Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy	Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603673N *I (U)Future Naval Capabilities Advanced Tech Dev*

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	241.652	260.847	258.860	-	258.860	271.498	277.895	274.790	277.887	Continuing	Continuing
3346: *Future Naval Capabilities Adv Tech Dev*	0.000	236.652	255.847	258.860	-	258.860	271.498	277.895	274.790	277.887	Continuing	Continuing
9999: *Congressional Adds*	0.000	5.000	5.000	-	-	-	-	-	-	-	-	10.000

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) address the Advanced Technology Development associated with the Future Naval Capabilities (FNC) Program. The FNC Program represents the requirements-driven, delivery-oriented portion of the Navy's Science and Technology (S&T) portfolio. FNC investments respond to Naval S&T Gaps that are identified by the Navy and Marine Corps after receiving input from Naval Research Enterprise (NRE) stakeholders. The Enabling Capabilities (ECs) and associated technology product investments of the FNC Program are competitively selected by a 3-star Technology Oversight Group (TOG), chartered by the S&T Corporate Board and representing the requirements, acquisition, research and fleet/forces communities of the Navy and the Marine Corps.

This was a new PE in FY 2013 that consolidated all Navy 6.3 FNC Program investments into a single Navy 6.3 PE. Marine Corps FNC 6.3 investments are consolidated in a single Marine Corps 6.3 PE (0603640M). In FY 2011 and FY 2012, the Navy's 6.3 FNC Program investments were spread across 8 separate 6.3 PEs: 0603114N, 0603123N, 0603235N, 0603236N, 0603271N, 0603279N, 0603747N and 0603782N. The consolidation in this PE allows all investments to be viewed by FNC Pillar, Enabling Capability (EC) and Technology Product. It greatly enhances the visibility of the FNC Program by providing an easily navigable overview of all 6.3 FNC investments in a single place.

B. Program Change Summary ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	252.836	256.144	263.891	-	263.891
Current President's Budget	241.652	260.847	258.860	-	258.860
Total Adjustments	-11.184	4.703	-5.031	-	-5.031
• Congressional General Reductions	-	-0.297			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	5.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-11.184	-			
• Rate/Misc Adjustments	-	-	-5.031	-	-5.031

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy	Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603673N *I (U)Future Naval Capabilities Advanced Tech Dev*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2014	FY 2015
Project: 9999: *Congressional Adds*		
Congressional Add: *ASW Research Prog - Cong*	5.000	5.000
Congressional Add Subtotals for Project: 9999	5.000	5.000
Congressional Add Totals for all Projects	5.000	5.000

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 3	R-1 Program Element (Number/Name) PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	Project (Number/Name) 3346 / *Future Naval Capabilities Adv Tech Dev*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3346: *Future Naval Capabilities Adv Tech Dev*	-	236.652	255.847	258.860	-	258.860	271.498	277.895	274.790	277.887	Continuing	Continuing

A. Mission Description and Budget Item Justification

FNC investments are typically 3-5 years in duration. They provide a continuance of basic research by maturing technologies from a Technology Readiness Level (TRL) of 3 or 4 to a TRL of 6. All FNC products require BA2 and BA3 funded technology development, which is coordinated to ensure tangible technology products are delivered upon completion of each investment. Each year the TOG refreshes the FNC Program by approving new ECs and technology products as older ones get delivered. After transition to an acquisition program, FNC products are further engineered, integrated and ultimately, delivered to the warfighter. The development and delivery of each FNC product is guided by a Technology Transition Agreement (TTA) that is signed by the requirements and acquisition sponsors, as well as the S&T developer.

