Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602782N: *Mine & Exp Warfare Applied Res*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	53.055	43.897	36.833	0.000	36.833	37.836	44.589	51.474	59.179	Continuing	Continuing
0000: *Mine & Exp Warfare Applied Res*	46.074	40.710	36.833	0.000	36.833	37.836	44.589	51.474	59.179	Continuing	Continuing
9999: *Congressional Adds*	6.981	3.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.942

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 (Feb 2009). 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 provides technologies for Naval Mine Countermeasures (MCM), Expeditionary Warfare, U.S. Naval sea mining, Naval Special Warfare (NSW), and Joint Tri-Service Explosive Ordnance Disposal (EOD). This program is strongly aligned with the Joint Chiefs of Staff Joint Warfighting Capability Objectives through the development of technologies to achieve military objectives with minimal casualties and collateral damage. 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" by focusing on 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. These efforts concentrate on the development and transition of technologies for the MCM-related and Urban Asymmetric/Expeditionary Warfare Operations (UAEO)-related Future Naval Capabilities (FNC) Enabling Capabilities (ECs). The Mine and Obstacle Detection/Neutralization efforts include technologies for clandestine and overt minefield reconnaissance, organic ship self-protection, organic minehunting and neutralization/breaching. The Urban Asymmetric Operation effort includes critical warfighting functions such as Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), fires, maneuver, sustainment, etc. The Naval Special Warfare and Explosive Ordnance Disposal technology efforts concentrate on the development of technologies for safe near-shore mine detection, diver mobility and survivability, and ordnance disposal operations.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
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B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	54.689	40.880	0.000	0.000	0.000
Current President's Budget	53.055	43.897	36.833	0.000	36.833
Total Adjustments	-1.634	3.017	36.833	0.000	36.833
• Congressional General Reductions		-0.183			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		3.200			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-0.843	0.000			
• SBIR/STTR Transfer	-0.791	0.000			
• Program Adjustments	0.000	0.000	36.833	0.000	36.833

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Project: 9999: *Congressional Adds*		
Congressional Add: *Electromagnetic Signatures Assessment System Using Multiple Autonomous Undersea Vehicles, Phase III*	1.596	1.992
Congressional Add: *Virtual Onboard Analyst For Multi-Sensor Mine Detection*	0.997	1.195
Congressional Add: *Detection and Neutralization of Electronically Initiated Improved Explosive Devices (IEDs)*	1.995	0.000
Congressional Add: *Water Security Program (Inland Water Quality and Desalination)*	2.393	0.000
Congressional Add Subtotals for Project: 9999	6.981	3.187
Congressional Add Totals for all Projects	6.981	3.187

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602782N: *Mine & Exp Warfare Applied Res*

FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602782N: *Mine & Exp Warfare Applied Res*	PROJECT 0000: *Mine & Exp Warfare Applied Res*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
0000: *Mine & Exp Warfare Applied Res*	46.074	40.710	36.833	0.000	36.833	37.836	44.589	51.474	59.179	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project focuses on reducing the time involved in conducting MCM operations and increasing safe standoff from minefields. It develops and transitions technologies for MCM-related and UAEO-related FNC ECs. The MCM effort includes technologies for clandestine and overt minefield reconnaissance, organic ship self-protection, organic minehunting, neutralization/breaching and clearance. The Littoral Warfare effort includes critical warfighting functions such as C4ISR, fires, maneuver, sustainment, etc. The sea mining effort emphasizes technologies for future sea mines. The Naval Special Warfare and Explosive Ordnance technology efforts concentrate on the development of technologies to enhance diver capabilities including: safe near-shore mine sensing, mobility and survivability, and ordnance disposal operations.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MINE TECHNOLOGY	0.184	0.288	0.330	0.000	0.330
This activity assesses advanced sea mine technologies to maintain expertise in this Naval Warfare area. An acoustic sensing capability for the naval mine Target Detection Device (TDD) is being addressed. Future mine and minefield concepts are being addressed. *FY 2009 Accomplishments:* - Continued assessment of sea mine technologies in order to maintain a level of expertise in naval mines. - Initiated evaluation of an acoustic sensing capability for the naval mine Target Detection Device (TDD). *FY 2010 Plans:* - Continue all efforts of FY 2009.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate development of concepts for semi-autonomous and remote controlled mines and minefields. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete evaluation of an acoustic sensing capability for the naval mine Target Detection Device (TDD). - Initiate development of target discrimination technology for Target Detection Device (TDD).					
MINE/OBSTACLE DETECTION This activity focuses on applied research to enable longer detection ranges and precise mine location with fewer false alarms in a variety of challenging environments. It supports Discovery and Invention (D&I) and MCM-related FNC ECs. Efforts in Synthetic Aperture Sonar (SAS) technologies for longer range detection and classification of mine-like targets and magnetic gradiometer sensing and electro-optic (EO) technology for buried mine identification, and sensor integration onto Autonomous Underwater Vehicles (AUVs) are being addressed. EO sensor research develops algorithms to enable image processing for rapid overt reconnaissance from an Unmanned Aerial Vehicle (UAV). Other processing, classification and data fusion techniques to reduce operator workload, and a mine burial prediction "expert system" are also being developed. Efforts also support development of MCM Mission Modules for Littoral Combat Ships (LCS). The investment reduction in FY 2011 reflects the completion and transition of major FNC and D&I programs/projects during FY 2011. *FY 2009 Accomplishments:* - Continued at-sea testing of prototype Low Frequency Broadband (LFBB) acoustic scattering sonar focusing on multi-aspect mine classification/identification and characterization of clutter in various environments.	31.495	29.363	25.684	0.000	25.684

