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 0603747N UNDERSEA 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	73.123	83.565	68.037						Continuing	Continuing
2916: UNDERSEA WARFARE ADVANCED TECHNOLOGY	70.024	81.171	68.037						Continuing	Continuing
9999: CONGRESSIONAL PLUS-UPS	3.099	2.394	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.

All Navy advanced technology development in undersea target detection, classification, localization, tracking and neutralization is funded through this PE. The related technologies being developed are aimed at enabling Sea Shield, one of the three core operational concepts detailed in the Naval Transformational Roadmap. Associated efforts focus on new Anti-Submarine Warfare (ASW) operational concepts that promise to improve wide-area surveillance, detection, localization, tracking and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. The focus is on leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship and air ASW assets.

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	75.422	81.490	74.747	
Current BES/President's Budget	73.123	83.565	68.037	
Total Adjustments	-2.299	2.075	-6.710	
Congressional Program Reductions		-0.258		
Congressional Rescissions				
Total Congressional Increases		2.400		
Total Reprogrammings	-1.758			
SBIR/STTR Transfer	-0.541			
Program Adjustments			-6.660	
Rate/Misc Adjustments		-0.067	-0.050	

Congressional Increase Details ($ in Millions)

	FY 2008	FY 2009
Project: 9999, **DEEP WATER ACOUSTIC DETECTION SYSTEM**	3.099	0.000
Project: 9999, **THEATER UNDERSEA WARFARE INITIATIVE**	0.000	2.394

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603747N UNDERSEA WARFARE ADVANCED TECHNOLOGY					PROJECT NUMBER 2916	
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**
2916: UNDERSEA WARFARE ADVANCED TECHNOLOGY	70.024	81.171	68.037						Continuing	Continuing

