FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2005
Exhibit R-2

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N
PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	41,239	35,255	31,897	34,554	53,396	56,317	61,349	78,442
R2720	OCEAN MODELING FOR MINE AND EXPEDITIONARY WARFARE							
	961	0	0	0	0	0	0	0
R2917	MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY							
	33,870	32,580	31,897	34,554	53,396	56,317	61,349	78,442
R9166	MODELING THE WARRIOR AS A COGNITIVE SYSTEM - PHASE II							
	1,646	1,684	0	0	0	0	0	0
R9343	AUGMENTED REALITY PROGRAM							
	1,203	0	0	0	0	0	0	0
R9344	EXTREME TERRAIN MEDICAL EVACUATION VEHICLE PILOT							
	1,636	0	0	0	0	0	0	0
R9345	HYPERSPECTRAL IMAGER FOR THE COASTAL OCEAN (HICO)							
	1,923	0	0	0	0	0	0	0
R9561	COUNTERMINE LIDAR UAV-BASED SYSTEM (CLUBS)							
	0	991	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element develops and demonstrates prototype Mine Warfare (MIW) system components that support 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. Gulf War operations demonstrated the requirement to quickly counter the mine threat. Advanced technologies are required to rapidly detect and neutralize all mine types, from deep water through the beach. This program supports the advanced development and integration of sensors, processing, warheads and delivery vehicles to demonstrate improved MIW capabilities. It supports the

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PROGRAM ELEMENT: 0603782N
PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

Organic Mine Countermeasures (OMCM) Future Naval Capabilities. Within the Naval Transformation Roadmap, this investment will achieve one of three key transformational capabilities required by Sea Shield as well technically enable the Ship to Objective Maneuver (STOM) key transformational capability within Sea Strike.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

PROGRAM CHANGE SUMMARY:

	FY 2004	FY 2005	FY 2006	FY 2007
FY 2005 President's Budget Submission	38,913	32,899	38,880	37,595
Cong Rescissions/Adjustments/Undist. Reductions	0	-337	0	0
Congressional Action	0	2,700	0	0
Execution Adjustments	2,553	0	0	0
FNC Realignment	0	0	441	4,698
Non-Pay Inflation Adjustments	-37	0	0	0
Program Adjustments	0	-7	-7,391	-7,858
Rate Adjustments	0	0	-33	119
SBIR Assessment	-190	0	0	0
FY 2006/2007 President's Budget Submission	41,239	35,255	31,897	34,554

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable.

Schedule: Not applicable.

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2005
Exhibit R-2a

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R2917 MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY	33,870	32,580	31,897	34,554	53,396	56,317	61,349	78,442

A. 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. Recent real-world operations demonstrated the requirement to counter the projected 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. It supports the Organic Mine Countermeasures (OMCM) Future Naval Capabilities.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
MINE/OBSTACLE DETECTION	11,655	15,786	15,648	15,321

This activity focuses on developing and demonstrating technologies that support detection, classification, identification and multi-sensor data fusion of mine and obstacle data to speed tactical timelines and increase operator standoff. Efforts include: remote sensing techniques/procedures to survey threat mining activities and locations (ends FY04); electro-optic (E-O) sensors/systems to enable unmanned airborne vehicle (UAV) rapid minefield reconnaissance and precise mineline location from very shallow water (VSW) through the beach exit zone; sensors/systems to enable cooperating unmanned underwater vehicles (UUVs) to perform wide-area reconnaissance and assault lane reconnaissance/preparation from shallow water through the surf zone (SZ); decision support and visualization software for amphibious planning/operations; and sensor data fusion to enable a theater mine warfare common operating picture and own ship protection. This activity supports the development and transition of technologies for the Organic Mine Countermeasures (OMCM)Future Naval Capabilities (FNC).

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

Budget for Mine/Obstacle Detection reflects TOG-approved funding for Organic Mine Countermeasures FNC.

