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 0603123N FORCE PROTECTION 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	125.869	113.502	66.035						Continuing	Continuing
2912: FORCE PROTECTION ADVANCED TECHNOLOGY	75.194	52.675	63.695						Continuing	Continuing
3049: FORCE PROTECTION	2.132	2.226	2.340						Continuing	Continuing
9999: CONGRESSIONAL PLUS-UPS	48.543	58.601	0.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

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

This PE 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.

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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 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	119.562	55.099	63.845	
Current BES/President's Budget	125.869	113.502	66.035	
Total Adjustments	6.307	58.403	2.190	
Congressional Program Reductions		-0.316		
Congressional Rescissions				
Total Congressional Increases		58.760		
Total Reprogrammings	8.079			
SBIR/STTR Transfer	-1.772			
Program Adjustments			2.155	
Rate/Misc Adjustments		-0.041	0.035	

Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **ACCELERATING FUEL CELLS MANUFACTURABILITY AND THEIR APPLICATION IN THE ARMED FORCES**	2.651	2.394
Project: 9999, **ADVANCED CONTINUOUS ACTIVE SONAR FOR UUVS**	0.000	2.492
Project: 9999, **ADVANCED LOGISTICS FUEL REFORMER FOR FUEL CELLS**	2.313	2.394
Project: 9999, **ADVANCED VOLUME SENSOR SYSTEM**	1.548	0.000
Project: 9999, **AGILE PORT AND HIGH SPEED SHIP TECHNOLOGY**	2.314	5.983
Project: 9999, **CENTER FOR APPLIED RESEARCH IN INTELLIGENT AUTONOMOUS SYSTEMS**	0.000	2.394
Project: 9999, **CRYOGENIC POWER SYSTEM FOR UNMANNED UNDERWATER VEHICLES**	0.968	0.000
Project: 9999, **DETECTING IMPROVISED EXPLOSIVE DEVICES (IEDS)**	0.965	0.000
Project: 9999, **DIRECT MOTOR DRIVEN WATERJET**	1.548	0.000
Project: 9999, **DURABILITY, ENERGY SAVING AND SUSTAINABILITY OF OCEANIC VEHICLES AND SUPPORT INFRASTRUCTURE THROUGH USE OF NANOTECH LUBRICANTS**	0.000	0.798
Project: 9999, **ELECTROCHEMICAL FIELD DEPLOYABLE SYSTEM FOR POTABLE WATER GENERATION**	2.316	2.791
Project: 9999, **FUTURE FUEL NON-TACTICAL VEHICLE INITIATIVE**	1.547	1.596

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Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **HIGH POWER DENSITY MOTOR DRIVE**	0.000	0.997
Project: 9999, **HIGH SPEED POWER NODE SWITCHING AND CONTROL CENTER**	1.549	0.000
Project: 9999, **HIGH TEMPERATURE SUPERCONDUCTOR TRAP FIELD MAGNET MOTOR**	0.000	1.995
Project: 9999, **IMPLEMENTATION OF FORMABLE TEXTILE FOR COMPLEX SHAPED AEROSPACE COMPOSITE STRUCTURES**	1.547	1.596
Project: 9999, **IMPROVED STEALTH AND LOWER COST OPERATIONS FOR SHIPS USING HIGH STRENGTH FLAME RESISTANT LCP REINFORCED NETTING**	0.000	1.596
Project: 9999, **INNOVATIVE METHODS FOR SHIP-BUILDING AFFORDABILITY**	1.543	0.000
Project: 9999, **INTEGRATED ADVANCED COMMUNICATIONS TERMINAL (IACT)**	0.966	0.000
Project: 9999, **INTEGRATED ADVANCED SHIP CONTROL (IASC)**	0.000	1.197
Project: 9999, **INTEGRATED SHIP AND MOTION CONTROL TECHNOLOGY**	0.000	3.430
Project: 9999, **LASER PERIMETER AWARENESS SYSTEM**	1.448	1.496
Project: 9999, **M65 BISMALEIMIDE CARBON FIBER PREPREG**	2.322	1.596
Project: 9999, **MARITIME MOBILE FORCE PROTECTION PROGRAM**	1.544	0.000
Project: 9999, **MOBILE MANUFACTURING AND REPAIR CELL/ENGINEERING EDUCATION OUTREACH PROGRAM**	3.860	2.394
Project: 9999, **MULTI-FUEL COMBUSTOR FOR SHIPBOARD FUEL CELLS**	1.545	1.596
Project: 9999, **PURE HYDROGEN SUPPLY FROM LOGISTICS FUEL**	2.320	0.000
Project: 9999, **REMOTE CONTINUOUS ENERGETIC MATERIAL MANUFACTURING FOR PYROTECHNIC IR DECOYS**	0.000	1.596
Project: 9999, **SECURE INFRASTRUCTURE TECHNOLOGY LABORATORY (SINTEL)**	3.091	0.000
Project: 9999, **SELF HEALING TARGET SYSTEM FOR LASER AND SNIPER RANGES**	0.000	1.596
Project: 9999, **SINGLE GENERATOR OPERATIONS LITHIUM ION BATTERY**	4.847	3.988
Project: 9999, **SOLID STATE DC PROTECTION SYSTEM (SSDCP)**	0.386	1.197
Project: 9999, **STABILIZED LASER DESIGNATION CAPABILITY**	0.000	1.995