A. Mission Description and Budget Item Justification

All Navy advanced technology developments in undersea target detection, classification, localization, tracking and neutralization are funded through this project. Technologies being developed within this project are aimed at enabling Sea Shield, one of the three core operational concepts detailed in the Naval Transformational Roadmap. Associated efforts focus on new ASW operational concepts that promise to improve wide-area surveillance, detection, localization, tracking and attack capabilities against quiet adversary submarines operating in noisy and cluttered shallow water environments. Related efforts are aimed at leveraging technologies that will protect the country's current capital investment in surveillance, submarine, surface ship and air ASW assets.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
ANTI-SUBMARINE WARFARE (ASW) DISTRIBUTED SEARCH	0.000	0.000	3.345	
ASW Distributed Search focuses the development of technologies for the non-covert tactical search for undersea targets ranging from hours to weeks using automated sensor systems deployed around operating areas including along key transit routes to protect naval/maritime forces, around temporarily fixed sea base regions and naval force operating areas, or around fixed defensive regions and areas of interest such as key US/Allied ports. "Non-covert" implies availability of airborne assets for sensor deployment (although other means may also be used), and the ability to employ active sonar along with passive and non-acoustic methods. "Search" is conducted in concentrated areas, typically exploiting cues received from surveillance systems. The submarine target must be detected beyond its weapons release range. The objective is to develop rapidly deployable systems employing automated detection and classification capabilities for use in both shallow and deep water operating environments. Distributed Search supports the ASW protected passage Maritime Shield operational constructs. Related efforts include the development of distributed systems employing optimization as well as active acoustic sensing and processing techniques, navy-unique transduction and underwater networking technology. Efforts also include the development of Unmanned Undersea Vehicle-based and affordable off-board deployable sensing systems employing persistent detection concepts and components. These efforts provide an				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
extended reach of organic platform-based systems through the use of new sensor concepts, improved materials for advanced sensors, optimized deployment, employment, and automated operation of distributed sensor fields. The cornerstone of Distributed Search is the development of rapidly deployable, long-endurance active sensors with automated processing suitable for use in a wide variety of operational environments. The FY 2009 to FY 2010 funding increase is due to the realignment of the Wide Area ASW Surveillance activity into this new activity. *FY 2010 Plans:* The following efforts were transferred to this new activity from the FY 2009 Wide Area ASW Surveillance activity: - Continue development of Distributed Systems Processing (DSP) threat submarine feature association and field tracking algorithms for active and passive distributed acoustic ASW systems. - Initiate development high fidelity computer-based simulation training with linked architecture that supports ASW training from the operator-level to the ASW Commander-level applicable to both surface and air platforms.					
ANTI-SUBMARINE WARFARE (ASW) PERFORMANCE ASSESSMENT The goal of this work is to integrate ocean and atmospheric environmental characteristics with sensor performance predictions in order to develop algorithms and Tactical Decision Aids (TDAs) that will accurately predict overall sensor performance in a given environment in near real-time for both present and future situations. The results of these research efforts in conjunction with embedded state-of-the-art command and operator-level training will facilitate the optimum employment of ASW sensor systems, thus increasing their effectiveness and potentially decreasing the number of sensors used to provide coverage in a given area. This work will provide operational commanders with sensor performance predictions which allow them to accurately judge the performance of those sensors, as well as information with which to deploy them for the greatest operational effect. It will also provide information as to how the performance evolves over time due to effects such as the deformation of sensor locations by currents, sound velocity		0.000	0.000	6.417	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
profile changes, geologic magnetic interference changes, or changes to the optical properties of the water, etc. The effort includes performance predictions for fields of sensors as well as individual sensors themselves and applies to both acoustic and non-acoustic sensors. Work includes development of ASW sensor and system performance models, and realistic simulations and measures of effectiveness that incorporate and exploit critical environmental knowledge. It includes efforts to couple ocean dynamics and acoustics, characterize ambient noise in the littorals, measure and model acoustic and optical propagation and scattering in complex environments, develop algorithms to extract environmental information from through-the-sensor measurements and quantification and prediction of uncertainty. This information is combined with the operating characteristics of particular sensors (or groups of sensors) to provide predictions of sensor performance in the environment at that particular time and in the future. The predictions will also include assessments of the prediction uncertainty due to environmental measurement and sensor performance uncertainties. This work aligns principally with the Assure Access and Hold at Risk S&T Focus Area in the Naval S&T Strategic Plan and contributes measurably to the Operational Environments S&T Focus Area strategic objectives. The FY 2009 to FY 2010 funding increase is due to the realignment of the Wide Area ASW Surveillance activity into this new activity. *FY 2010 Plans:* The following efforts were transferred to this new activity from the FY 2009 Wide Area ASW Surveillance activity: - Continue a research effort focusing on distributed system in-situational environmental characterization and system monitoring. - Continue a research effort to determine the placement of and follow-on control and pattern keeping of acoustic sources and mobile distributed sensor systems. - Continue research effort aimed at the ideal placement of acoustic sources and drifting sensor systems.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Complete algorithm testing of uncontrolled drifting systems using a simulator. This effort transitioned from PE 0602747N in FY 2009. - Complete test planning of source algorithms to be used to determine the optimal initial placement of uncontrolled drifting distributed systems. - Complete development of algorithms to optimize the initial placement of uncontrolled drifting systems. This effort transitioned from PE 0602747N. - Complete development of a simulator for placement of uncontrolled drifting systems. This effort transitioned from PE 0602747N in FY 2009. This effort is intended to transition to Program Executive Office Air ASW, Assault and Special Mission Programs (PMA-264). The agreement is being negotiated and the details will be entered after the TA is signed.				