FY 2004 Accomplishments:

-Continued development of Rapid Overt Airborne Reconnaissance (ROAR) multispectral laser, 3-D camera for tactical airborne VSW Surf Zone/Beach Zone (SZ/BZ) day/night mine/minefield/obstacle detection.
-Continued demonstration of integrated UUV search, marking, bathymetry mapping, threat objects and gaps and reporting back in test-bed minefields in VSW environments.
-Continued demonstration of capability to enable diver teams using UUVs to efficiently and accurately reacquire previously targeted areas and individual targets.
-Continued integration of dual frequency small Synthetic Aperture Sonar (SAS) into a UUV for reconnaissance.
-Continued development of multi-platform fusion of AV-15 Kingfisher data and those from high-resolution mine hunting systems (e.g. AN/AQS-20) for improved ship mine detection and avoidance.
-Completed and transitioned Remote Sensing Tier II algorithm refinements and enhancements to the Naval Oceanographic Office.
-Completed demonstration of laser diode array illuminator, enabling a night capability for multispectral detection of minefields on the beach.
-Completed initial demonstration of VSW multi-platform, coordinated UUV reconnaissance and reacquisition/identification during a Combined Joint Task Force Exercise (JTFEX 04-02).
–Initiated integration of Laser Scalar Gradiometer (LSG) in UUV for buried mine classification.

FY 2005 Plans:

-Continue demonstration of capability to enable diver teams with UUVs to efficiently and accurately reacquire previously targeted areas and individual targets.
-Continue demonstration of integrated UUV search, marking, bathymetry mapping, threat objects and gaps and report back in test-bed minefields in VSW environments.
-Continue integration of LSG in UUV.
-Continue development of multi-platform fusion of AV-15 Kingfisher data and those from high-resolution mine hunting systems (e.g. AN/AQS-20) for improved mine detection and avoidance.
-Complete integration of dual frequency small SAS into UUV for reconnaissance and initiate field evaluation.
-Complete development of ROAR multispectral laser, 3-D camera for tactical airborne VSW/SZ/BZ day/night mine/minefield/obstacle detection.
-Initiate at-sea testing of ROAR sensor and begin helicopter integration.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

FY 2006 Plans:

-Continue development of multi-platform fusion of AV-15 Kingfisher data and those from high-resolution mine hunting systems (e.g. AN/AQS-20) for improved mine detection and avoidance.
-Complete at-sea testing of ROAR sensor for tactical airborne VSW/SZ/BZ day/night mine/minefield/obstacle detection and initiate transition to PMS-495.
-Complete integration of LSG into UUV and initiate field evaluation of LSG performance against buried mines.
-Initiate system development for Over-the-Horizon (OTH) deployment of UUV systems by Autonomous Surface Vehicles (ASVs) and large UUVs.
-Initiate development of buried minefield detection capability for tactical airborne SZ/BZ buried minefield detection.

FY 2007 Plans:

-Continue system development for OTH deployment of UUV systems by ASVs and large UUVs.
-Continue development of multi-platform fusion of AV-15 Kingfisher data and those from high-resolution mine hunting systems (e.g. AN/AQS-20 and submarine-launched mine warfare (MIW) UUVs) for improved mine detection and avoidance.
-Continue development of buried minefield detection capability for tactical airborne SZ/BZ buried minefield detection.
-Demonstrate combined LSG and dual frequency SAS sensor suite in a UUV in a Fleet exercise.
-Initiate multiple unmanned system data fusion for reduction in false alarms and reduction in tactical timelines.

	FY 2004	FY 2005	FY 2006	FY 2007
MINE/OBSTACLE NEUTRALIZATION	11,941	12,469	9,749	7,317

Mine and Obstacle Neutralization is focused on dramatically improving the capability to neutralize mines and obstacles from deep water through the beach exit zone. Efforts include the development of technologies for: stand-off breaching of mines and obstacles in the surf and beach zones (SZ/BZ); minesweeping of sea mines; and expendable, autonomous neutralization of sea mines. Stand-off breaching efforts will demonstrate a mine and obstacle breaching capability that is enabled by precision weapon guidance and Intelligence, Surveillance, and Reconnaissance (ISR), and delivered by Naval Tactical Aircraft (TACAIR), USAF Bombers, and Naval guns. In the near-term, tactical performance of existing unitary bombs will be demonstrated. Far-term effort will

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

demonstrate a tactical countermine dart and dispenser concept. The minesweeping effort will develop a mission package for deployment on Unmanned Surface Vehicles (USVs). Commencing in FY07, an expendable, autonomous underwater neutralizer capability for deep and shallow water sea mines will be developed. This activity supports the development and transition of technologies for the OMCM FNC.
Budget for Mine/Obstacle Neutralization reflects TOG-approved funding for Organic Mine Countermeasures FNC.