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Congressional Increase Details ($ in Millions)	FY 2008	FY 2009
Project: 9999, **STRATEGIC/TACTICAL RESOURCE INTEROPERABILITY KINETIC ENVIRONMENT PROGRAM**	0.000	1.117
Project: 9999, **TACTICAL COMPACT OPTICAL INTERROGATOR**	1.544	0.000
Project: 9999, **ULTRA-WIDE COVERAGE VISIBLE NEAR INFRARED SENSOR FOR FORCE PROTECTION**	0.000	1.197
Project: 9999, **UNDERGROUND COORDINATION OF MANAGED MESH-NETWORKS (UCOMM)**	0.773	2.394
Project: 9999, **VIDEO AND WATER MIST TECHNOLOGIES FOR INCIPIENT FIRE DETECTION ON SHIPS**	0.000	3.190
Project: 9999, **WIDE-AREA SENSOR FOR FORCE PROTECTION TARGETING**	1.544	1.596
Project: 9999, **WIDE-BAND GAP SEMICONDUCTOR MATERIALS**	1.544	0.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 1319 - Research, Development, Test & Evaluation, Navy/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY					PROJECT NUMBER 2912	
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**
2912: FORCE PROTECTION ADVANCED TECHNOLOGY	75.194	52.675	63.695						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: Total Ship Survivability Damage Tolerance and Recoverability; Over-the-Horizon Missile Defense; Two-Torpedo Salvo Defense; Defense of Harbor and Near-Shore Naval Infrastructure Against Asymmetric Threats; Sea Based Missile Defense of Ships & Littoral Installations; Aircraft Integrated Self-Protection Suites; Hostile Fire Detection and Response Spirals 1 and 2; Four-Torpedo Salvo Defense; Shipboard Force Protection in Port and Restricted Waters - Detection and Classification; and Underwater Total Ship Survivability.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FLEET FORCE PROTECTION AND DEFENSE AGAINST UNDERSEA THREATS	24.782	13.598	19.725	
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				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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 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. The decrease from FY 2008 to FY 2009 reflects the completion of FNC Enabling Capabilities Two-Torpedo Salvo Defense, Aircraft Integrated Self-Protection Suites, and Hostile Fire Detection and Response Spiral 2; and decreased efforts in Defense of Harbor and Near-Shore Naval Infrastructure Against Asymmetric Threats. The increase in funding from FY 2009 to FY 2010 is due to the ramping up of the following Future Naval Capability Enabling Capabilities: Shipboard Force Protection in Port and Restricted Waters - Detection and Classification, Four-Torpedo Salvo Defense, Advanced Threat Aircraft Countermeasures, and Helicopter Low-Level Operations (HELO).				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2008 Accomplishments: Sensors & Associated Processing - - Completed FNC Enabling Capabilities: Two-Torpedo Salvo Defense, Aircraft Integrated Self-Protection Suites, and Hostile Fire Detection and Response Spiral 2. - Completed laboratory demonstration of a coated carbon fiber cable that survives 27 times longer than Zylon under direct flame at temperatures >1800 degrees Fahrenheit. Integrated Defensive Electronic Countermeasures Pre-Planned Product Improvement (IDECM P3I). - Completed laboratory demonstration of the upgraded multiband laser towards a goal of 5W in all bands for EO/IR Jammer for TACAIR. - Completed the End User Terminal (EUT) effort by conducting a side-by-side laboratory demonstration of the Dismounted-Digital Automated Computing Terminal (D-DACT) including the integrated 256 color Organic Light Emitting Diode (OLED) display with a Liquid Crystal Display D-DACT. - Completed the integration of the Gallium Arsenide (GaAs) transmitter with an ALE-55 sized Fiber-Optic Towed Decoy (FOTD) and onboard power supply for the Integrated Defensive Electronic Countermeasures Pre-Planned Product Improvement (IDECM P3I) effort. - Completed the integration of a noncryogenic solid-state Mid-wave Infrared (MWIR) multiband laser into a prototype Tactical Aircraft Directed IR Countermeasures (TADIRCM) pod that will undergo an Early Operational Assessment (EOA) (EO/IR Laser Jammer for TACAIR). - Completed preparations for the completion of the EUT effort by planning a field demonstration of the full capabilities of the integrated personal communications, situational awareness, and gunfire detection system including the Monocular Display with a super video graphics adapter (SVGA) resolution of 800x600 pixels. - Completed the Integrated EO/IR Self Protect Suite for Rotary Wing Aircraft by conducting a field demonstration of the integrated Missile Warning Sensor (MWS) and multi-band fiber coupled laser jammer. - Completed the Intelligent Video Surveillance project including integration of object recognition and tracking algorithms, machine vision, and multiple networked video streams into different classes of EO/IR sensors.				