ANTI-SUBMARINE WARFARE (ASW) SURVEILLANCE ASW Surveillance focuses on dramatically improving detection, classification, and localization capabilities in large ocean areas relative to the capabilities of legacy ASW surveillance systems. The related technologies support the conduct of covert wide-area surveillance ranging from one day to six months. The objectives are to develop and demonstrate technologies that provide clandestine indications and warnings in far forward and contested operating areas and in complex operational environments against all submarine threats including new threats with unknown target signatures and tactics. Covertness implies use of non-observable platforms and/or deployed automated sensors employing passive sonar or other non-detectable methods. The surveillance process includes initial detection and classification. Efforts include the development of Unmanned Undersea Vehicle-based and affordable off-board deployable sensing systems employing a wide variety of surveillance concepts and components. These efforts focus on alternative detection phenomena, vector/tensor sensors, automated acoustic processing, more compact and longer lasting power sources, and high bandwidth acoustic communications links. The FY 2009 to FY 2010 funding increase is due to the realignment of the Wide Area ASW Surveillance activity into this new activity.	0.000	0.000	44.783	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2010 Plans: The following efforts were transferred to this new activity from the FY 2009 Wide Area ASW Surveillance activity: - Continue the On-Demand Detection Classification and Localization (ODDCL) effort focusing on the development of sensor and platform designs and key components compatible with a notional Concept of Operations. - Continue system level design and integration for ODDCL. - Continue development of a tactical area prototype system for PLUS. - Continue a PLUS prototype system simulation test in preparation for FY 2011 at-sea experiments. - Continue analysis of data collected during the FY 2010 PLUS at-sea experiments. - Continue two at-sea experiments focused on increasing system persistence capabilities. - Complete Submarine Track & Trail (STT) Baseline advanced research efforts in the areas of advanced undersea sensors, communications, autonomy, and sensor data collection and analysis to support tracking algorithm and automated processing development. - Complete DADS deployability, survivability and classification performance improvement effort. - Complete testing of the Palantir (a non-acoustic surveillance system) sensor system. - Complete tactical test planning for the Palantir sensor. - Complete DADS at-sea classification performance improvement testing. - Complete at-sea testing of integrated STT submersibles and evaluate overall system performance. - Complete DADS deployability, covert communications and survivability testing. - Complete at-sea demonstrations of STT submersible with fully integrated sensor package. - Initiate system level integration and testing for ODDCL. - Initiate development of a vector sensor towed array and associated signal processing with performance nominally equivalent to a "thin-line" (TB-29) twin-line towed array to be compatible with the existing TB-29 array handling system.				
BATTLEGROUP ANTI-SUBMARINE WARFARE (ASW) DEFENSE	2.506	0.000	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Battlegroup ASW Defense technology focuses on the development of platform-based sources and receivers aimed at denying submarines the ability to target grey ships. This technology area is primarily concerned with detections inside 10 nautical miles. Battlegroup ASW Defense integrates next-generation technologies, automatic target recognition, sensors that adjust to complex acoustic environments, and environmentally adaptive processing techniques. Battlegroup ASW Defense will enable smaller, lighter, and cheaper arrays, large multi-line arrays, and submarine flank arrays all with environmental adaptation capabilities. The decrease in funding from FY 2008 to FY 2009 is due to the completion of the Multi-Mode Magnetic Detection System (MMMDS) project in FY 2008. Additionally, the decrease in Battlegroup ASW Defense supports a basic shift in Naval strategy away from platform-based undersea surveillance systems toward deployable, distributed systems. *FY 2008 Accomplishments:* - Completed the integration of MMMDS sensor hardware/software into towed vehicles flown by vertical takeoff unmanned aerial vehicle surrogates. - Completed MMMDS final reporting; transition to NAVAIR. - Initiated/completed MMMDS planning and execution of final over water demonstration with realistic target.				
NEUTRALIZATION Neutralization focuses on undersea weapons technologies to counter threat submarines by increasing the Probability of Kill (PK). The ultimate goals of Neutralization efforts are to develop reduced size advanced undersea weapons with revolutionary capabilities and to fill Sea Shield mission capability gaps and demonstrate transformational capabilities for ASW weapons. The increase in funding from FY 2008 to FY 2009 is due to the phased movement of Lightweight Torpedo Technologies (LTT) from Applied (6.2) to Advanced (6.3), which provides a tactically revolutionary PK against quiet diesel-electric submarines operating in harsh shallow water environments, and CRAW which is capable of deployment from an air-vehicle at low altitude to neutralize undersea threat targets from the	16.940	20.668	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
stand-off ranges of US Naval vessels. These research efforts began in FY 2007 and continue for five years and are targeted for transition in FY 2010 and FY 2011 respectively. These projects are funded in accordance with the FNC process and are approved by the Technology Oversight Group. The FY 2009 to FY 2010 funding decrease is due to the realignment of the Neutralization activity to the newly established Undersea Weaponry activity. *FY 2008 Accomplishments:* - Continued LTT integration of broadband and adjunct sensors for in-water data collection to result in a new dual-mode sensor guidance and control system for at-sea testing. - Continued feasibility investigations under LTT to quantify adjunct sensor configurations and signal processing approaches to enable positive discrimination of artificial targets at standoff ranges. This feasibility investigation is expected to result in five (5) new patent applications. (Transitioned from PE 0602747N) - Continued LTT feasibility investigations to select the stealth and propulsion technologies for future integration as a low cost propulsion replacement for the Mk 54 lightweight torpedo (LWT). (Transitioned from PE 0602747N) - Continued LTT feasibility investigations and selected geo-coordinate based navigation system technologies and connectivity methods (i.e. acoustic communications, fiber link) for future development of technologies for LWT demonstration). (Transitioned from PE 0602747N) - Continued data collection for LWT broadband and counter-countermeasures in the harsh shallow water environment of the Shore Bombardment Area site off the Southern California Off-Shore Range using an experimental test vehicle fitted with a broadband Mk 54 array. (Transitioned from PE 0602747N) - Continued LTT sensor package development to achieve integrated coherent broadband sonar and novel adjunct sensors homing and classification capabilities for LWT. (Transitioned from PE 0602747N) - Continued LTT advanced counter-countermeasure algorithm and tactics development for LWT. (Transitioned from PE 0602747N) - Continued feasibility assessment of LTT to best utilize precision targeting and distributed sensors for weapon employment from high altitude and standoff range. (Transitioned from PE 0602747N)				