This project supports the naval pillars of Capable Manpower, Enterprise and Platform Enablers, Expeditionary Maneuver Warfare, Force Health Protection, Forcenet, Power and Energy, Sea Basing, Sea Shield and Sea Strike. Each of these pillars is listed as a separate R-2 Activity. Under each R-2 Activity, the BA 6.3 accomplishments and plans for every Enabling Capability (EC) and Technology Product in the FNC Program are listed. ECs are composed of one or more interrelated technology products, so for clarity, each product is shown under its EC.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: CAPABLE MANPOWER (CMP)	17.493	18.312	18.451	-	18.451
Description: This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Capable Manpower (CMP) FNC pillar. The CMP Pillar develops deliverable technologies that provide new capabilities in manpower and personnel management, training and education, and human-systems integration for more intuitive systems. ***FY 2014 Accomplishments:*** EC: CMP-FY10-01 INFORMATION ARCHITECTURE FOR IMPROVED DECISION MAKING - Complete Data Triage - Fuse imaging, electronic warfare, inorganic and acoustic sensor inputs into integrated, fused, and intuitive displays that enhance the presentation and command understanding of uncertain information. - Complete Display Information with Uncertainty - Develop and demonstrate a submarine mission planning capability that reduces operator burden, provides flexibility to develop plans across different mission operations, and shifts the cognitive work of planners and command team reviewers from manual processes toward higher levels of critical-thinking.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: CMP-FY10-02 ADAPTIVE TRAINING TO ENHANCE INDIVIDUAL AND TEAM LEARNING AND PERFORMANCE - Complete Adaptive Training for Combat Information Center Teams - Demonstrate adaptive training system technologies that enhance individual and team training for surface ship Combat Information Center personnel. - Complete Adaptive Training for Submarine Navigation & Piloting Teams - Develop and demonstrate training diagnostic tools and measures to help ensure that individuals and teams training in the Integrated Submarine Piloting and Navigation/Submarine Bridge Trainer meet rigorous Navy standards. EC: CMP-FY11-01 NAVAL NEXT-GENERATION IMMERSIVE TECHNOLOGY (N2IT) - Continue Augmented Immersive Team Training (AITT) - Design and demonstrate the efficacy of a new virtual training architecture for urban and dense infrastructure environments. - Continue Perceptual Training Systems and Tools (PercepTs) - Design, demonstrate, and evaluate the efficacy of new technologies for perceptual training. EC: CMP-FY11-02 PERFORMANCE SHAPING FUNCTIONS FOR ENVIRONMENTAL STRESSORS - Complete Performance Shaping Functions - Incorporate environmental stressors (fatigue, motion, vibration and extreme temperatures) into systems engineering tools. EC: CMP-FY12-01 LIVE, VIRTUAL, & CONSTRUCTIVE TRAINING FIDELITY - Continue Cognitive Fidelity Synthetic Environment - Design and develop virtual simulations that elicit the appropriate perceptual-cognitive responses for Naval aviation training. - Continue Tactics & Speech Capable Semi-Automated Forces - Conduct advanced development of software that automatically generates doctrinally accurate semi-autonomous forces that are adaptive to training scenario events. - Continue Virtual-Constructive Representations on Live Avionics Displays - Develop, test, and refine the Live, Virtual, & Constructive (LVC) symbology used during experimentation and validation efforts. EC: CMP-FY13-02 SIMULATION TOOLSET FOR ANALYSIS OF MISSION, PERSONNEL AND SYSTEMS (STAMPS) - Continue Platform Design and Acquisition Toolset - Develop a toolset that assesses the relationship between ship design and manpower during realistic missions and applications.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: CMP-FY14-02 UNMANNED AERIAL SYSTEMS INTERFACE, SELECTION AND TRAINING TECHNOLOGIES (U-ASISTT) - Initiate Dynamic, Adaptive & Modular Training for Unmanned Aerial Systems (UAS) - Develop semi-automated forces knowledge structures. - Initiate Selection for Unmanned Aerial Systems (UAS) Personnel (SUPer) - Construct specific unmanned aircraft system selection tests. - Initiate Unmanned Aerial Systems (UAS) Control Station Human Machine Interface - Create display design options that address the information demands of unmanned aircraft system operators.					