FY 2004 Accomplishments:

-Continued development and demonstration of dispensing technologies using sled and horizontal gun testing for air-delivered and naval gun-delivered darts.
-Continued development of mine influence sweep payload (spiral 1) for USV mine influence sweeping.
-Continued performance characterization of Mk-84 bombs against buried mines.
-Completed demonstration of tactical effectiveness of Mk-84 bombs (USAF delivered), Joint Direct Attack Munition (JDAM) to clear a BZ lane of light obstacles and proud mines.
-Completed static water effects testing (height of detonation at tactical impact) to characterize Mk-84 bomb lethality against SZ mines and light obstacles.
-Completed high explosive dart lethality demonstrations against SZ and BZ mines (proud and buried).
-Completed separate BZ and SZ chemical dart lethality demonstrations against proud and buried mines.
-Completed 1st flight test of the Mine and Obstacle Defeat System (MODS) with a full payload of inert darts.
-Completed USV tow testing to determine mine influence sweep speed attributes.
-Initiated development of an Assault Breaching Mission Planning Tool for fleet operations using precision guided bombs against mines and obstacles and began integration of Mk-84 bomb lethality data for proud mines and obstacles into the Mine Warfare Decision Aid Library (MEDAL).

FY 2005 Plans:

-Complete development of an Assault Breaching Mission Planner, demonstrate utility with MEDAL, and begin transition to PMS-495.
-Complete performance characterization of Mk-84 bombs against buried mines.
-Complete development of USV minesweeping payload (spiral 1) and complete integration on a USV; conduct technology demonstration of mine influence sweep payload performance; conduct initial fleet demonstration of early USV mine sweeping capability from a High Speed Vehicle (HSV).
-Conduct demonstration of dart dispensing technologies and integration of payload and delivery platforms for system level demonstrations and conduct 2nd flight test of the MODS with a full payload of inert darts.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

-Initiate dart fabrication and begin planning FY06 MODS “live” payload demonstration.
-Initiate development of USV minesweeping module concept for the Littoral Combat Ship (LCS).
-Initiate development of mechanical designs for neutralization of moored and bottom mines in VSW.

FY 2006 Plans:

-Complete dart fabrication and complete MODS flight demonstration of the dispensing of live darts against live tactical mines.
-Complete development and demonstration of USV minesweeping module concept and begin transition to PMS-495/PMS-420 for LCS flight 0.
-Complete mechanical designs for neutralization of bottom and moored mines in VSW then implement and test.
-Initiate and Complete integration of Mk-84 bomb lethality data for proud and buried mines and obstacles into the Joint Munitions Effectiveness Manuals (JMEM).
-Initiate the transition of countermine dart warhead technology to PMS-495.
-Initiate countermine dart lethality optimization in coordination with PMS-495.
-Initiate countermine dart dispensing optimization in coordination with PMS-495
-Initiate development of low drag, low frequency sound source for mine influence sweeping.
-Initiate development of advanced mine influence sweeping payload for USVs, focusing on increasing swept path and endurance.

FY 2007 Plans:

-Continue development of advanced mine influence sweeping payload for USVs.
-Continue development of low drag, low frequency sound sources for mine influence sweeping.
-Complete countermine dart lethality optimization.
-Complete transition countermine dart technology to PMS-495.
-Complete countermine dart dispensing optimization and complete transition of dart dispensing technology to PMS-495.
-Initiate development of an expendable, autonomous underwater vehicle neutralizer, initially focused on neutralization of moored influence sea mines in shallow water.
-Initiate development of advanced influence minesweeping module for unmanned surface vehicle mine sweeping.
-Initiate development of precision navigation capability for targeting and safe navigation through assault lanes.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

-Initiate development of stand-off, assault breaching warhead fuse to extend effectiveness of unitary warheads to greater water depths.

