned Underwater Vehicle (UUV) based optimized search strategies for VSW reconnaissance • Development of sensing technologies and capability to conjunctively employ sensed information • Demonstrate and evaluate capability to communicate target information to a control authority • Demonstrate asset redirection • Demonstrate integrated search, marking, and report back in	**Modeling and Simulation** • Concept based assessment of technologies for Organic Mine Countermeasures **Advanced Airborne Mine Detection** • Development of advanced electro-optic technologies for detection of minefields from a maritime UAV **VSW/EOD Reconnaissance** • Development of UUV based optimized search strategies for VSW reconnaissance **Advanced Surveillance** • Optimize processing and data reduction tools for wide area detection of mined areas and obstacle belts

		test-bed minefields in VSW environments	
Complete	**Joint Countermine ACTD** • Completed Joint Countermine Advanced Concept Technology Demonstration (JCM ACTD) logistics support for select "residual" technologies **MINE IDENTIFICATION** • Integrated component STIL technologies in airborne minehunting sonar (AQS-20) towbody • Quantified performance as function of operational parameters • Transitioned Streak Tube Imaging Lidar (STIL) technology to PE0604373N (Airborne Mine Countermeasures) for AQS-	**Advanced Surveillance** • Algorithm development efforts on critical environmental information for amphibious operations **Expeditionary Warfare Communications Networking** • Evaluation/assessment of high capacity communications links between mine countermeasures ships at sea **MINE IDENTIFICATION** • Analysis of helicopter towed STIL mine identification technology	**VTDP Compound Helicopter** • Flight control system design • Modifications to H-60 helicopter

	20/X **Advanced Airborne Target Designator** • Completed field tests and documentation of results, quantifying localization errors **Expeditionary Warfare Communications Networking** • Demonstrated, during Fleet Battle Experiment-H, advanced high capacity communications link between mine countermeasures ships at sea **VSW/EOD Reconnaissance** • Demonstrated coordinated navigation and positioning in VSW through deployment of a search vehicle and inspection vehicle during Fleet Battle Experiment-H.		

Breaching/ Neutralization	**FY00**	**FY01**	**FY02 ($19,000)**

Initiate	• Development of reactive dart dispensing concepts • Development of chemical penetrator for neutralization of mines • Development of continuous rod warhead for obstacle reduction • Analysis of existing/planned fleet air/gun launched delivery systems for stand-off mine/obstacle breaching	• Development of chemical dart dispensing concepts	• Stand-off obstacle breaching • Autonomous influence minesweeping for assault breaching • Integration of high velocity, reactive dart warhead payload and delivery platform for system level demonstration
Continue	• Continued development and lethality testing of high velocity, reactive darts for neutralization of beach and surf zone mines.	• Development of reactive dart dispensing concepts • Development of chemical penetrator for neutralization of mines • Development of continuous rod warhead for obstacle reduction	• Development of chemical penetrator for neutralization of mines • Development of continuous rod warhead for obstacle reduction
Complete	• Demonstrated lethality of reactive dart against surrogate beach zone mines • Developed inverse guidance law concept using Global Positioning Systems position and velocity state data only	• Demonstration of lethality of reactive dart against representative surf zone mines • Demonstration of reactive dart dispensing • Demonstration of reactive hydrodynamic stability • Demonstration of chemical dart lethality against	• Demonstrate delivery of reactive darts from air delivered platform • Demonstrate chemical dart lethality against representative surf zone mines

		representative beach zone mines • Analysis of existing/planned fleet air/gun launched delivery systems for mine/obstacle breaching	

(U) OTHER PROGRAM FUNDING SUMMARY: The Navy's 6.1 program contributes to this effort.

(U) NAVY RELATED RDT&E:
(U) PE 0601153N (Defense Research Sciences)
(U) PE 0602131M (Marine Corps Applied Research)
(U) PE 0602747N (Undersea Warfare Applied Research)
(U) PE 0602782N (Mine and Expeditionary Warfare Applied Research)
(U) PE 0602435N (Ocean Warfighting Environment Applied Research)
(U) PE 0603502N (Surface and Shallow Water MCM)
(U) PE 0603513N (Shipboard System Component Dev)
(U) PE 0603640M (Marine Corpse Advanced Technology)
(U) PE 0604373N (Airborne Mine Countermeasures)
(U) PE 0604784N (Distributed Surveillance System)

(U) NON-NAVY RELATED RDT&E:
(U) PE 0602712A (Countermine Systems)
(U) PE 0603606A (Landmine WF and Barrier Advanced Technology)

(U) SCHEDULE PROFILE: Not applicable.