FY 2015 Plans: EC: CMP-FY11-01 NAVAL NEXT-GENERATION IMMERSIVE TECHNOLOGY (N2IT) - Complete Augmented Immersive Team Training (AITT) - Develop, integrate, and demonstrate hardware and software for Augmented Reality training for infantry operations. - Complete Perceptual Training Systems and Tools (PercepTs) - Design, demonstrate, and evaluate the efficacy of new technologies for perceptual training. EC: CMP-FY12-01 LIVE, VIRTUAL, & CONSTRUCTIVE TRAINING FIDELITY - Continue Cognitive Fidelity Synthetic Environment - Design and develop virtual simulations that elicit the appropriate perceptual-cognitive responses for Naval aviation training. - Continue Tactics & Speech Capable Semi-Automated Forces - Demonstrate software that automatically generates doctrinally accurate semi-autonomous forces that are adaptive to training scenario events. - Continue Virtual-Constructive Representations on Live Avionics Displays - Test, evaluate, and refine the Live, Virtual, & Constructive (LVC) zymology used during experimentation and validation efforts. EC: CMP-FY13-02 SIMULATION TOOLSET FOR ANALYSIS OF MISSION, PERSONNEL AND SYSTEMS (STAMPS) - Continue Manpower Planning and Optimization Toolset - Develop total ownership cost measures and analytical techniques to evaluate proposed shipboard manpower and personnel requirements. - Continue Platform Design and Acquisition Toolset - Develop a software toolset for evaluation of ship design and manpower configurations. EC: CMP-FY14-02 UNMANNED AERIAL SYSTEMS INTERFACE, SELECTION AND TRAINING TECHNOLOGIES (U-ASISTT)					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Dynamic, Adaptive & Modular Training for UAS - Design knowledge structures to support activity learning, scenario requirements to activities links, semi-automated forces envelope generation, cognitive modeling, generative semi-automated forces behaviors and integration with DoN simulation and training systems. - Continue Selection for UAS Personnel (SUPer) - Construct unmanned aircraft operator selection and classification test batteries, including underlying data collection instruments within the DoN's APEX framework. - Continue UAS Control Station Human Machine Interface - Create Common Control Station information display design specifications that focus on reducing the information demands placed on unmanned aircraft system operators. EC: CMP-FY15-01 ACCELERATING DEVELOPMENT OF SMALL UNIT DECISION MAKERS (ADSUDM) - Initiate Decision Making-Learning Management System (DM-LMS) - Define existing Marine Corps measures/ standards of Decision Making (DM) and instructional method guidelines and develop software products to plan, assess, and track decision making skill development. - Initiate Digital Integrated Representation of Tactical Environment (DIRTE) - Define existing Marine Corps CONOPS for classroom and sustainment training and develop rapid terrain modeling and sketchpad software products to enable small unit leaders and instructors to create effective decision making environments and scenarios. - Initiate Simulation Tailored Training and Assessment (ST2A) - Define existing Marine Corps situated tutor techniques and unobtrusive monitoring techniques and develop software and hardware prototypes to execute decision making program of instruction and scenarios in simulation. EC: CMP-FY15-02 ENVIRONMENT DESIGNED TO UNDERTAKE COUNTER A2AD TACTICS TRAINING & EXPERIMENTATION (EDUCAT2E) - Initiate Environment Designed to Undertake Counter A2AD Tactics Training & Experimentation (EDUCAT2E) - Investigate and develop an approach to an objective, metrics-driven training and experimentation capability for Fast Attack Craft and Mine Warfare threats.					