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

- Completed the IDECM P3I effort by conducting final flight testing of improved decoys and towlines.
- Completed performance evaluation of a Counter Torpedo Detection, Classification and Localization (CTDCL) prototype torpedo protection system capable of countering two torpedoes launched in rapid succession.
- Initiated 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.

Underwater Platform Self-Defense -
- Completed the Underwater Threat Neutralization project including demonstration of a scalable low frequency continuous wave acoustic system for use against underwater asymmetric threats in port.
- Initiated the development of low-cost, light-weight swimmer detection and localization technologies.

FY 2009 Plans:
Sensors & Associated Processing -
- Continue all efforts of FY 2008, less those noted as completed above.
- Continue new FNC EC entitled Shipboard Force Protection in Port and Restricted Waters - Detection and Classification, initiated, in FY 2008. 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 inport 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.
- Initiate the Countermeasures for Advanced Imaging Infrared (IIR) Guided Missiles FNC effort by commencing IIR threat surrogate hardware development.
- Initiate the Countermeasures for Millimeter Wave Guided Missiles FNC effort by initiating wide band gap monolithic microwave integrated circuit (MMIC) Ka-band development.
- Initiate the Multifunction Capabilities for Missile Warning Sensors FNC effort by commencing signal processor development.

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
- Initiate the Helicopter Laser-Based Landing Aids FNC effort by commencing laser technologies development. Underwater Platform Self-Defense - - Continue all efforts of FY 2008, less those noted as completed above. - Initiate expanded development of autonomous, underway refueling for Unmanned Sea Surface Vehicle Technologies. - Initiate 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. *FY 2010 Plans:* Sensors & Associated Processing – - Continue all efforts of FY 2009. Underwater Platform Self-Defense - - Continue all efforts of FY 2009. - Complete development and demonstration of low-cost, light-weight swimmer detection and localization technologies.				
MISSILE DEFENSE (MD) This activity describes Missile Defense Science and Technology (S&T) projects of the Sea Shield Future Naval Capability (FNC) program and an OSD-funded Joint Integrated Fire Control (JIFC) demonstration. - Advanced Area Defense Interceptor (AADI) S&T planning and data analysis effort for Navy-Marine Corps Air-Directed Surface-to-Air Missile (ADSAM) live firing demonstration at White Sands Missile Range in FY 2008. The metric for AADI is execution of an ADSAM demonstration by the Navy and Marine Corps that establishes the basis for further development of an operational Naval Integrated Fire Control/Counter-Air (NIFC-CA) capability. - Distributed Weapons Coordination (DWC) open architecture combat system algorithms for Theater Air and Missile Defense (TAMD) Automated Battle Management Aids (ABMA), including Common	34.069	20.211	16.798	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Threat Evaluation (CTE) and Preferred Shooter Recommendation (PSR) functions that will enable fleet units to defend against air and missile attacks with increased effectiveness and efficiency. Metrics for DWC include (a) increased effectiveness of combat resources through a theater-wide threat evaluation process; (b) increased efficiency of weapons resources through weapon assignment and preferred shooter recommendations considering Theater Ballistic Missile Defense (TBMD) and Area/Ship Defense capability operating simultaneously; and (c) reduced “free riders” (threats not fired at) due to ineffective use of resources (unengaged targets) by 50% (threshold) 80% (objective). - Distributed Sensor Coordination (DSC) algorithms for airborne sensor management in ADSAM and multi-threat air defense engagements. The metric for DSC is effective coordination of airborne sensor resources to support NIFC-CA capability, evaluated using laboratory Monte Carlo simulations within simulated stressing air defense environments. - Naval Interceptor Improvements (NII) technology upgrades for STANDARD Missile (SM) future TAMD missile. Metrics will be 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 to extend DWC ABMA functionality to include coordination of passive defense