Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	94.569	61.877	64.057	-	64.057	71.574	77.254	61.939	69.146	Continuing	Continuing
2912: *Force Protection Advanced Technology*	59.700	59.405	42.730	-	42.730	49.879	55.182	59.271	66.429	Continuing	Continuing
3049: *Force Protection*	3.266	2.472	2.504	-	2.504	2.552	2.612	2.668	2.717	Continuing	Continuing
3315: *Medium Range Unmanned Aerial System*	-	-	18.823	-	18.823	19.143	19.460	-	-	0.000	57.426
4027: *Naval Innovative Science and Engineering*	4.397	-	-	-	-	-	-	-	-	0.000	4.397
9999: *Congressional Adds*	27.206	-	-	-	-	-	-	-	-	0.000	27.206

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 addresses advanced technology development associated with providing the capability of Platform and Force Protection for the U.S. Navy. This program supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial and air) and the protection of those platforms. This PE supports the Future Naval Capabilities (FNC) in the areas of Sea Shield and Cross Pillar Enablers, and Enterprise and Platform Enablers (EPE). The goal of this program is to provide the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage while preserving operational capability. Surface Ship & Submarine, Hull, Mechanical & Electrical (HM&E), Missile Defense, Fleet Force Protection and Defense against Undersea Threats, and Emerging Threats activities all support FNC efforts.

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 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603123N: *Force Protection Advanced Technology*

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	92.962	61.877	54.554	-	54.554
Current President's Budget	94.569	61.877	64.057	-	64.057
Total Adjustments	1.607	-	9.503	-	9.503
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-0.509	-			
• SBIR/STTR Transfer	-2.060	-			
• Program Adjustments	-	-	9.747	-	9.747
• Section 219 Reprogramming	4.179	-	-	-	-
• Rate/Misc Adjustments	-	-	-0.244	-	-0.244
• Congressional General Reductions Adjustments	-0.003	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Project: 9999: *Congressional Adds*		
Congressional Add: *Captive Air Amphibious Transporter (CAAT)*	2.191	-
Congressional Add: *HBCU Applied Research Incubator*	0.797	-
Congressional Add: *High-Temperature Radar Dome Materials*	1.593	-
Congressional Add: *Multi-Element Structured Filter Arrays for Naval Platforms*	3.426	-
Congressional Add: *NAVAIR Project for Land/Sea-Based Air Systems Maintenance and Air Worthiness*	1.992	-
Congressional Add: *Pure Hydrogen Supply from Logistic Fuels*	2.390	-
Congressional Add: *Agile Port And High Speed Ship Technology*	1.593	-
Congressional Add: *Single Generator Operations Lithium Ion Battery*	3.983	-
Congressional Add: *High Power Density Motor Drive*	2.868	-
Congressional Add: *Wide Area Sensor For Force Protection Targeting*	1.593	-
Congressional Add: *Accelerated Fuel Cells Manufacturability and Their*	1.593	-
Congressional Add: *Advanced Logistics Fuel Reformer For Fuel Cells*	2.390	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603123N: *Force Protection Advanced Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Congressional Add: *High Temperature Superconductor Trap Field Magnet*	0.797	-
Congressional Add Subtotals for Project: 9999	27.206	-
Congressional Add Totals for all Projects	27.206	-

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
2912: *Force Protection Advanced Technology*	59.700	59.405	42.730	-	42.730	49.879	55.182	59.271	66.429	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project addresses advanced technology development associated with providing the capability of Platform and Force Protection for the U.S. Navy. This project supports the development of technologies associated with all naval platforms (surface, subsurface, terrestrial, and air) and the protection of those platforms. It supports the Sea Shield and Cross Pillar Enablers, and Enterprise and Platform Enablers (EPE) -- Future Naval Capabilities (FNCs). The goals of this project are to provide the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage while preserving operational capability.