FY 2016 Base Plans: EC: CMP-FY12-01 LIVE, VIRTUAL, & CONSTRUCTIVE TRAINING FIDELITY - Complete Cognitive Fidelity Synthetic Environment - Design and develop virtual simulations that elicit the appropriate perceptual-cognitive responses for Naval aviation training.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Tactics & Speech Capable Semi-Automated Forces - Demonstrate software that automatically generates doctrinally accurate semi-autonomous forces that are adaptive to training scenario events. - Complete Virtual-Constructive Representations on Live Avionics Displays - Test, evaluate, and refine the Live, Virtual, & Constructive (LVC) symbology used during experimentation and validation efforts. EC: CMP-FY13-02 SIMULATION TOOLSET FOR ANALYSIS OF MISSION, PERSONNEL AND SYSTEMS (STAMPS) - Continue Manpower Planning and Optimization Toolset - Demonstrate software that assesses the risks and capabilities of varying levels of manpower authorizations to operate a specific platform design during various mission scenarios. - Continue Platform Design and Acquisition Toolset - Demonstrate software that assesses the trade space and cost commitments of different platform designs and manning compliments. EC: CMP-FY14-02 UNMANNED AERIAL SYSTEMS INTERFACE, SELECTION AND TRAINING TECHNOLOGIES (U-ASISTT) - Continue Dynamic, Adaptive & Modular Training for UAS - Design knowledge structures for integration with DoN simulation and training systems. - Continue Selection for UAS Personnel (SUPer) - Construct unmanned aircraft operator selection and classification test batteries, including underlying data collection instruments within the DoN's APEX framework. - Continue UAS Control Station Human Machine Interface - Create Common Control Station information display design specifications that focus on supervisory control and the reduction of the information demands placed on unmanned aircraft system operators. EC: CMP-FY15-01 ACCELERATING DEVELOPMENT OF SMALL UNIT DECISION MAKERS (ADSUDM) - Continue Decision Making-Learning Management System (DM-LMS) - Define existing Marine Corps measures and standards of decision making and instructional method guidelines, and develop software products to plan, assess, and track decision making skill development. - Continue Digital Integrated Representation of Tactical Environment (DIRTE) - Define existing Marine Corps CONOPS for classroom and sustainment training and develop rapid terrain modeling and sketchpad software products that enable small unit leaders and instructors to create effective decision making environments and scenarios.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Simulation Tailored Training and Assessment (ST2A) - Define existing Marine Corps situated tutor techniques and unobtrusive monitoring techniques, and develop software and hardware prototypes to execute decision making programs of instruction and scenarios in simulation. EC: CMP-FY15-02 ENVIRONMENT DESIGNED TO UNDERTAKE COUNTER A2AD TACTICS TRAINING & EXPERIMENTATION (EDUCAT2E) - Continue Environment Designed to Undertake Counter A2AD Tactics Training & Experimentation (EDUCAT2E) - Develop threat response software models to support an objective, metrics-driven training and experimentation capability for Fast Attack Craft and Mine Warfare threats. EC: CMP-FY16-01 OPERATIONAL PLANNING TOOL - Initiate Operational Planning Tool - Demonstrate software to facilitate the planning cycle structure used by Navy command and control planners to prepare mission plans that range from the Maritime Operations Centers down to maritime tactical units. ***FY 2016 OCO Plans:*** N/A					
Title: ENTERPRISE AND PLATFORM ENABLERS (EPE)	31.975	18.423	21.668	-	21.668
Description: This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Enterprise and Platform Enablers (EPE) FNC pillar. The EPE Pillar develops cross-cutting, deliverable technologies that provide new capabilities for naval service platforms that lower acquisition, operations and maintenance costs, improve system safety and availability, and improve platform survivability. The FY 2014 to FY 2015 decrease was due to the completion of EPE-FY09-01 and EPE-FY10-02, and the planned ramp-down of EPE-FY10-01 and EPE-FY10-03. The FY 2015 to FY 2016 increase was due primarily due to an increase in work required to complete EPE-FY12-02, the planned ramp-up of EPE-FY15-02 and EPE-FY15-03. ***FY 2014 Accomplishments:*** EC: EPE-FY07-02 Maritime Prepositioning Force Future Marine Expeditionary Brigade Force Closure					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 3	**R-1 Program Element (Number/Name)** PE 0603673N / *(U)Future Naval Capabilities Advanced Tech Dev*	**Project (Number/Name)** 3346 / *Future Naval Capabilities Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete 38 MW Axial-Flow Waterjet - Conduct Maritime Pre-Positioning Force Future (MPF-F) final at-sea demo of the Axial-Flow Waterjet on the Littoral Combat Ship (LCS). EC: EPE-FY08-08 Turbine Engine Reduced Cost of Operations 2 - Complete Turbine Engine Technology Demonstrations (Engines) - Finish detail design, initiate long-lead hardware procurement and start engine fabrication for the XTE69/LFU1 durability demonstrator engine (F-135 based). EC: EPE-FY09-01 AFFORDABLE COMMON RADAR ARCHITECTURE - Continue Affordable Common Radar Architecture - Demonstrate final test objective architecture-compliant advanced development model in a relevant environment. EC: EPE-FY09-07 AFFORDABLE SUBMARINE PROPULSION AND CONTROL ACTUATION - Continue Advanced Material Propeller - Design and fabricate an Advanced Material Propeller (AMP) and conduct a structural performance evaluation of Generation 1 full-scale prototype composite blades, scale hub and root block. EC: EPE-FY10-01 ADVANCED SHIPBOARD WATER DESALINATION - Continue Advanced Navy Reverse Osmosis System (formerly known as both Desalination System and Pretreatment System) - Develop, fabricate and test desalination seawater pretreatment system demonstrators. EC: EPE-FY10-02 AFFORDABLE MODULAR PANORAMIC PHOTONICS MAST - Complete Compact Hyper-spectral Scanning Imager - Demonstrate a prototype camera in a Mast Test Vehicle (MTV) in a relevant at-sea environment. - Complete Compact Low Light Level Short, Wavelength Infrared (SWIR) Video Camera - Demonstrate a Low Light Level Short, Wavelength Infrared (SWIR) Video Camera in a Mast Test Vehicle (MTV) in a relevant at-sea environment. - Complete Modular Photonics Mast Housing - Demonstrate the Modular Photonics Mast Housing and Panoramic Headwindow in a Mast Test Vehicle (MTV) in a relevant at-sea environment. EC: EPE-FY10-03 CORROSION AND CORROSION RELATED SIGNATURE TECHNOLOGIES FOR INCREASED OPERATIONAL AVAILABILITY					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Advanced Active Shaft Grounding System (ASGS)/Shaft Current Sensor - Design system and complete full scale demonstration. - Complete Dual-Use Corrosion/Signature Sensor for Ballast Tanks - Design system and complete full scale demonstration. - Continue Advanced-Robust Impressed Current Cathodic Protection (ICCP) Anodes and Reference Cells - Conduct large scale testing with selected Impressed Current Cathodic Protection (ICCP) components. EC: EPE-FY11-01 FLIGHT DECK THERMAL MANAGEMENT - Continue Integrated Thermal Management System Design - Integrate panels to ship deck and initiate selection of ship test bed to resolve final integration issues. EC: EPE-FY12-01 CORROSION MITIGATION TECHNOLOGIES - Continue Corrosion Resistant Surface Treatment - Process scaled components for testing. - Continue Sprayable Acoustic Damping Systems - Demonstrate promising damping systems on mockup structures and selected small scale platform. EC: EPE-FY12-02 INTEGRATED HYBRID STRUCTURAL MANAGEMENT SYSTEM (IHSMS) - Continue Distributed Structural Micro-Sensor Nodes - Develop and demonstrate the technology feasibility of a distributed sensor architecture with diagnostic and prognostic capability for rotorcraft structural health management. - Continue Rotor - Hot Spot Sensors and Integration - Demonstrate structural health monitoring rotor-hot spot sensors and integration technologies for rotary wing vehicles. EC: EPE-FY13-01 TOWED ARRAY SYSTEM RELIABILITY IMPROVEMENT - Continue Tools for Predicting Array Operational Loading & Distribution - Build functionality to improve the model, ensuring operability as its complexity and fidelity increase. EC: EPE-FY14-02 ALUMINUM ALLOY CORROSION CONTROL AND PREVENTION - Initiate Aluminum Alloy Corrosion Mitigation Technologies - Evaluate commercial and near-commercial technologies for re-solutionizing Magnesium precipitates on Al 5XXX alloys.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Initiate Aluminum Alloy Corrosion Prediction Tool - Evaluate and select Degree of Sensitization (DoS) detectors.					