measures (emission control, use of decoys, maneuvering). Metrics will be 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) equipment - 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 interceptor and associated weapon system enhancements to defeat anti-ship ballistic missile (ASBM) threats with high confidence while retaining or improving baseline capability against advanced anti-ship cruise missiles (ASCM). Specific metrics are classified. - Enhanced Lethality Guidance Algorithms (ELGA) to increase probability of kill versus an expanded threat set including ASBMs and advanced ASCMs. Metrics for this project will be classified. - Enhanced Maneuverability Missile Airframe (EMMA) technology for Navy shipboard missile systems to intercept highly agile maneuvering ASCMs and ASBMs. Metrics for this project will be classified. - Advanced technologies that support delivery of Navy approved FNC enabling capabilities (EC) structured to address operational capability gaps in air and missile defense.				

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B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Joint Integrated Fire Control (JIFC) S&T planning and preparations, non-FNC expansion of the AADI ADSAM demonstration, to support participation of Army, Air Force and coalition sensor and weapon test assets. The metric for this expanded participation is a series of demonstrations in FY08-09 that show a technology basis for effective interoperability with Navy and Marine Corps participating systems. These additional demonstrations are designed to show the viability of a multi-Service/coalition JIFC capability to defend expeditionary forces from air and missile attacks. Funding decrease in FY 2009 reflects near completion of AADI and completion of DWC and DSC projects. *FY 2008 Accomplishments:* - Continued AADI planning and coordination for FY 2008 Navy ADSAM live-fire demonstration. - Completed testing and demonstration of DWC and DSC algorithms. - Initiated EDWC, NII and PCNW project efforts. - Initiated JIFC demonstration S&T planning and preparations. *FY 2009 Plans:* - Continue all efforts of FY 2008, less those noted as complete above. - Complete AADI project and JIFC effort. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Initiate ELGA and EMMA project efforts.					
SURFACE SHIP & SUBMARINE HULL MECHANICAL & ELECTRICAL (HM&E) 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		16.343	18.866	27.172	

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
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 increase of funding from FY 2008 through FY 2010 is due to the initiation of new FNC Enabling Capabilities including Underwater Total Ship Survivability, and Affordable Submarine Propulsion and Control Actuator; and the realignment of Compact Power Conversion Technologies from PE 0603236N/ Turbine Engine Technology. *FY 2008 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. - Completed development of on-board vehicle power system technologies for future Marine Corps Battlefield Power System. - Initiated Total Ship Survivability Damage Tolerance and Recoverability efforts which include integrated damage control situation awareness technologies. - Initiated 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.				

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B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
FY 2009 Plans: - Continue all efforts of FY 2008, less those noted as completed above. - Continue compact power conversion technologies FNC transitioned from PE 0603236N/Turbine Engine Technology. - Complete risk reduction activities associated with advanced direct current homopolar motor with General Atomics. - Initiate expanded demonstration of superconductive degaussing coil in a relevant environment. - Initiate 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. - Initiate Underwater Total Ship Survivability/Payload Implosion and Platform Damage Avoidance efforts. - Initiate preliminary designs of control surface actuator systems. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete preliminary designs of control surface actuator systems. - Complete expanded demonstration of superconductive degaussing coil in a relevant environment. - Initiate detailed design and breadboard demonstration of control surface actuator systems. - Initiate scaled testing and large scale analysis for ship protection systems. - Initiate Compact Power Conversion Technology Phase 2 Critical Component Development.				