This Project reflects the alignment of investments for the following ECs: Anti-Ship Missile Defense Technologies; Defense of Harbor and Near-Shore Naval Infrastructure Against Asymmetric Threats; Sea Based Missile Defense of Ships & Littoral Installations; Four-Torpedo Salvo Defense; Shipboard Force Protection in Port and Restricted Waters - Detection and Classification; Compact Power Conversion Technologies; Affordable Submarine Propulsion and Control Actuation and Underwater Total Ship Survivability.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: FLEET FORCE PROTECTION AND DEFENSE AGAINST UNDERSEA THREATS	20.571	17.441	11.490
Description: Fleet Force Protection and Defense against Undersea Threats addresses efforts that include applied research for complementary sensor and processing technologies for platform protection and shipboard technologies to increase the survivability of surface ship and submarine platforms against torpedo threats. The first major goal of this activity is to develop complementary sensor and processing technologies for 21st century warfighting success and platform protection. Current small platforms (both surface and airborne) have little or no situational awareness (SA) or self-protection against air, surface, and asymmetric threats. This activity will provide tactical aircraft (TACAIR) and other platforms with effective threat warning and self-protection. The technology areas specific to platform protection will develop individual or multi-spectral [Electro-Optic (EO), IR, radio frequency (RF), EM, visual, and acoustic] sensors and associated processing. To defend platforms from current and advanced threats in at-sea littoral environments and in port, these technologies must improve multi-spectral detection and distribution of specific threat information. The Fleet Force Protection portion of this activity includes support to the FNC Enabling Capabilities for: Aircraft Integrated Self-protection Suites; Intent Determination - EO/IR Enhancements; Proof-of-Concept for Non-lethal Approach; Advanced Electronic Sensor Systems for Missile Defense; Hostile Fire Detection and Response Spirals 1 and 2; Defense of Harbor and Near-Shore			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Naval Infrastructure Against Asymmetric Threats; Four-Torpedo Salvo Defense; and Shipboard Force Protection in Port and Restricted Waters - Detection and Classification. The second major goal of this activity is to develop enabling technologies that will increase the survivability of surface ship and submarine platforms against torpedo threats. Proposed technologies focus on defeating high priority threats including torpedoes (i.e. straight running, wake homing, acoustic homing, air dropped torpedoes, and salvoes of torpedoes). Technologies developed will minimize shipboard impact and require no shipboard organizational maintenance. The Anti-Torpedo Torpedo (ATT) provides technologies that enable an ATT to engage threat torpedoes detected by a surface ship towed sensor system. The ultimate goal is to develop technologies to enable a torpedo defense capability, including ship self-defense against salvo torpedo attacks, to fill the FNC Sea Shield Warfighting Capability Gap/Enabling Capability: Platform Defense against Undersea Threats. Ultimately the goal is to deliver an anti-torpedo-torpedo for use in defeating a four-torpedo salvo attack against a surface platform. This activity supports the development of technologies that aid the helicopter pilot when operating in degraded visual cue environments (brown-out). The decrease in funding from FY 2011 to FY 2012 is due to several FNCs that are nearing completion. ***FY 2010 Accomplishments:*** Sensors & Associated Processing - - Continued new FNC Enabling Capability (EC) Shipboard Force Protection in Port and Restricted Waters - Detection and Classification. This project will develop mission specific electro-optic/infrared sensors to detect, classify, and determine the intent of potential terrorist and special operations force threats to ships and craft in port and transiting restricted waters. - Continued the Countermeasures for Advanced Imaging Infrared (IIR) Guided Missiles FNC effort by commencing IIR threat surrogate hardware development. - Continued the Countermeasures for Millimeter Wave Guided Missiles FNC effort by initiating wide band gap monolithic microwave integrated circuit (MMIC) Ka-band development. - Continued the Multifunction Capabilities for Missile Warning Sensors FNC effort by commencing signal processor development. - Continued the Helicopter Laser-Based Landing Aids FNC effort by commencing laser technologies development. Underwater Platform Self-Defense -			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Continued the development of low-cost, light-weight swimmer detection and localization technologies. - Continued expanded development of autonomous, underway refueling for Unmanned Sea Surface Vehicle Technologies. - Continued advanced development of software encoded algorithms for the Anti-Torpedo Torpedo (ATT) sensor and controller that will enable ATT's to successfully engage torpedo salvoes of up to four attacking units. - Completed development and demonstration of low-cost, light-weight swimmer detection and localization technologies. ***FY 2011 Plans:*** Sensors & Associated Processing - - Continue all efforts of FY 2010. - Continue the Helicopter Laser-Based Landing Aids FNC effort by development of a ladar capable of sensing through brown-out and providing a display format that is usable to the pilot. - Complete FNC EC Shipboard Force Protection in Port and Restricted Waters - Detection and Classification. This effort develops mission specific electro-optic/infrared sensors to detect, classify, and determine the intent of potential terrorist and special operations force threats to ships and craft in port and transiting restricted waters. Sensor projects included in this FNC EC include Distributed Millimeter Wave (DmmW) Sensor, Active/Passive Dual Imaging IR (MW/SW) Sensor, and Situational Panoramic Infrared (SPIR) Sensor. Underwater Platform Self-Defense - - Continue all efforts of FY 2010, less those noted as completed above. In support of FNC (Force Projection Advanced Technology), perform the following efforts - - Initiate the development of advanced technologies that support delivery of Navy approved FNC enabling capabilities structured to close operational capability gaps in force projection. - Initiate the packaging of advanced force projection technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period. - Initiate the development of force projection technologies that support naval requirements identified within the Sea Shield and Sea Strike naval capability pillars as well as those applicable to specific naval platforms and those that apply across the naval enterprise. ***FY 2012 Plans:*** Sensors & Associated Processing			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Continue all efforts of FY 2011, less those noted as completed above. - Complete the Multifunction Capabilities for Missile Warning Sensors FNC effort. - Complete the Helicopter Laser-Based Landing Aids FNC effort by development of a ladar capable of sensing through brown-out and providing a display format that is usable to the pilot. Underwater Platform Self-Defense - Continue all efforts of FY 2011.			
Title: MISSILE DEFENSE (MD)	20.342	24.184	13.385
Description: This activity describes Missile Defense Science and Technology (S&T) projects of the Sea Shield Future Naval Capability (FNC) program. - Naval Interceptor Improvements (NII) technology upgrades for STANDARD Missile (SM) future missile. Metrics are to achieve SM performance requirements in specified tactical rain environments and all specified electronic countermeasures environments, while meeting the planned transition date. - Extended Distributed Weapons Coordination (EDWC) algorithms for an Automated Battle Management Aid (ABMA) that recommends hard kill weapons, soft kill countermeasures, and emission control measures to reduce the probability of being hit or to optimally engage threats with self-defense weapons. Metric is improved probability of negation (Pneg) against advanced ballistic & cruise missile anti-ship threats that may be susceptible to decoys & jamming, while meeting the planned transition date. - Positive Control of Naval Weapons (PCNW) - additional technology upgrades for SM to enable forward relay, remote launch and potentially forward pass engagements. Metrics are classified. - Midcourse and Terminal Algorithms (MTA) for prototype state-of-the art weapon system algorithms for STANDARD Missile (SM) engagements vs modern anti-ship missile threats. Specific metrics are classified. - Enhanced Lethality Guidance Algorithms (ELGA) to increase Navy shipboard missile probability of kill versus an expanded threat set including ASBMs and advanced ASCMs. Metrics for this project are classified. - Enhanced Maneuverability Missile Airframe (EMMA) technology for Navy shipboard missile systems to intercept highly agile maneuvering ASCMs and ASBMs. Metrics for this project are classified. - Integrated Active & Electronic Defense (IAED) technology basis for response combinations of active and electronic weapons & systems to optimize Pneg against ASBMs and ASCMs, including potential interactions. Metrics are classified. - Radar Resource Manager (RRM) algorithms and software for weapon control system capability to provide dynamic platform and force-level radar management and coordination of radar resources for integrated air and missile defense (IAMD). Metrics will be classified.			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Funding increases from FY 2010 to FY 2011 as a result from EDWC, NII and PCNW project funding migrating from Applied Research (6.2) to Advanced Research (6.3) in their last year of effort before transition to acquisition. The MTA project ramps up in FY 2010 while the ELGA and EMMA projects start in FY 2010, also accounting for part of this increase. The FY 2011 to FY 2012 decrease represents completion of EDWC, PCNW, and NII projects in FY 2011 and is not offset by initiation of the RRM project in FY 2012. ***FY 2010 Accomplishments:*** - Continued EDWC, NII and PCNW project efforts. - Continued MTA project efforts. - Initiated ELGA and EMMA project efforts. ***FY 2011 Plans:*** - Complete EDWC, NII and PCNW efforts. - Continue MTA and ramp up of the ELGA and EMMA projects. - Initiate IAED project effort. ***FY 2012 Plans:*** - Continue all efforts of FY 2011. - Initiate RRM project effort.			
Title: SURFACE SHIP & SUBMARINE HULL MECHANICAL & ELECTRICAL (HM&E) ***Description:*** Activity includes: Signature Reduction, Hull Life Assurance, and Advanced Capability Electric Systems. Signature Reduction addresses electromagnetic (EM), infrared (IR), and acoustic signature tailoring, both topside and underwater. Hull Life Assurance addresses development of new structural system approaches for surface ships and submarines, including the management of weapon effects to control structural damage and the improvement of structural materials. Advanced Capability Electric Systems area addresses electrical and auxiliary systems and component technology to provide improvements in system energy and power density, system operating efficiency, and recoverability from casualties. Advanced Damage Control Countermeasures addresses fire, smoke, and flooding detection using a volume sensor and the use of a hybrid water-mist for electronic space protection. This activity includes support to the Sea Strike, Cross Pillar Enablers, and Enterprise and Platform Enablers (EPE) FNC programs. The decrease in funding from FY 2010 to FY 2011 is for the Advanced Naval Power Next Generation Systems (NGIPS) development, a separate effort from the ongoing Compact Power Conversion FNC. The NGIPS effort is ramping down; the FNC efforts will be entering Phase III in FY 2011.	18.787	17.780	17.855

