Exhibit R-2, PB 2010 Navy RDT&E Budget Item Justification									DATE: May 2009	
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603782N MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	28.169	34.501	28.782						Continuing	Continuing
2917: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY	26.433	33.304	28.782						Continuing	Continuing
9999: CONGRESSIONAL PLUS-UPS	1.736	1.197	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval S&T Strategic Plan approved by the S&T Corporate Board (Jan 2007). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential science and technology efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

This PE primarily develops and demonstrates prototype Mine Countermeasures (MCM) and Expeditionary Warfare system components that support capabilities enabling Naval 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. Real world operations have demonstrated the requirement to quickly counter the mine threat. Advanced technologies must rapidly detect and neutralize all mine types, from deep water to the inland objective. This program supports the advanced development and integration of sensors, processing, warheads and delivery vehicles to demonstrate improved Naval Warfare capabilities. It supports the MCM-related Future Naval Capabilities (FNC) Enabling Capabilities (ECs). Within the Naval Transformation Roadmap, this investment will achieve one of three key transformational capabilities required by Sea Shield as well as 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.

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B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	28.253	33.426	31.414	
Current BES/President's Budget	28.169	34.501	28.782	
Total Adjustments	-0.084	1.075	-2.632	
Congressional Program Reductions		-0.094		
Congressional Rescissions				
Total Congressional Increases		1.200		
Total Reprogrammings	0.074			
SBIR/STTR Transfer	-0.158			
Program Adjustments			-2.657	
Rate/Misc Adjustments		-0.031	0.025	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: 9999, **JOINT EXPLOSIVE ORDNANCE DISPOSAL DIVER SITUATIONAL AWARNESS SYSTEM**	0.771	1.197
Project: 9999, **UPWARD LOOKING SONAR (ULS)**	0.965	0.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603782N MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY					PROJECT NUMBER 2917	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
2917: MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY	26.433	33.304	28.782						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project primarily develops and demonstrates prototype MCM technologies that support a range of capabilities enabling Naval 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 operations have demonstrated the requirement to counter the projected mine threat. Advanced technologies are required to rapidly detect and neutralize all mine types, from deep water to the inland objective. This project supports the advanced development and integration of sensors, processing, warheads and delivery vehicles. It supports the MCM-related FNC ECs.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
MINE/OBSTACLE DETECTION	14.123	19.508	19.397	
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: electro-optic sensors/systems to enable Unmanned Aerial Vehicle (UAV) rapid minefield reconnaissance and precise mineline location from Very Shallow Water (VSW) through the BZ; sensors/systems to enable cooperating Unmanned Underwater Vehicles (UUVs) to perform wide-area reconnaissance and assault lane reconnaissance/preparation from shallow water through the SZ; sensor development for detection and classification of buried mines; technologies for MCM Mission Modules for the new Littoral Combat Ships (LCS); 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 MCM-related FNCs. This S&T investment supports the Joint Requirements Oversight Council of the Joint Chiefs of Staff and Office of the Chief of Naval Operations (OPNAV) validated requirements for MCM. This S&T investment of mine and obstacle detection provides critical S&T transitions to the Mine Warfare Mission package of the				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011

Navy's new LCS. This investment in MCM S&T is reported as part of OPNAV's annual report to Congress in the MCM Certification Plan. This plan is reviewed and approved by the Office of the Secretary of Defense, and any deviations in ONR's reported S&T funding for MCM throughout the Future Years Defense Plan must be reported and justified through Navy and OSD. Further, the MCM S&T investment plan structure is reviewed and authorized by the Navy's Technology Oversight Group that approves ECs, their supporting products, and funding profiles.

The increase from FY 2008 to FY 2009 reflects the increased investment in the MCM critical S&T areas of Buried Mine Sensors and Processing; Undersea Cooperative Cueing (for UUVs); and MCM Sensors for the LCS. The FY 2009 budget reflects the transition of 6.2 applied research into advanced technology development (6.3). FY 2010 budget reflects the addition of new FNC products under Advanced Sonar Technologies for High Clearance Rate MCM.

FY 2008 Accomplishments:

- Continued advanced processing development for Low Frequency Broad Band to enable rapid detection, classification and identification of buried sea mines.
- Continued development of multi-platform fusion from high-resolution mine hunting systems (e.g. AN/AQS-20) for improved mine detection and avoidance.
- Continued development of Tactical Unmanned Aerial Vehicle (TUAV)-based SZ/BZ buried minefield detection capability.
- Continued multiple unmanned system MCM data fusion techniques for reduction in false alarms and reduction in tactical timelines.
- Continued technology development, integration and early demonstration planning for MCM Mission Module systems for Advanced Flight LCS.
- Continued transition of ROAR sensor technology to PMS-495.
- Completed demonstration of capability to enable diver teams with UUVs to efficiently and accurately reacquire previously targeted areas and individual targets.
- Completed demonstration of integrated UUV: search; marking; mapping of bathymetry, threat objects and gaps; and report back in test-bed minefields in VSW environments.