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued development of automatic mine detection and classification algorithms for integrated forward-looking iPUMA sonar and side-looking sonars. - Continued development of multi-platform fusion of data from high-resolution mine hunting systems (e.g. AN/AQS-20 and submarine-launched Mine warfare (MIW) Unmanned Underwater Vehicles (UUVs) via registration with those from the Mine Warfare Environmental Data Library (MEDAL) for improved mine detection and avoidance. - Continued development of UUV-based extended range electro-optic identification sensors and supporting meteorology and oceanography and planning systems. - Continued large area search and survey based upon multiple, cooperating UUVs. - Continued technology development for a Tactical UAV (TUAV) buried minefield detection sensor. - Continued technology development for MCM Mission Module systems for Advanced Flight LCS. - Continued demonstration of flapping fin propulsion on an inexpensive, stealthy undersea vehicle to enable new mine warfare mission capabilities. - Continued development of an ultrafast silicon carbide (SiC) avalanche transistor and a SiC drift step recovery diode. - Continued development of Multiple Input Multiple Output (MIMO) UUV communications by determining channel capacity and extending use to moving platforms. - Continued integration of iPUMA and SAS systems in a single vehicle to obtain 100% area coverage. - Continued to investigate and develop signal processing algorithms in areas of research such as environmentally adaptive channel estimation/equalization, multi-carrier modulation techniques, and spatial diversity exploitation to enable reliable, high-rate communication between fixed and/or mobile nodes in an ad hoc underwater acoustic communication network. - Completed development of algorithms exploiting broadband acoustic transmit waveforms for improved automatic classification of buried mines from clutter. - Completed development of data fusion algorithms for underwater electro-optic, magnetic and acoustic sensors to enhance probability of classification (Pc) and probability of identification (Pid) and reduce false alarm rate for proud and buried mine hunting.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Completed evaluation of LRS algorithm development requirements utilizing data streams available from national and organic sensors. - Completed model prediction verification for acoustic interactions with ocean bottoms containing configurations of inclusions, multiple scattering from clusters, rough surface shadowing effects and layers to improve model performance in buried mine identification. - Completed phenomenology studies for improved mine detection algorithms for UAV sensors. - Completed the development of a numerical simulation capability for exploring SAS system sensitivities to seafloor sediment parameters. - Completed the development of multi-static acoustic sensing and processing for cooperating, unmanned vehicles. - Initiated development of a Mine/Obstacle Detection and Avoidance capability for Autonomous Underwater Vehicles (AUVs) equipped with the iPUMA sonar system. - Initiated development of a small ultrasound acoustic underwater camera for UUV-based classification and identification of underwater mines. - Initiated development of advanced 3-D LIDAR mine detection algorithms to support post mission analysis. - Initiated development of drifting mine detection concepts. - Initiated development of heat engine for unmanned underwater vehicles powered by thermal gradients in the water column. - Initiated development of Performance Analysis and Training Tool (PATT) to assess the performance characteristics of high frequency imaging sonars and the associated sonar processing concepts. - Initiated investigation of Finite Element Modeling (FEM) for estimating the performance of the Low Frequency Broadband (LFBB) Buried Mine Identification System over a wide range of tactically important environments. - Initiated modeling of data fusion and mine contact handling. - Initiated research to demonstrate new structural-acoustic-based mine identification algorithms that do not require extensive training data to work in new underwater environments.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiated research to extend electro-optical imaging resolution in underwater environments by using short exposure techniques. Acquisition Workforce Fund: - Funded DoD Acquisition Workforce Fund. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete technology development for a Tactical UAV (TUAV) buried minefield detection sensor. - Complete development of advanced 3-D LIDAR mine detection algorithms to support post mission analysis. - Complete development of the Performance Analysis and Training Tool (PATT) to assess the performance characteristics of high frequency imaging sonars and the associated sonar processing concepts. - Complete investigation of Finite Element Modeling (FEM) for estimating the performance of the Low Frequency Broadband (LFBB) Buried Mine Identification System over a wide range of tactically important environments. - Complete technology development 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 development of a high source level, single crystal based projector that can extend the maximum detection range of the Low Frequency Broadband (LFBB) Mine Identification System. - Initiate Phase 2 of Advanced Mission Module Technology Development.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate performance evaluation of physical layer signal processing algorithms and signaling schemes developed for underwater acoustic communication networks. - Initiate implementation of candidate physical layer algorithms and signaling schemes into acoustic modems targeted for UUV platforms. - Initiate investigation into cross-layer and/or network layer design strategies for ad hoc underwater acoustic communication networks comprised of fixed and/or mobile nodes. - Initiate development of technologies for detection of mines and obstacles in riverine environments. - Initiate development of mine burial prediction models which include migrating sandwaves. - Initiate development of prediction models for surf zone optical properties. - Initiate effort to quantify and validate improvements in probability of detection and the reduction of false alarms that can be achieved through multi-static acoustic sensing and processing for cooperating, unmanned vehicles. - Initiate development of new waveforms and algorithms for improved automatic discrimination of mines from non-traditional clutter. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Continue development of automatic mine detection and classification algorithms for integrated forward-looking iPUMA sonar and side-looking sonars. - Continue research to extend electro-optical imaging resolution in underwater environments by using short exposure techniques. - Complete large area search and survey based upon multiple, cooperating UUVs and USVs. - Complete Phase 2 of Advanced Mission Module Technology Development with a final demonstration. - Complete development of multi-platform fusion of data from high-resolution mine hunting systems (e.g. AN/AQS-20) and submarine-launched Mine Warfare (MIW) UUVs via registration with those from the Mine Warfare Environmental Data Library (MEDAL) for improved mine detection and avoidance. - Complete performance evaluation of physical layer signal processing algorithms and signaling schemes developed for underwater acoustic communication networks.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Complete development of Multiple Input Multiple Output (MIMO) UUV communications by determining channel capacity and extending use to moving platforms. - Complete demonstration of flapping fin propulsion on an inexpensive, stealthy undersea vehicle to enable new mine warfare mission capabilities. - Complete development of an ultrafast silicon carbide (SiC) avalanche transistor and a SiC drift step recovery diode. - Complete at sea prototype Low Frequency Broadband (LFBB) acoustic scattering sonar focusing on multi-aspect mine classification/identification and characterization of clutter in various environments. - Initiate development of system concepts for wide area detection of surface and submerged drifting mines.					
MINE/OBSTACLE NEUTRALIZATION Activity includes applied research to support selected MCM related FNC ECs for rapid mine and obstacle neutralization and sea mine jamming techniques to increase surface ship safe standoff from threat mines. It includes various lethality, vulnerability and dispensing computational tools, models and assessments to support the various far-term Surf Zone (SZ) and Beach Zone (BZ) mine and obstacle breaching concepts. In FY 2009, funding programmed for new FNC ECs was realigned to reflect the priorities of the Navy. The investment reduction from FY 2009 through FY 2010 reflects the completion and transfer of many major projects by the end of FY 2009 and 2010. *FY 2009 Accomplishments:* - Continued technology development for autonomous neutralization of sea mines in VSW areas. - Continued development of precision navigation capability for targeting, safe navigation through assault lanes including lane marking. - Continued development of AUV technologies for neutralization of littoral sea mines.	4.207	1.308	0.801	0.000	0.801