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

- Continued development and integration of adjunct sensors into a lightweight torpedo sensor and design signal processing and data fusion techniques to improve target classification in areas of high contact density. (Transitioned from PE 0602747N)
- Continued a high fidelity weapon frequency model development effort to parallel adjunct sensor developments and provide accurate synthetic data for algorithm design and measurement. (Transitioned from PE 0602747N)
- Completed LTT feasibility investigations addressing adjunct sensor configurations, stealth and propulsion technologies, and geo-coordinate based navigation systems. (Transitioned from PE 0602747N)
- Initiated in-water data collection for development of advanced counter countermeasure processing, weapon-to-weapon acoustic communication and a salvo vehicle intelligent controller.
- Initiated development of a high channel count LTT broadband transmitter.
- Initiated development and integration of a total LTT system prototype in the Mk 54 torpedo form factor for at sea demonstrations.
- Initiated development of a reduced size/weight CRAW for air deployment. This effort will include sensor, guidance and control, warhead, propulsion, and air frame integration tasks.
- Initiated CRAW in water data collection to support development of guidance and control algorithms enabling an ASW offensive capability in the Common Very Lightweight Torpedo.
- Initiated tests to support the development of a CRAW warhead that will achieve required performance against submarine targets, and demonstrate feasibility of achieving final goal.

FY 2009 Plans:

All efforts, except those indicated as complete below, transfer from this activity to the new Undersea Weaponry Activity in FY 2010.

- Initiate and complete LTT development, scale up and testing prototype components.
- Complete LTT advanced counter-countermeasure algorithm and tactics development for LWT.
- Initiate demonstration of LTT underwater acoustic communications capability to enable coordinated attack and net-centric connectivity. (Transitioned from PE 0602747N)

