Exhibit R-2, PB 2010 Navy RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 2 - Applied Research					R-1 ITEM NOMENCLATURE PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH					
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	69.831	54.689	40.880						Continuing	Continuing
0000: MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	69.831	54.689	40.880						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 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, PB 2010 Navy RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 2 - Applied Research	**R-1 ITEM NOMENCLATURE** PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	70.504	47.869	45.234	
Current BES/President's Budget	69.831	54.689	40.880	
Total Adjustments	-0.673	6.820	-4.354	
Congressional Program Reductions		-0.152		
Congressional Rescissions				
Total Congressional Increases		7.000		
Total Reprogrammings	-0.099			
SBIR/STTR Transfer	-0.574			
Program Adjustments			-4.402	
Rate/Misc Adjustments		-0.028	0.048	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **AUTONOMOUS UNDERWATER VEHICLE (AUV) DOCKING AND RECHARGING STATION**	2.722	0.000
Project: 9999, **DETECTION AND NEUTRALIZATION OF ELECTRONICALLY INITIATED IMPROVED EXPLOSIVE DEVICES (IEDS)**	2.316	1.995
Project: 9999, **ELECTROMAGNETIC SIGNATURE ASSESSMENT SYSTEM USING MULTIPLE AUTONOMOUS UNDERWATER VEHICLES**	1.929	1.596
Project: 9999, **NAVY SPECIAL WARFARE (NSW) UNATTENDED SENSOR NETWORK**	1.543	0.000
Project: 9999, **REMOTE CONTROLLED SURVEILLANCE SONAR SYSTEM (RCSSS)**	0.966	0.000
Project: 9999, **VIRTUAL ONBOARD ANALYST (VIRONA) FOR MULTI-SENSOR MINE DETECTION**	0.966	0.997
Project: 9999, **WATER SECURITY PROGRAM (INLAND WATER QUALITY AND DESALINATION)**	0.773	2.393

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 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH					PROJECT NUMBER 0000	
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**
0000: MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	69.831	54.689	40.880						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 2008	FY 2009	FY 2010	FY 2011
MINE TECHNOLOGY	0.196	0.193	0.288	

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 2008 Accomplishments:
- Continued assessment of sea mine technologies in order to maintain a level of expertise in naval mines.

FY 2009 Plans:
- Continue all efforts of FY 2008.
- Initiate 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, PB 2010 Navy RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH			PROJECT NUMBER 0000	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiate development of concepts for semi-autonomous and remote controlled mines and minefields.					
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 decrease from FY 2008 to FY 2009 reflects a reduced level of investment to support other Navy priorities. *FY 2008 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. - Continued development of automatic mine detection and classification algorithms for integrated forward-looking iPUMA sonar and side-looking sonars. - Continued development of data fusion algorithms for underwater EO, magnetic and acoustic sensors to enhance probability of classification and probability of identification and reduce false alarm rate for proud and buried mine hunting. - 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) UUVs via registration with those from the Mine Warfare Environmental Data Library (MEDAL) for improved mine detection and avoidance.		42.238	32.585	29.533	

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH	PROJECT NUMBER 0000

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continued development of UUV-based extended range electro-optic identification sensors and supporting meteorology and oceanography and planning systems. - Continued evaluation of Littoral Remote Sensing (LRS) algorithm development requirements utilizing data streams available from national and organic sensors. - Continued large area search and survey based upon multiple, cooperating UUVs. - Continued 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. - Continued phenomenology studies for improved mine detection algorithms for UAV sensors. - 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 the development of a numerical simulation capability for exploring SAS system sensitivities to seafloor sediment parameters. - Continued the development of multi-static acoustic sensing and processing for cooperating, unmanned vehicles. - Completed design and development of Broadband interferometric SAS - and complete at-sea testing. - Completed development of long range, forward-looking iPUMA sonar for small (12.75”) UUVs and begin at-sea testing. - Completed development of UWB SAR imaging algorithms and design, and construction of SAR breadboard experimental system. - Completed the development of a low-cost, 12.75” UUV-based EO sensor for mine identification and conduct initial sea testing of sensor performance. - Completed the primary sub-system design efforts to extend mine identification using acoustic color concept to longer ranges. - Initiated demonstration of flapping fin propulsion on an inexpensive, stealthy undersea vehicle to enable new mine warfare mission capabilities. - Initiated development of algorithms exploiting broadband acoustic transmit waveforms for improved automatic classification of buried mines from clutter. - Initiated development of an ultrafast silicon carbide (SiC) avalanche transistor and a SiC drift step recovery diode.				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiated development of Multiple Input Multiple Output (MIMO) UUV communications by determining channel capacity and extending use to moving platforms. - Initiated integration of iPUMA and SAS systems in a single vehicle to obtain 100% area coverage. - Transitioned revolutionary low frequency broadband mine hunting technology to PMS-403. *FY 2009 Plans:* - Continue all efforts of FY 2008 less those noted as completed above. - Complete development of algorithms exploiting broadband acoustic transmit waveforms for improved automatic classification of buried mines from clutter. - Complete 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. - Complete evaluation of LRS algorithm development requirements utilizing data streams available from national and organic sensors. - Complete 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. - Complete phenomenology studies for improved mine detection algorithms for UAV sensors. - Complete the development of a numerical simulation capability for exploring SAS system sensitivities to seafloor sediment parameters. - Complete the development of multi-static acoustic sensing and processing for cooperating, unmanned vehicles. - Initiate development of a Mine/Obstacle Detection and Avoidance capability for Autonomous Underwater Vehicles (AUVs) equipped with the iPUMA sonar system. - Initiate development of a small ultrasound acoustic underwater camera for UUV-based classification and identification of underwater mines. - Initiate development of advanced 3-D LIDAR mine detection algorithms to support post mission analysis. - Initiate development of drifting mine detection concepts.					