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued acoustic organic mine jamming investigations as a follow-on to FNC work in electromagnetic organic mine jamming. - Completed development of models to assess performance of bombs against mines in VSW. - Completed development of advanced computational models for high speed water entry and penetration. - Completed development of advanced computational tools for predicting soil penetration by countermine darts. - Completed assessment of stand-off, assault breaching warhead fuse to extend effectiveness of unitary warheads to greater water depths. - Initiated development of prototype mission planner for JDAM Assault Breaching System (JABS) in the VSW. - Initiated review of GPS augmentation data collected during end-to-end tests with Amphibious Assault Vehicle (AAV) and airborne platform with mine detection sensor. - Initiated review of data collected during AAV testing with augmented reality. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete acoustic organic mine jamming investigations as a follow-on to FNC work in electromagnetic organic mine jamming. - Complete development of precision navigation capability for targeting, safe navigation through assault lanes including lane marking. - Complete development of prototype mission planner for JABS in the VSW. - Complete review of data collected during AAV testing with augmented reality. - Complete review of GPS augmentation data collected during end-to-end tests with AAV and airborne platform with mine detection sensor. - Complete technology development for autonomous neutralization of sea mines in VSW areas. - Initiate development of concepts for sweeping and/or jamming of advanced mine threats. - Initiate a project to study feasibility of mine jamming from autonomous undersea vehicles.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate development of autonomous behaviors to improve neutralization efficiency of littoral sea mines. - Initiate development of system concepts for autonomous neutralization of surface and submerged drifting mines. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete development of AUV technologies for neutralization of littoral sea mines. - Complete development of autonomous behaviors to improve neutralization efficiency of littoral sea mines. - Initiate demonstration of autonomous neutralization of littoral sea mines. - Initiate a project to study system concepts for autonomous neutralization of surface and submerged drifting mines.					
SPECIAL WARFARE/EOD The goal of this effort is to develop technologies to extend stand-off of special operations and EOD forces in clandestine hydrography, mine clearance and port security missions while increasing the range and effectiveness of divers. Advanced technologies are needed to gain access to areas contaminated by area-denial sensors and/or booby traps. Developed technologies will transition to the Joint Service EOD Program, the Naval EOD Program, or the DOD Technical Response Group. This activity includes applied research in sensor technology for NSW and EOD autonomous and handheld sonar systems to increase detection range and accuracy in harsh environments. Other efforts include mission support technology improvements for AUVs and human divers - such as communications, navigation and life support. *FY 2009 Accomplishments:* - Continued development of AUV technologies for autonomous inspection of ship hulls.	10.188	9.751	10.018	0.000	10.018