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Initiate demonstration of LTT weapon salvo capability utilizing behavior-based control (Transitioned from PE 0602747N) - Initiate development of an integrated LTT set-to-hit simulation capability to evaluate weapon performance gains to include robust representations of component technologies developed and demonstrated under the LTT project. - Initiate design and development of an integrated LTT full system prototype consisting of hardware and software upgrades for a final at-sea demonstration to be conducted in FY 2010. - Initiate in-water data collection on CRAW homing in presence of countermeasures.				
UNDERSEA WEAPONRY Undersea Weaponry focuses on the development of enabling technologies to counter threat submarines and surface vessels by increasing Probability of Kill (PK) and platform survivability. Weapon technology focus areas include: the Lightweight Torpedo Technologies (LTT) and the Compact Rapid Attack Weapon (CRAW) projects. The ultimate goal of this activity is to provide revolutionary capabilities needed to fill Sea Shield Warfighter Capability Gaps, to accommodate unique payload limitations through the development of modular and reduced sized undersea weapons based on common technology enablers (where possible), and to provide improved submarine cuing/wide area search in deep and shallow water ocean areas while providing the capability to rapidly transition the submarine mission to engagement/neutralization. The FY 2009 to FY 2010 funding increase is due to the realignment of the Neutralization activity into this new activity. *FY 2010 Plans:* The following efforts transferred to this activity from the FY 2009 Neutralization activity: - Continue development of a reduced size/weight CRAW for air deployment. This effort will include sensor, guidance and control, warhead, propulsion, and air frame integration tasks. - Continue CRAW in water data collection to support development of guidance and control algorithms enabling an ASW offensive capability in the Common Very Lightweight Torpedo.	0.000	0.000	13.492	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Continue tests to support the development of a CRAW warhead that will achieve required performance against submarine targets, and demonstrate feasibility of achieving final goal. - Continue in-water data collection on CRAW homing in presence of countermeasures. - Complete LTT feasibility investigations to select the stealth and propulsion technologies for future integration as a low cost propulsion replacement for the Mk 54 lightweight torpedo (LWT). - Complete further development of advanced fusing technology for LWT started in FY09 as part of the LTT FNC project. - Complete LTT feasibility investigations and selected geo-coordinate based navigation system technologies and connectivity methods (i.e. acoustic communications, fiber link) for future development of technologies for LWT demonstration). - Complete data collection for LWT broadband and counter-countermeasures in the harsh shallow water environment of the Shore Bombardment Area site off the Southern California Off-Shore Range using an experimental test vehicle fitted with a broadband Mk 54 array. - Complete LTT sensor package development to achieve integrated coherent broadband sonar and novel acoustic sensors for homing and classification capabilities for LWT. - Complete feasibility assessment of LTT to best utilize precision targeting and distributed sensors for weapon employment from high altitude and standoff range. - Complete in-water data collection for development of advanced counter countermeasure processing. - Complete development of a high channel count LTT broadband transmitter. - Complete development and integration of a total LTT system prototype in the Mk 54 torpedo form factor for at sea demonstrations. - Complete development of an integrated LTT set-to-hit simulation capability to evaluate weapon performance gains to include robust representations of component technologies developed and demonstrated under the LTT project. - Complete design and development of an integrated LTT full system prototype consisting of hardware and software upgrades for final at-sea demonstrations to be conducted in FY 2010. - Initiate and complete at-sea demonstration and assessment of LTT full system prototype. - Transition demonstrated Lightweight Torpedo Technologies to PE 0604610N (Lightweight Torpedo Development).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Due to a realignment of priorities the following efforts were completed/ended in FY2009: - LTT integration of broadband and adjunct sensors for in-water data collection to result in a new dual-mode sensor guidance and control system for at-sea testing. - Feasibility investigations under LTT to quantify adjunct sensor configurations and signal processing approaches to enable positive discrimination of artificial targets at standoff ranges. This feasibility investigation is expected to result in five (5) new patent applications. - LTT sensor package development to achieve integrated coherent broadband sonar and novel adjunct sensors homing and classification capabilities for LWT. - Development and integration of adjunct sensors into a lightweight torpedo sensor and design signal processing and data fusion techniques to improve target classification in areas of high contact density. - In-water data collection for development of advanced counter countermeasure processing, weapon-to-weapon acoustic communication and a salvo vehicle intelligent controller. - Demonstration of LTT underwater acoustic communications capability to enable coordinated attack and net-centric connectivity. - Demonstration of LTT weapon salvo capability utilizing behavior-based control.				
WIDE AREA ANTI-SUBMARINE WARFARE (ASW) SURVEILLANCE Wide Area ASW Surveillance is focused on dramatically improving the capability to sanitize large areas relative to the capabilities of legacy ASW sensors. Efforts include the development of affordable off-board systems with associated processing and robust, high-bandwidth communications links. The cornerstone of Wide Area ASW Surveillance is the ability to rapidly distribute sensors from air, surface and sub-surface platforms as well as to develop long-endurance sensors and unmanned ASW vehicles. This activity represents a shift from traditional fixed surveillance systems to autonomous, networked, multi-static operation, supported by passive/active signal processing with the objective of increased detection capabilities.	50.578	60.503	0.000	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
The FY 2008 to FY 2009 increase represents the net effect of the phased movement of technologies from Applied (6.2) to Advanced (6.3) Research as the technologies mature and prepare for transition to acquisition. Additionally, the increase in Wide Area ASW Surveillance supports a basic shift in Naval strategy away from platform-based undersea surveillance systems toward deployable, distributed systems. The FY 2009 to FY 2010 funding decrease is due to the realignment of efforts in this activity to the newly established ASW Distributed Search; ASW Surveillance; and Performance Assessment activities respectively. *FY 2008 Accomplishments:* - Continued STT-Baseline advanced research efforts in the areas of advanced undersea sensors, communications, autonomy, and sensor data collection and analysis to support tracking algorithm and automated processing development. - Continued DADS deployability, survivability and classification performance improvement effort. - Continued testing of the Palantir (a non-acoustic surveillance system) sensor system. The related test planning is conducted in PE 0602747N. - Continued tactical test planning for the Palantir sensor. - Continued development of active sonar sensors and processing for wide area surveillance of deep ocean operating areas. - Completed integration of STT sensors with undersea submersibles. - Completed all Littoral ASW Multistatic Project efforts for CDMR, CDMS, and development of multistatic signal processing algorithms and transition products to PMA-264, Air Anti-Submarine Warfare Assault and Special Missions Program Office, PE 0603254N, Project 1292. - Completed development of and test an experimental design model of a Deep Water Active Deployable System (DWADS) for surveillance of deep ocean submarine threats. - Initiated DADS at-sea classification performance improvement testing. - Initiated at-sea testing of integrated STT submersibles and evaluate overall system performance. - Initiated integration and evaluation of STT tracking algorithms and automated processing. - Initiated and complete design improvements of the Palantir sensor/data collection system and conduct an FY 2008 data collection exercise.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Initiated development of DSP threat submarine feature association and field tracking algorithms for active and passive distributed acoustic ASW systems. - Initiated the ODDCL effort focusing on the development of sensor and platform designs and key components compatible with a notional Concept of Operations. - Initiated development of an advanced development model of a DWADS System for surveillance of deep ocean submarine threats. - Initiated development of a tactical area prototype system for Persistent Littoral Undersea Surveillance (PLUS). This effort transferred to this PE from PE 0602747N. *FY 2009 Plans:* The following efforts transfer to the new ASW Distributed Search activity in FY 2010: - Continue development of DSP threat submarine feature association and field tracking algorithms for active and passive distributed acoustic ASW systems. The following efforts transfer to the new ASW Surveillance activity in FY 2010: - Continue STT-Baseline advanced research efforts in the areas of advanced undersea sensors, communications, autonomy, and sensor data collection and analysis to support tracking algorithm and automated processing development. - Continue DADS deployability, survivability and classification performance improvement effort. - Continue testing of the Palantir (a non-acoustic surveillance system) sensor system. - Continue tactical test planning for the Palantir sensor. - Continue DADS at-sea classification performance improvement testing. - Continue at-sea testing of integrated STT submersibles and evaluate overall system performance. - Continue the ODDCL effort focusing on the development of sensor and platform designs and key components compatible with a notional Concept of Operations. - Continue development of a tactical area prototype system for PLUS. - Initiate simulation test of the PLUS prototype system in preparation for at-sea experiments. - Initiate analysis of data collected during the PLUS at-sea experiments.				