	FY 2004	FY 2005	FY 2006	FY 2007
LITTORAL COMBAT	4,757	4,325	6,500	11,916

Within the Naval Transformation Roadmap, this investment supports achievement of transformational capabilities of Ship To Objective Maneuver (STOM), a key transformational capability within Sea Strike. This activity develops and demonstrates prototype capability to enable Naval Expeditionary Forces to influence operations ashore. The goal of Littoral Combat is the application of technologies to enhance the ability of the Navy/Marine Corps team to execute the naval portion of a joint campaign in the littorals. This activity considers all the critical functions of warfighting: command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR), fires, maneuver, sustainment, force protection, and training. This activity includes Littoral Combat Power Projection FNC investments formerly included in Mine/Obstacle Detection, such as Hostile Fire Detection and Response Spirals 1 and 2, Improvised Explosive Devices Spirals 1 and 2, Modular Scalable Weapon, Advanced Naval Fires Technology Spiral 1, and Position Location Information. It was split out to provide improved detail of the underlying investment. Budget for Littoral Combat reflects TOG-approved funding for Organic Mine Countermeasures FNC.

FY 2004 Accomplishments:

-Continued development of advanced sensing algorithms to derive maps using digital imagery from airborne ISR assets to support expeditionary maneuver. (FY05 effort funded in PE 0602782N; effort continues in this PE in FY 06)
-Initiated development of technologies to improve the functionality of fires coordination within the weapon systems/platforms of expeditionary forces.
-Initiated development of planar/phased array electronic attack antenna technology.

FY 2005 Plans:

-Continue development of fires coordination and fire control system software/hardware for indirect fire weapons systems.
-Continue development of advanced lightweight materials for weapon systems/platforms. (Previous efforts funded by PE 0603640M)

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

-Continue development of lightweight mission essential computational fire control interfaces for weapons systems. (Previous efforts funded by PE 0603640M)
-Continue development of improved fire control technologies for weapon aiming and pointing systems. (Previous efforts funded by PE 0603640M, 0602236N and PE 0603236N.)
-Continue development of radio frequency (RF) emitter identification and geolocation technology. (Previous efforts funded by PE 0602131M)
-Continue integration and demonstration of secure mobile networks/secure wireless local area network (LAN) communication technologies. (Previous efforts funded by PE 0602782N and PE 0602131M)
-Continue development of planar/phased array electronic attack antenna technology.
-Complete development of an advanced sensor miniature digital data link. (Development also funded by PE 0602782N)

FY 2006 Plans:

-Continue development of fires coordination and control system software/hardware for indirect fire weapons systems.
-Continue development of advanced lightweight materials for weapon systems/platforms.
-Continue development of lightweight mission essential computational interfaces for weapons systems. (FY07 effort funded by PE 0603640M)
-Continue development of improved fire control technologies for weapon aiming and pointing systems. (FY07 effort funded by PE 0603236N)
-Continue integration, development and demonstration of secure mobile networks/secure wireless LAN communication technologies. (FY07 effort funded by PE 0603640M)
-Continue advanced naval fires technology development Spiral 1. (Previous efforts funded by PE 0602131M and PE 0603640M; FY07 effort funded by PE 0603236N)
-Continue development of advanced ammunition packaging. (Previous and concurrent funding by PE 0602131M and PE 0603640M; FY07 effort funded by PE 0603640M)
-Continue hostile fire detection and response technology development (including Gunslinger). (Previous efforts funded by PE 0602131M)
-Continue development of enhanced sensor fusion Measurement and Signatures Intelligence (MASINT) capabilities. (Previous efforts funded by PE 0603640M; FY07 effort funded by PE 0603640M)
-Continue development of radio frequency (RF) emitter identification and geolocation technology.
-Complete development/testing/demonstration of Signals Intelligence (SIGINT) visualization system technologies in support of Ship to Objective Maneuver (STOM). (Previous efforts funded by PE 0603640M)

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

-Complete development of planar/phased array electronic attack antenna technology.
-Complete development of advanced sensing algorithms to derive maps using digital imagery and transition to Program of Record. (Previous effort funded by PE 0602131M)
-Initiate development of innovative tactical Global Information Grid (GIG)-compliant networking technologies.