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602782N MINE AND EXPEDITIONARY WARFARE APPLIED RESEARCH			PROJECT NUMBER 0000	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiate development of heat engine for unmanned underwater vehicles powered by thermal gradients in the water column. - Initiate development of Performance Analysis and Training Tool (PATT) to assess the performance characteristics of high frequency imaging sonars and the associated sonar processing concepts. - Initiate 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. - Initiate modeling of data fusion and mine contact handling. - Initiate research to demonstrate new structural-acoustic-based mine identification algorithms that do not require extensive training data to work in new underwater environments. - Initiate research to extend electro-optical imaging resolution in underwater environments by using short exposure techniques. - 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. *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.					

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification		DATE: May 2009			
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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- 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. - 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.					
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.		5.714	4.363	1.308	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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 2008 Accomplishments:* - Continued development of models to assess performance of bombs against mines in Very Shallow Water (VSW). - Continued development of advanced computational models for high speed water entry and penetration. - Continued development of advanced computational tools for predicting soil penetration by countermine darts. - Continued technology development for autonomous neutralization of sea mines in VSW areas. - Continued development of stand-off, assault breaching warhead fuse to extend effectiveness of unitary warheads to greater water depths. - Continued development of precision navigation capability for targeting, safe navigation through assault lanes including lane marking. - Initiated development of AUV technologies for neutralization of littoral sea mines. - Initiated acoustic organic mine jamming investigations as a follow-on to FNC work in electromagnetic organic mine jamming. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Complete development of models to assess performance of bombs against mines in VSW. - Complete development of advanced computational models for high speed water entry and penetration. - Complete development of advanced computational tools for predicting soil penetration by countermine darts. - Complete assessment of stand-off, assault breaching warhead fuse to extend effectiveness of unitary warheads to greater water depths.				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiate development of prototype mission planner for JDAM Assault Breaching System (JABS) in the VSW. - Initiate review of GPS augmentation data collected during end-to-end tests with Amphibious Assault Vehicle (AAV) and airborne platform with mine detection sensor. - Initiate 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. - 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.					
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		10.468	10.567	9.751	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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 2008 Accomplishments:* - Continued assessment of x-ray fluorescence technologies for the detection of bulk explosive compounds in containers and vehicles. - Continued development of AUV technologies for autonomous inspection of ship hulls. - Continued development of buried ordnance identification sensor. - Continued development of dual-mode visible sensor for clandestine tracking of near-shore craft and other objects. - 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. - Completed development of a Seal Delivery Vehicle (SDV) low-observable periscope. - Completed development of robotic manipulators, actuators and control algorithms based on artificial muscle materials. - Initiated design of an underwater riverine autonomous surveillance system that uses multiple small sensor nodes to provide persistent surveillance. - Initiated development of tactile-feedback robotic manipulators. - Initiated development of technologies for portable hand-held detection of concealed Improvised Explosive Devices (IEDs). *FY 2009 Plans:* - Continue all efforts of FY 2008 less those noted as completed above. - Complete development of dual-mode visible sensor for clandestine tracking of near-shore craft and other objects. - Complete development of buried ordnance identification sensor.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Complete assessment of x-ray fluorescence technologies for the detection of bulk explosive compounds in containers and vehicles. - Initiate development of low collateral damage neutralization device. - Initiate 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. - 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.				

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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 0603502N/Surface and Shallow Water Mine Countermeasures									Continuing	Continuing
PE 0603606A/Landmine Warfare and Barrier Advanced Technology									Continuing	Continuing
PE 0603640M/USMC Advanced Technology Demonstration (ATD)									Continuing	Continuing
PE 0603654N/Joint Service Explosive Ordnance Development									Continuing	Continuing
PE 0603782N/Mine and Expeditionary Warfare Advanced Technology									Continuing	Continuing
PE 0604654N/Joint Service Explosive Ordnance Development									Continuing	Continuing

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PE 1160401BB/Special Operations Technology Development	Continuing	Continuing
PE 1160402BB/Special Operations Advanced Technology Development	Continuing	Continuing

D. Acquisition Strategy

Not applicable.

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.