FY 2015 Plans: EC: EPE-FY09-01 Affordable Common Radar Architecture - Complete Affordable Common Radar Architecture - Develop, fabricate, integrate and test a low cost surface radar replacement system. EC: EPE-FY11-01 FLIGHT DECK THERMAL MANAGEMENT - Complete Integrated Thermal Management System Design - Integrate panels to ship deck and finalize selection of ship test bed to resolve final integration issues. EC: EPE-FY09-07 AFFORDABLE SUBMARINE PROPULSION AND CONTROL ACTUATION - Continue Advanced Material Propeller - Assess blade/hub joint strength, perform blade fatigue and deflection testing, and static and dynamic testing of the complex hub unit. EC: EPE-FY10-01: ADVANCED SHIPBOARD WATER DESALINATION - Complete Advanced Navy Reverse Osmosis System - Demonstrate robust reverse osmosis based water purification systems on ship platforms. EC: EPE-FY10-03 CORROSION AND CORROSION RELATED SIGNATURE TECHNOLOGIES FOR INCREASED OPERATIONAL AVAILABILITY - Complete Advanced-Robust ICCP Anodes and Reference Cells - Complete reference cell laboratory performance testing and down select. EC: EPE-FY12-01 CORROSION MITIGATION TECHNOLOGIES - Continue Corrosion Resistant Surface Treatment - Complete development of single step treatment. - Continue Sprayable Acoustic Damping Systems - Complete corrosion testing of prototype Sprayable Acoustic Damping system. EC: EPE-FY12-02 INTEGRATED HYBRID STRUCTURAL MANAGEMENT SYSTEM (IHSMS) - Continue IHSMS Fleet Structural Health Management Decision Tool (formerly known as Distributed Structural Micro-Sensor Nodes and Rotor Hot Spot Sensors and Integration) - Develop wireless energy harvesting sensors					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
for rotorcraft structural health management, and evaluate and optimize rotor-hot spot sensors and integration technologies that allow improved health assessment of rotating frame and selected structural hot spots. EC: EPE-FY13-01 TOWED ARRAY SYSTEM RELIABILITY IMPROVEMENT - Continue Tools for Predicting Array Operational Loading & Distribution - Develop individual predictive models for hydrodynamic effects on a towed array that include the forces imparted on a towed array by the handling system and the effects of the combined forces on array internal components. EC: EPE-FY14-02 ALUMINUM ALLOY CORROSION CONTROL AND PREVENTION - Continue Aluminum Alloy Corrosion Mitigation Technologies - Continue coating formulation and evaluate properties. - Continue Aluminum Alloy Corrosion Prediction Tool - Develop algorithm for 5000 series aluminum alloy degree of sensitization and for prediction of Mean Time to Repair. EC: EPE-FY15-02 GAS TURBINE UPGRADES FOR REDUCED TOTAL OWNERSHIP COST (TOC) AND IMPROVED SHIP IMPACT - Initiate Shipboard Gas Turbine Marinization Package for Higher Temperature, Higher Pressure Operation - Conduct Navy gas turbine hot corrosion analysis and experimentation under shipboard environmental conditions and power scales. EC: EPE-FY15-03 SPECIAL HULL TREATMENT - Continue New Material(s) Development & Lab Characterization - Develop new materials mitigation technology for submarines. ***FY 2016 Base Plans:*** EC: EPE-FY09-07 AFFORDABLE SUBMARINE PROPULSION AND CONTROL ACTUATION - Complete Advanced Material Propeller - Develop Full Scale Test Plan for the Collins Class Submarine. EC: EPE-FY11-01 FLIGHT DECK THERMAL MANAGEMENT - Complete Integrated Thermal Management System Design - Integrate panels to ship deck and finalize selection of ship test bed to resolve final integration issues. EC: EPE-FY12-01 CORROSION MITIGATION TECHNOLOGIES					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Corrosion Resistant Surface Treatment - Deliver impellers treated with Corrosion Resistant Surface Treatment to PMS-505 for installation on LCS. - Complete Sprayable Acoustic Damping Systems - Demonstrate and integrate spray applied damping systems for improved structural vibration