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued development of low probability of intercept/low probability of detection (LPI/LPD) underwater communications. - Continued development of metal-hydride based thermal control technology for combat divers. - Continued development of technology to detect, monitor, and disrupt operation of Explosive Safe and Arming (ESA) devices. - Continued design of an underwater riverine autonomous surveillance system that uses multiple small sensor nodes to provide persistent surveillance. - Continued development of tactile-feedback robotic manipulators. - Continued development of technologies for portable hand-held detection of concealed Improvised Explosive Devices (IEDs). - Completed development of dual-mode visible sensor for clandestine tracking of near-shore craft and other objects. - Completed development of buried ordnance identification sensor. - Completed assessment of x-ray fluorescence technologies for the detection of bulk explosive compounds in containers and vehicles. - Initiated development of low collateral damage neutralization device. - Initiated development of technologies for the detection and disruption of passive and active IR sensors. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete design of an underwater riverine autonomous surveillance system that uses multiple small sensor nodes to provide persistent surveillance. - Complete development of low probability of intercept/low probability of detection (LPI/LPD) underwater communications - Complete development of metal-hydride based thermal control technology for combat divers. - Complete development of tactile-feedback robotic manipulators.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Complete development of technologies for portable hand-held detection of concealed Improvised Explosive Devices (IEDs). - Complete development of technology to detect, monitor, and disrupt operation of Explosive Safe and Arming (ESA) devices. - Initiate development of maritime TTL technologies. - Initiate development of technologies for contaminated water diving. - Initiate development of technologies for enhanced navigation and ISR in riverine environments. -Initiate development of technologies to detect and locate IEDs. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete development of low collateral damage neutralization device. - Complete development of technologies for the detection and disruption of passive and active IR sensors. - Initiate development of technologies to access Improvised IEDs.					
Accomplishments/Planned Programs Subtotals	46.074	40.710	36.833	0.000	36.833

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 0603782N: *MINE AND EXPEDITIONARY WARFARE ADVANCED TECHNOLOGY*	34.315	21.591	21.941	0.000	21.941	4.373	4.483	2.810	0.000	0.000	89.513

D. Acquisition Strategy

N/A

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E. Performance Metrics

The overall metrics of this applied research program are the development of technologies which focus on the Expeditionary Warfare challenge of speeding the tactical timeline and increasing safe standoff from minefields. Individual project metrics include the transition of 6.2 technology solutions into 6.3 advanced technology programs.

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
9999: *Congressional Adds*	6.981	3.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	30.942

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Add: Electromagnetic Signatures Assessment System Using Multiple Autonomous Undersea Vehicles, Phase III *FY 2009 Accomplishments:* This effort supported the development of algorithms needed to control a fleet of small autonomous underwater vehicles through the integration of inexpensive, easily deployable electromagnetic and acoustic measurement systems trained to work together to assess the electromagnetic or acoustic signature of a forward deployed vessel. *FY 2010 Plans:* Continue this effort to support Electromagnetic Signatures Assessment System Using Multiple Autonomous Undersea Vehicles, Phase III research.	1.596	1.992
Congressional Add: Virtual Onboard Analyst For Multi-Sensor Mine Detection *FY 2009 Accomplishments:* This effort supported the development of greater diversity in data covering the wide range of phenomenology needed to remove clutter and improve false alarms with regard to base and operate littoral mine countermeasure systems.	0.997	1.195

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
FY 2010 Plans: Continue this effort to support Virtual Onboard Analyst for Multi-Sensor Mine Detection research.		
Congressional Add: Detection and Neutralization of Electronically Initiated Improved Explosive Devices (IEDs) *FY 2009 Accomplishments:* This effort supported the continued development and demonstration of an effective and suitable IED detection and neutralization system through use of a magnetic pulse system. The system also provided a viable means of neutralization verification.	1.995	0.000
Congressional Add: Water Security Program (Inland Water Quality and Desalination) *FY 2009 Accomplishments:* This effort supported the development of a user friendly costing program to evaluate the economics for the use of various desalination technologies for inland brackish water desalination, development of electrodialysis as an efficient and cost effective means to desalinate brackish water, and the development of a program involving participation of students from NMSU in studies at the Brackish Groundwater National Desalination Research Facility in Alamogordo, NM.	2.393	0.000
Congressional Adds Subtotals	6.981	3.187

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602782N: *Mine & Exp Warfare Applied Res*	**PROJECT** 9999: *Congressional Adds*

E. Performance Metrics

Congressional Interest Items not included in other Projects.