Exhibit R-2a, PB 2010 Navy RDT&E Project Justification		DATE: May 2009
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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 0204152N/E-2 Squadrons									Continuing	Continuing
PE 0205601N/HARM Improvement									Continuing	Continuing
PE 0206313M/Marine Corps Communications Systems									Continuing	Continuing
PE 0601153N/Defense Research Sciences									Continuing	Continuing
PE 0602123N/Force Protection Applied Research									Continuing	Continuing
PE 0602131M/Marine Corps Landing Force Technology									Continuing	Continuing
PE 0602235N/Common Picture Applied Research									Continuing	Continuing
PE 0602271N/RF Systems Applied Research									Continuing	Continuing
PE 0603235N/Common Picture Advanced Technology									Continuing	Continuing
PE 0603271N/RF Systems Advanced Technology									Continuing	Continuing
PE 0603502N/Surface and Shallow Water Mine Countermeasures									Continuing	Continuing

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY	PROJECT NUMBER 2912

PE 0603561N/Advanced Submarine System Development		
PE 0603563N/Ship Concept Advanced Design	Continuing	Continuing
PE 0603564N/Ship Preliminary Design & Feasibility Studies	Continuing	Continuing
PE 0603609N/ Conventional Munitions	Continuing	Continuing
PE 0603640M/USMC Advanced Technology Demonstration (ATD)	Continuing	Continuing
PE 0604307N/Surface Combatant Combat System Engineering	Continuing	Continuing
PE 0604518N/Combat Information Center Conversion	Continuing	Continuing
PE 0604558N/New Design SSN	Continuing	Continuing

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:

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY	PROJECT NUMBER 2912

- 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.
- In-water successful demonstration of warhead lethality against specified threat at required Closest Point of Approach (CPA).
- Items included within the Missile Defense Activity description.

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY					PROJECT NUMBER 3049	
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**
3049: FORCE PROTECTION	2.132	2.226	2.340						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 Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
EMERGING THREATS	2.132	2.226	2.340	
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 2008 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. - Initiated full scale demo of swimmer defense system including sensors and response countermeasures.				

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY		PROJECT NUMBER 3049		
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
- Initiated interim demonstration of force protection detection and response system with automated detection and self learning algorithms. *FY 2009 Plans:* - Continue all efforts of FY 2008. - Initiate research to reduce force protection manpower and equipment costs through automation and predictive learning algorithms. - Initiate threat characterization research and perception experiments for sensor performance optimization and model development and validation. *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete full scale demo of swimmer defense system including sensors and response countermeasures. - Complete interim demonstration of force protection detection and response system with automated detection and self learning algorithms. - Initiate development of all weather sensors optimized for installation force protection. - Initiate research to advance sensor fusion capabilities in high density networks with diverse sensor grids. - Initiate research into sensors for use in counter-surveillance around protected facilities.					

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY	PROJECT NUMBER 3049

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 0602123N/Force Protection Applied Research									Continuing	Continuing
PE 0602131M/Marine Corps Landing Force Technology									Continuing	Continuing
PE 0602235N/Common Picture Applied Research									Continuing	Continuing
PE 0603235N/Common Picture Advanced Technology									Continuing	Continuing
PE 0603502N/Surface and Shallow Water Mine Countermeasures									Continuing	Continuing
PE 0603561N/Advanced Submarine System Development									Continuing	Continuing
PE 0603563N/Ship Concept Advanced Design									Continuing	Continuing
PE 0603564N/Ship Preliminary Design & Feasibility Studies									Continuing	Continuing
PE 0604558N/New Design SSN									Continuing	Continuing
PE 0604561N/SSN-21 Developments									Continuing	Continuing

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 0603123N FORCE PROTECTION ADVANCED TECHNOLOGY	PROJECT NUMBER 3049

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.

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- In-water successful demonstration of warhead lethality against specified threat at required Closest Point of Approach (CPA).
- Items included within the Missile Defense Activity description.

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 0603123N FORCE PROTECTION 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	48.543	58.601	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

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