control, total ownership cost reduction, improved platform performance, and reduced detectability. EC: EPE-FY12-02 INTEGRATED HYBRID STRUCTURAL MANAGEMENT SYSTEM (IHSMS) - Complete IHSMS Fleet Structural Health Management Decision Tool - Integrate structural health monitoring system into demonstration article, demonstrate structural health monitoring rotor hot-spot sensors and integration technologies, and evaluate system performance. EC: EPE-FY13-01 TOWED ARRAY SYSTEM RELIABILITY IMPROVEMENT - Continue Tools for Predicting Array Operational Loading & Distribution - Develop a design for a highly instrumented towed array to be used in validating the predictive model of the forces operating on a towed array. EC: EPE-FY14-02 ALUMINUM ALLOY CORROSION CONTROL AND PREVENTION - Continue Aluminum Alloy Corrosion Mitigation Technologies - Conduct test and evaluation of prototype surface treatment and repair tools to enable aluminum alloy sensitization repair/desensitization technologies. - Continue Aluminum Alloy Corrosion Prediction Tool - Integrate a detection tool with sensitization prediction software as a singular tool with both detection and predictive capabilities to provide the time to repair aluminum ship structures. EC: EPE-FY15-02 GAS TURBINE UPGRADES FOR REDUCED TOTAL OWNERSHIP COST (TOC) AND IMPROVED SHIP IMPACT - Continue Shipboard Gas Turbine Marinization Package for Higher Temperature, Higher Pressure Operation - Demonstrate, test, and down select advanced coating and alloy combinations that are suitable for higher temperature capable gas turbine operation. EC: EPE-FY15-03 SPECIAL HULL TREATMENT - Continue New Material(s) Development & Lab Characterization - Develop new test methods for materials being developed under the program.					
FY 2016 OCO Plans:					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A					
Title: EXPEDITIONARY MANEUVER WARFARE (EMW)	8.662	8.742	10.392	-	10.392
Description: This R-2 Activity contains the Navy funded Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Expeditionary Maneuver Warfare (EMW) FNC Pillar. The EMW Pillar develops deliverable technologies that provide new capabilities in expeditionary maneuver warfare, including naval ground forces, with special emphasis on regular and irregular warfare in urban environments and combating terrorism. The FY 2015 to FY 2016 increase was due primarily to the initiation of EMW-FY16-01. ***FY 2014 Accomplishments:*** EC: EMW-FY12-02 FUTURE JOINT COUNTER RADIO-CONTROLLED IMPROVISED EXPLOSIVE DEVICE ELECTRONIC WARFARE (JCREW) - Continue Distributed Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (D-JCREW) - Develop implementation of a blue force communication network, tasking architecture and efficient data exchange for coordinating distributed Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (JCREW) platforms. - Continue Integrated Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (I-JCREW) - Develop the subsystems for an integrated, next generation Electronic Warfare (EW) system for countering improvised explosive devices. EC: EMW-FY13-01 AZIMUTH AND INERTIAL MICRO-ELECTRO-MECHANICAL SYSTEM (MEMS) NAVIGATION SYSTEM - Continue Micro-Electro-Mechanical (MEMS) Inertial Navigation System - Design and fabricate a full navigation system for hand-held targeting systems that will reduce target location error. EC: EMW-FY14-01 SPECTRAL AND RECONNAISSANCE IMAGERY FOR TACTICAL EXPLOITATION (SPRITE) - Initiate Automated Processing for Spectral Exploitation and Dissemination (APSED) - Demonstrate cross-cueing between existing wide-area search detections Electro-Optical and Hyper-Spectral Imagery and collection of inspection Red, Green, Blue and Hyper-Spectral Imagery.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Initiate Compact Wide Area Reconnaissance and Spectral Sensor (CWARSS) - Demonstrate a baseline for automated processing for spectral exploitation and dissemination.					