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
FY 2010 Accomplishments: - Continued development of diesel fuel reforming technology for molten carbonate and proton exchange membrane fuel cells. - Continued risk reduction activities of advanced superconducting homopolar main propulsion motor with General Atomics. - Continued development of autonomous recovery system for Unmanned Sea Surface Vehicles from a host ship. - Continued development of thermal management technology for shipboard power distribution. - Continued development of Integrated Damage Control Systems which includes Integrated Damage Control Communications and Advanced Magazine Protection System. - Continued compact power conversion technologies FNC transitioned from PE 0603236N/Turbine Engine Technology. - Continued Total Ship Survivability Damage Tolerance and Recoverability efforts which include integrated damage control situation awareness technologies. - Continued expansion of the Next Generation Integrated Power Systems (NGIPS) technology development, to de-risk and demonstrate applicable Medium Voltage Direct Current (MVDC) power dense, efficient, and fault tolerant technologies needed for future surface, and subsurface platforms. - Continued Affordable Submarine Propulsion and Control Surface Actuator technologies focused on the development and demonstration of affordable advanced material propellers and torque dense and quiet actuation of submarine control surface efforts. - Continued Underwater Total Ship Survivability/Payload Implosion and Platform Damage Avoidance efforts. - Completed preliminary designs of control surface actuator systems. - Completed expanded demonstration of superconductive degaussing coil in a relevant environment. - Initiated detailed design and breadboard demonstration of control surface actuator systems. - Initiated scaled testing and large scale analysis for ship protection systems. - Initiated Compact Power Conversion Technology Phase 2 Critical Component Development. ***FY 2011 Plans:*** - Continue all efforts of FY 2010, less those noted as completed above. - Complete detailed design and breadboard demonstration of control surface actuator systems. - Complete Compact Power Conversion Technology Phase 2 Critical Component Development. - Initiate fabrication of scaled control surface actuator systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 2912: *Force Protection Advanced Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Initiate Compact Power Conversion Technology Phase 3 large Scale Component Development and testing. ***FY 2012 Plans:*** - Continue all efforts of FY 2011, less those noted as completed above. - Complete Compact Power Conversion Technology Phase 3 large Scale Component Development and testing. - Initiate efforts in support of Renewable-Sustainable Expeditionary Power FNC. - Initiate efforts in support of Long Endurance Undersea Vehicle Propulsion FNC.			
Accomplishments/Planned Programs Subtotals	59.700	59.405	42.730