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 0603747N UNDERSEA WARFARE ADVANCED TECHNOLOGY	PROJECT NUMBER 2916

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Initiate two at-sea experiments focused on increasing system persistence capabilities. - Initiate DADS deployability, covert communications and survivability testing. - Initiate system level design and integration for ODDCL. - Initiate at-sea demonstrations of STT submersible with fully integrated sensor package. The following efforts transfer to the new ASW Performance Assessment activity in FY 2010: - Initiate test planning of source algorithms to be used to determine the optimal initial placement of uncontrolled drifting distributed systems. - Initiate research effort aimed at the ideal placement and control of acoustic sources and drifting sensor systems. - Initiate a research effort focusing on distributed system in-situational environmental characterization and system monitoring. - Initiate a research effort to determine the placement of and follow-on control and pattern keeping of mobile sources and distributed sensor systems. The following efforts complete; consequently they do not transfer or continue in FY 2010: - Complete development of and demonstrate an advanced development model of a DWADS System for surveillance of deep ocean submarine threats. This project transitions to the Advanced Development for Undersea Systems Program Office (IWS 5.0) and the ASW Cross Functional Team (N874). Funding to support the transition is in PE 0603561N Project 02033. - Complete development of active sonar sensors and processing for wide area surveillance of deep ocean operating areas. - Complete integration and evaluation of STT tracking algorithms and automated processing.				