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiated buried mine sensing identification processing. - Initiated technology development for multiple UUV Undersea Cooperative Cueing and Intervention in support of MCM operations. *FY 2009 Plans:* - Continue all FY 2008 efforts less those noted as completed above. - Complete buried mine sensing identification processing development. - Complete development and final flight testing of ROAR system against surface laid mines and obstacles. - Initiate field testing of prototype buried mine sensors. - Initiate integration of buried mine sensors onto airborne platform and begin flight testing. - Initiate planning for assault breaching systems exercise involving the mine detection systems. *FY 2010 Plans:* - Continue all FY 2009 efforts less those noted as completed above. - Complete development of Tactical Unmanned Aerial Vehicle (TUAV)-based SZ/BZ buried minefield detection capability. - Complete field testing of prototype buried mine sensors. - Complete integration of buried mine sensors onto airborne platform and begin flight testing. - Complete technology development, integration and early demonstration planning for MCM Mission Module systems for Advanced Flight LCS. - Initiate development of iPUMA/Synthetic Aperture Sonar system to provide the first non marine mammal based mine detection and classification capability for confined or highly obstructed areas. - Initiate development of Small Acoustic Color/Imaging Sonar system to provide the first non marine mammal detection, classification and identification capability for very shallow water (VSW) and reduce the false-alarm rate by x20 for all VSW mine threats. - Initiate development of Long Range Low Frequency Broadband (LRLFBB) Sonar to significantly increase the minehunting area coverage rate. - Initiate Phase 2 of Advanced Mission Module Technology Development.					
MINE/OBSTACLE NEUTRALIZATION		12.310	13.796	9.385	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Mine and Obstacle Neutralization activity is focused on 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 SZ/BZ; minesweeping and jamming of sea mines; and Autonomous Underwater Vehicle (AUV) neutralization of sea mines. Stand-off breaching efforts 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) and USAF Bombers. Tactical performance of existing unitary bombs is being demonstrated. Other efforts will demonstrate a tactical countermine dart and dispenser concept. The minesweeping effort develops a mission package for deployment on Unmanned Surface Vehicles (USVs). Also, efforts will focus on improving an existing breaching weapon fuze and developing a precision assault lane marking navigation capability. This activity supports the development and transition of technologies for the MCM-related FNC ECs. The funding profile from FY 2008 to FY 2009 reflects the increased emphasis on developing FNC products in AUV technology for neutralization of sea mines, assault lane navigation and improvements to breaching weapons. The investment reduction in FY 2010 reflects the completion and transition of major programs/ projects during FY 2010. *FY 2008 Accomplishments:* - Continued development of an autonomous mine neutralization system for VSW MCM. - Continued development of advanced Mine Warfare Mission module capabilities in support of the LCS Mine Warfare mission. - Continued development effort to extend effectiveness of unitary warheads to greater depths and initiated planning of flight demo with Naval Special Clearance Team 1. - Continued technology development of precision navigation capability for targeting, safe navigation through assault lanes including lane marking. - Completed development of low drag, low frequency sound source for mine influence sweeping. - Initiated development of an AUV system for neutralization of littoral mines.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: - Continue all FY 2008 efforts less those noted as completed above. - Initiate planning/preparation for flight demonstration of the JDAM Assault Breaching System (JABS) with tactical mines in very shallow water. - Initiate planning for assault breaching systems exercise involving the unitary warheads, precision navigation and lane marking. *FY 2010 Plans:* - Continue all FY 2009 efforts. - Complete development effort to extend effectiveness of unitary warheads to greater depths and initiated planning of flight demo with Naval Special Clearance Team 1. - Complete technology development of precision navigation capability for targeting, safe navigation through assault lanes including lane marking. - Complete flight demonstration of the JDAM Assault Breaching System (JABS) with tactical mines in very shallow water. - Complete development of an autonomous mine neutralization system for VSW MCM. - Complete development of advanced Mine Warfare Mission module capabilities in support of the LCS Mine Warfare mission. - Initiate development of autonomous behaviors to improve neutralization efficiency of littoral sea mines. - Initiate Phase 2 of Advanced Mission Module Technology Development.				

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C. Other Program Funding Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
PE 0601153N/Defense Research Sciences									Continuing	Continuing
PE 0602131M/Marine Corps Landing Force Technology									Continuing	Continuing
PE 0602435N/Ocean Warfighting Environment Applied Research									Continuing	Continuing
PE 0602712A/ Countermine Systems									Continuing	Continuing
PE 0602747N/Undersea Warfare Applied Research									Continuing	Continuing
PE 0602782N/Mine and Expeditionary Warfare Applied Research									Continuing	Continuing
PE 0603502N/Surface and Shallow Water Mine Countermeasures									Continuing	Continuing
PE 0603513N/Shipboard System Component Development									Continuing	Continuing
PE 0603606A/Landmine Warfare and Barrier Advanced Technology									Continuing	Continuing
PE 0603640M/USMC Advanced Technology Demonstration (ATD)									Continuing	Continuing

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PE 0604373N/Airborne MCM		
PE 0604784N/Distributed Surveillance System	Continuing	Continuing

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The overall metrics of this advanced technology program are the development of technologies supporting the Mine and Expeditionary Warfare challenges of reducing the MCM tactical timeline from months to days and eliminating the need for Navy divers and manned equipment to enter minefields. Another important metric is the scheduled transition of 6.3 advanced technology projects from the FNCs program into Navy and Marine Corps acquisition programs at agreed upon Technology Readiness Levels. Technology-specific metrics include: Mine warfare data fusion capabilities yielding a 10%-25% reduction in time and risk to mine hunting activities; Mine hunting sensors - Probability of Detection = 95%, Probability of Identification of Proud Mines = 90%, Probability of Classification of Buried Mines = 80%; Unmanned Systems for MCM sized for inclusion in the Littoral Combat Ship Mine Warfare Mission Package; MCM sensors sized, packaged and capable of 12 hour missions with a search rate greater than .05 square nautical mines per hour; Mine sweeping: Modular magnetic and acoustic influence sweeping systems packaged for deployment from Unmanned Surface Vehicles; Minesweeping single sortie coverage > 9.4 square nautical miles at 20 nautical miles per hour during a 4 hour mission up to Sea State 3; Surface-laid mine and obstacle breaching capability > 90% in the Beach Zone (BZ) using unitary warheads, and > 80% in the Surf Zone (SZ).

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COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
9999: CONGRESSIONAL PLUS-UPS	1.736	1.197	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

N/A

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A