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• 0602123N: *FORCE PROTECTION APPLIED RESEARCH*	26.579	21.747	20.769	0.000	20.769	17.226	9.152	1.238	0.000	0.000	96.711

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The overall goals of this advanced technology program are the development of technologies which focus on the warfighter and providing the ability to win or avoid engagements with other platforms or weapons and, in the event of engagement, to resist and control damage while preserving operational capability. Overall metric goals are to transition the advanced technology projects into acquisition programs. Each Activity within this PE has unique goals and metrics, some of which include classified quantitative measurements.

Specific examples of metrics under this PE include:
- Demonstrate improved performance of main propulsion electric motors and controllers (50% reduced weight and volume) by FY 2011.
- Demonstration of a Medium Voltage Direct Current (MVDC) architecture containing Commercial Off the Shelf (COTS) components to assess the viability of MVDC distribution for CG (X) cruiser by the end of FY 2011.
- Items included within the Missile Defense Activity description.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 3049: *Force Protection*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3049: *Force Protection*	3.266	2.472	2.504	-	2.504	2.552	2.612	2.668	2.717	Continuing	Continuing

A. Mission Description and Budget Item Justification

Advanced technologies developed, critical to protecting naval installations, will provide seamless full spectrum protection against asymmetric terrorist attack by improving the ability to: sense developing and immediate threats; shape our responses through improved situational awareness and decision making; shield personnel, mission critical facilities, infrastructure, and operating fleet assets; maintain essential functions; and sustain and restore critical services in the aftermath of an incident. Technologies developed will also seek to reduce the required manpower and skill levels devoted to the force protection mission.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: EMERGING THREATS	3.266	2.472	2.504

Description: This activity includes: Advanced technologies developed, critical to protecting naval installations, will provide seamless full spectrum protection against asymmetric terrorist attack by improving the ability to: sense developing and immediate threats; shape our responses through improved situational awareness and decision making; shield personnel, mission critical facilities, infrastructure, and operating fleet assets; maintain essential functions; and sustain and restore critical services in the aftermath of an incident. Technologies developed will also seek to reduce the required manpower and skill levels devoted to the force protection mission.