FY 2007 Plans:

-Continue design and development of rocket propelled grenade (RPG) defensive systems. (Previous efforts funded by PE 0602782N)
-Continue development of innovative tactical beyond line of sight (BLOS) GIG-compliant networking technologies.
-Continue development of advanced lightweight materials for weapon systems/platforms.
-Continue development of insensitive munitions capable MCM systems. (Previous efforts funded by PE 0602131M)
-Continue development of technologies for automated control of large sensor networks for Distributed Common Ground Station (DCGS). (Previous efforts funded by PE 0602131M).
-Complete development of fires coordination and fire control system software/hardware for indirect fire weapons systems.
-Complete Gunslinger Hostile Fire Detection demonstration and integration.
-Complete development of radio frequency (RF) emitter identification and geolocation technology.
-Initiate development of conformal/phased array electronic attack antenna (high-power & broadband) technology.

	FY 2004	FY 2005	FY 2006	FY 2007
ASSAULT BREACHING SYSTEM	5,517	0	0	0

Assault Breaching System concepts led to a future mine and obstacle breaching capability. The employment of air and surface strike weapon systems will minimize exposure to service personnel; enable amphibious landing forces to maintain an unencumbered operational tempo from the sea to the objectives ashore; and reduce total ownership costs and logistics requirements. It supports the future naval warfare directions of power projection, operational maneuver from the sea, Ship To Objective Maneuver (STOM) and sea-based logistics.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

FY 2004 Accomplishments:

-Continued development and demonstration of reconnaissance technologies for detecting minefields in the surf zone.
-Conducted tradeoff analysis including systems that can provide a precision mine and obstacle breaching capability delivered by Naval Tactical Aircraft, United States Air Force Bombers, and Naval Guns.

FY 2005 Plans:

-Not applicable.

FY 2006 Plans:

-Not applicable.

FY 2007 Plans:

-Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:
PE 0601153N (Defense Research Sciences)
PE 0602131M (Marine Corps Landing Force Technology)
PE 0602747N (Undersea Warfare Applied Research)
PE 0602782N (Mine and Expeditionary Warfare Applied Research)
PE 0602435N (Ocean Warfighting Environment Applied Research)
PE 0603502N (Surface and Shallow Water Mine Countermeasures)
PE 0603513N (Shipboard System Component Development)
PE 0603640M (US Marine Corps Advanced Technology Demo)
PE 0604373N (Airborne Mine Countermeasures)
PE 0604784N (Distributed Surveillance System)

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

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2917 PROJECT TITLE: MINE & EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY

D. ACQUISITION STRATEGY:
Not applicable.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

R2720	FY 2004	FY 2005
OCEAN MODELING FOR MINE AND EXPEDITIONARY WARFARE	961	0

This effort developed a fully-functioning web site populated with hourly moored buoy data, weather information, satellite data, model-output and forecasts, and portals to similar information at other ocean observing sites nationally.

R9166	FY 2004	FY 2005
MODELING THE WARRIOR AS A COGNITIVE SYSTEM - PHASE II	1,646	1,684

In FY04, this effort initiated the design and implementation of new technologies for modeling warrior competencies and capabilities across operations, support and training. In FY05, plans include expanding the scope of the effort to include emerging missions to better understand the warrior's human factors and development of situation-specific models.

R9343	FY 2004	FY 2005
AUGMENTED REALITY PROGRAM	1,203	0

This effort supported the development of an Augmented Reality program (ARVCOP – Augmented Reality Visualization of the Common Operational Picture) to enhance maritime navigation (including amphibious operations), operational security, and harbor defense.

R9344	FY 2004	FY 2005
EXTREME TERRAIN MEDICAL EVACUATION VEHICLE PILOT	1,636	0

This effort supports the design, development and prototyping of a medical evacuation ground transport platform suitable for use on uneven terrain and is internally air transportable in the MV-22 (Osprey) tilt rotor aircraft.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603782N PROGRAM ELEMENT TITLE: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

R9345	FY 2004	FY 2005
HYPERSPECTRAL IMAGER FOR THE COASTAL OCEAN (HICO)	1,923	0

This effort developed a hyperspectral Earth and Space imager for deployment on the international space station (ISS).

R9561	FY 2004	FY 2005
COUNTERMINE LIDAR UAV-BASED SYSTEM (CLUBS)	0	991

This effort develops Light Detection and Ranging (LIDAR) technology to support the detection of mines and obstacles in the Surf Zone from an Unmanned Aerial Vehicle (UAV).