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603747N UNDERSEA WARFARE ADVANCED TECHNOLOGY	PROJECT NUMBER 2916

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 0204311N/Integrated Surveillance System									Continuing	Continuing
PE 0205620N/Surface ASW Combat System Integration									Continuing	Continuing
PE 0601153N/Defense Research Sciences									Continuing	Continuing
PE 0602235N/Common Picture Applied Research									Continuing	Continuing
PE 0602435N/Ocean Warfighting Environment Applied Research									Continuing	Continuing
PE 0602702E/Tactical Technology									Continuing	Continuing
PE 0602747N/Undersea Warfare Applied Research									Continuing	Continuing
PE 0602782N/Mine and Expeditionary Warfare Applied Research									Continuing	Continuing
PE 0603175C/Ballistic Missile Defense Technology									Continuing	Continuing
PE 0603235N/Common Picture Advanced Technology									Continuing	Continuing
PE 0603254N/ASW Systems Development									Continuing	Continuing
									Continuing	Continuing

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APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603747N UNDERSEA WARFARE ADVANCED TECHNOLOGY	PROJECT NUMBER 2916

PE 0603506N/Surface Ship Torpedo Defense		
PE 0603513N/Shipboard System Component Development	Continuing	Continuing
PE 0603553N/Surface ASW	Continuing	Continuing
PE 0603561N/Advanced Submarine System Development	Continuing	Continuing
PE 0603734N/CHALK CORAL	Continuing	Continuing
PE 0603739E/Advanced Electronics Technologies	Continuing	Continuing
PE 0603782N/Mine and Expeditionary Warfare Advanced Technology	Continuing	Continuing
PE 0604221N/P-3 Modernization Program	Continuing	Continuing
PE 0604261N/Acoustic Search Sensors	Continuing	Continuing
PE 0604503N/SSN-688 and Trident Modernization	Continuing	Continuing
PE 0604784N/Distributed Surveillance System	Continuing	Continuing

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Improve target detection, localization, and tracking and increase attack capabilities by providing the following capabilities:
- Localization of 85% or more of enemy submarines in far forward or contested waters with false locations of less than 10% of total calls.

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- Effective cueing of an attack from a distance of up to 200nm.
- Improvement of the Lightweight Torpedo (Mk 54). Specific improvements are classified.
- Extending deep water active distributed system lifetime to a few months with a probability of detection (Pd) of 90% within 4 hours (field configuration) or 90% per crossing (barrier configuration), with a False Alarm Rate (FAR) of no more than 4/day.
- Delivery from a Vertical Takeoff Unmanned Air Vehicle (VTUAV) and/or a long-range, high-speed Unmanned Air Vehicle (UAV) a compact undersea weapon capable of a high Probability of Kill (PK) given precise target localization.
- Detection and localization performance with a single-line vector sensor array nominally equivalent or superior to that of two coherently processed TB-29A arrays. Acquisition costs to be competitive with the cost of a current TB-29A and at least 30% less than the cost of two arrays. Sensor and telemetry packaging will be adequate to achieve neutral buoyancy in an existing TB-29A form factor with array power efficiency greater than 75%. Array handling will be compatible with the existing TB-29 handling system.

Increase sensor to shooter performance and the effective lifetime of distributed ASW search systems by:
- Achieving a drifting active distributed system lifetime of at least two days in areas of tactical significance while maintaining required system performance with a minimum number of sensor nodes.
- Maintaining an effective lifetime of a month for mobile active distributed systems when subjected to the action of eddies from a major ocean current.
- Predicting reseed 6 hours before performance degrades.
- Holding the Area of Uncertainty (AOU) to no larger than 10 nm2 for an hour after initial detection through the control of the coherent sources.

Through a combination of better Anti-Submarine Warfare (ASW) command-level training and improved operator training provide the following:
- Improve the ability of active sonar operators to detect targets and reject potential false alarms compared to current simulation based training.
- Increase Pd by 50%.
- Provide a decrease in FAR by a factor of two.
- Provide a reduction in the probability of a hit on a High Value Unit (HVU) by a factor of two.
- Improve the ability of the ASW Commander to position assets to increase coverage, reduce active system interference and deal effectively with competing missions.
- Reduce training cost by greater than 80% and increase the frequency of training opportunities by greater than 600% relative to live training.

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 0603747N UNDERSEA WARFARE ADVANCED TECHNOLOGY					PROJECT NUMBER 9999	
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	3.099	2.394	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