FY 2010 Accomplishments:
- Continued development of lower cost/higher performance Force Protection sensors and automated detection algorithms, and decision support tools.
- Continued interim demonstration of prototype Force Protection sensors.
- Continued development of intrusion/incident response countermeasures for Force Protection.
- Continued research to reduce force protection manpower and equipment costs through automation and predictive learning algorithms.
- Continued threat characterization research and perception experiments for sensor performance optimization and model development and validation.
- Completed full scale demo of swimmer defense system including sensors and response countermeasures.
- Completed interim demonstration of force protection detection and response system with automated detection and self learning algorithms.
- Initiated development of all weather sensors optimized for installation of force protection.
- Initiated research to advance sensor fusion capabilities in high density networks with diverse sensor grids.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 3049: *Force Protection*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
- Initiated research into sensors for use in counter-surveillance around protected facilities. ***FY 2011 Plans:*** - Continue all efforts of FY 2010, less those noted as completed above. - Complete interim demonstration of prototype Force Protection sensors. - Complete development of intrusion/incident response countermeasures for Force Protection. - Initiate development of assessment algorithms and information analysis technologies to augment skills or replace persons in operations centers. - Initiate research into sensors and countermeasures for use against unmanned underwater vehicles. ***FY 2012 Plans:*** - Continue all efforts of FY 2011, less those noted as completed above. - Complete threat characterization research and perception experiments for sensor performance optimization and model development and validation. - Complete research to advance sensor fusion capabilities in high density networks with diverse sensor grids.			
Accomplishments/Planned Programs Subtotals	3.266	2.472	2.504

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The overall goals of this advanced technology program are the development of technologies which will provide seamless full spectrum protection against asymmetric terrorist attack by improving the ability to protect naval installations. Overall metric goals are to reduce the required manpower and skill levels devoted to the force protection mission. Specific metric under the Project includes: In-water successful demonstration of warhead lethality against specified threat at required Closest Point of Approach (CPA).

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 3315: *Medium Range Unmanned Aerial System*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3315: *Medium Range Unmanned Aerial System*	-	-	18.823	-	18.823	19.143	19.460	-	-	0.000	57.426

A. Mission Description and Budget Item Justification

This program is a FY12 New Start. This is a future sea and land based Verical Take-off and Landing (VTOL) Unmanned Aerial System (UAS) with at least a 300 mile radius and 9 hours endurance. Primary mission is Intelligence, Surveillance and Reconnaissance. The system will be fully autonomous and have provisions for future weapons system integration. This will be a technology development effort consisting of initial trade studies to identify enabling technologies and technology gaps and identify potential candidate systems suitable for technology insertion. Technology thrust areas will include air-vehicle performance, shipboard launch and recovery, autonomous operations and sensors technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Medium Range Unmanned Aerial System	-	-	18.823
FY 2012 Plans: - Initiate design, development and demonstration of technologies for advanced autonomous capabilities to enable highly capable sea based unmanned or optionally manned air vehicles. - Initiate design, development and demonstration of air vehicle technologies to enable sea based unmanned or optionally manned platforms.			
Accomplishments/Planned Programs Subtotals	-	-	18.823

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The overall goal of this advanced technology program is the development of technologies which focus on Intelligence, Surveillance and Reconnaissance. The desired IOC is 2018/2019.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 4027: *Naval Innovative Science and Engineering*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
4027: *Naval Innovative Science and Engineering*	4.397	-	-	-	-	-	-	-	-	0.000	4.397

A. Mission Description and Budget Item Justification

Funding suppports research and development efforts as directed un Section 219 of the fiscal year 2009 Duncan Hunter National Defense Authorization Act.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012
Title: Naval Innovative Science and Engineering	4.397	-	-
Description: Funding suppports research and development efforts as directed un Section 219 of the fiscal year 2009 Duncan Hunter National Defense Authorization Act. ***FY 2010 Accomplishments:*** Section 219 (Naval Innovative Science and Engineering) included in the FY 2009 Duncan Hunter National Defense Authorization Act, established mechanisms whereby the director of a naval laboratory may utilize up to three percent of all funds available to the laboratory to sponsor individual projects for: 1. Innovative basic and applied research that is conducted at the laboratory and supports military missions; 2. Development programs that support the transition of technologies developed by the defense laboratory into operational use; 3. Development activities that improve the capacity of the defense laboratory to recruit and retain personnel with needed scientific and engineering expertise; and 4. The revitalization and recapitalization of the laboratories.			
Accomplishments/Planned Programs Subtotals	4.397	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

The overall metrics of Section 219 is to increase retention and recruitment; number of advanced degrees, patent awards, and technical papers; successful technology transition to the warfighter; and laboratory ability to conduct innovative research.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 9999: *Congressional Adds*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
9999: *Congressional Adds*	27.206	-	-	-	-	-	-	-	-	0.000	27.206

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
Congressional Add: Captive Air Amphibious Transporter (CAAT) ***FY 2010 Accomplishments:*** This effort developed a 1/2 scale technology demonstrator of an amphibious, logistic craft for the Marine Corps to transport supplies and equipment from ship to challenging landing locations.	2.191	-
Congressional Add: HBCU Applied Research Incubator ***FY 2010 Accomplishments:*** This effort demonstrated a realistic three-dimensional flat display surface multi-touch technology for the effective control of submarine perspective displays replacing the current two dimension "plan-view" displays.	0.797	-
Congressional Add: High-Temperature Radar Dome Materials ***FY 2010 Accomplishments:*** This effort supported high-temperature radar dome materials research.	1.593	-
Congressional Add: Multi-Element Structured Filter Arrays for Naval Platforms ***FY 2010 Accomplishments:*** This effort provided research to reduce weight, volume and parasitic energy consumption of air filtration and distribution systems used for next generation shipboard fuel cell auxiliary power units, which will significantly increase the effectiveness of current and future Naval platforms by enhancing key war fighting capabilities such as speed, range and fuel efficiency.	3.426	-
Congressional Add: NAVAIR Project for Land/Sea-Based Air Systems Maintenance and Air Worthiness ***FY 2010 Accomplishments:*** This effort developed thermal barrier coating systems for the Naval Air Systems Command (NAVAIR) in collaboration with Focus: HOPE.	1.992	-
Congressional Add: Pure Hydrogen Supply from Logistic Fuels ***FY 2010 Accomplishments:*** This effort investigated a means of extracting pure hydrogen from standard logistic fuels to be used by all applications of fuel cells.	2.390	-
Congressional Add: Agile Port And High Speed Ship Technology	1.593	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 9999: *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
FY 2010 Accomplishments: This effort supported agile port and high speed ship technology research.		
Congressional Add: Single Generator Operations Lithium Ion Battery ***FY 2010 Accomplishments:*** This effort supported single generator operations lithium ion battery research.	3.983	-
Congressional Add: High Power Density Motor Drive ***FY 2010 Accomplishments:*** This effort identified optimal trade-offs between various component and subsystem ratings, sizes, weights that will lead to a fully realizable demonstration of an advanced high power density motor drive at a modest power rating.	2.868	-
Congressional Add: Wide Area Sensor For Force Protection Targeting ***FY 2010 Accomplishments:*** This effort developed a design for a podlet structure attached to the ball-gimbal sensor suitable for carriage on a tactical Unmanned Air System (UAS), such as the MQ-1C Extended Range Multi-Purpose (ERMP) /Warrior. The structure design, mounting, packaging and interconnection of the system components in the podlet were developed.	1.593	-
Congressional Add: Accelerated Fuel Cells Manufacturability and Their ***FY 2010 Accomplishments:*** This effort provided for the demonstration of a high-volume assembly and remanufacturing processes associated with the life-cycle of solid oxide fuel cells.	1.593	-
Congressional Add: Advanced Logistics Fuel Reformer For Fuel Cells ***FY 2010 Accomplishments:*** This effort conducted advanced technology development targeted towards demonstration of a fuel processor system and development of a diesel engine performance improvement system for shipboard applications to improve the reliability and efficiency of shipboard engines, improve service life and reduce operating costs.	2.390	-
Congressional Add: High Temperature Superconductor Trap Field Magnet ***FY 2010 Accomplishments:*** This effort supported high-temperature superconductor trap field magnet motor research.	0.797	-
Congressional Adds Subtotals	27.206	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603123N: *Force Protection Advanced Technology*	PROJECT 9999: *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Add.