FY 2015 Plans: EC: EMW-FY12-02 FUTURE JOINT COUNTER RADIO-CONTROLLED IED ELECTRONIC WARFARE (JCREW) - Continue Distributed Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (D-JCREW) - Develop distributed resource allocation and RF situational awareness techniques to provide automated tactical-level distributed jamming on multiple ground-based EW systems. - Continue Integrated Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (I-JCREW) - Develop components and techniques to enable simultaneous transmission and reception of EW and blue-force communication waveforms. EC: EMW-FY13-01 AZIMUTH AND INERTIAL MICRO-ELECTRO-MECHANICAL SYSTEM (MEMS) NAVIGATION SYSTEM - Complete Micro-Electro-Mechanical (MEMS) Inertial Navigation System - Design, fabricate and demonstrate a full navigation system for hand-held targeting systems that will reduce target location error. EC: EMW-FY14-01 SPECTRAL AND RECONNAISSANCE IMAGERY FOR TACTICAL EXPLOITATION (SPRITE) - Continue Automated Processing for Spectral Exploitation and Dissemination (APSED) - Conduct a feasibility effort to develop an Electro-Optical (EO) and Hyper-Spectral Imagery (HSI) image processing architecture that includes EO-to-HSI cross-correlation and fusion, image archiving and retrieval, and exploitation product generation. - Continue Compact Wide Area Reconnaissance and Spectral Sensor (CWARSS) - Complete preliminary hardware design for a wide-area intelligence, surveillance and reconnaissance capability with simultaneous high spatial and spectral resolution.					
FY 2016 Base Plans: EC: EMW-FY12-02 FUTURE JOINT COUNTER RADIO-CONTROLLED IED ELECTRONIC WARFARE (JCREW) - Continue Distributed Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (D-JCREW) - Using realistic scenarios, demonstrate tactical-level distributed jamming on multiple ground-based Electronic Warfare systems.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Integrated Joint Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (I-JCREW) - Employing realistic scenarios, demonstrate the simultaneous reception and transmission of Electronic Warfare and blue-force communication waveforms. EC: EMW-FY12-03 Wide Area Surgical and Persistent Surveillance (WASPS) Capabilities For Tier 2/3 UAVs - Initiate/Complete Tactical Nighttime Wide Area Surveillance - Conduct final demonstration and complete transition. EC: EMW-FY14-01 SPECTRAL AND RECONNAISSANCE IMAGERY FOR TACTICAL EXPLOITATION (SPRITE) - Complete Automated Processing for Spectral Exploitation and Dissemination (APSED) - Demonstrate an Electro-Optical (EO) and Hyper-Spectral Imagery (HSI) Image Processing architecture that includes EO to HSI cross-correlation and fusion, image archiving and retrieval, and exploitation product generation. - Complete Compact Wide Area Reconnaissance and Spectral Sensor (CWARSS) - Demonstrate parts of the baseline design for a multi-model wide area sensor compatible with a small space, weight and power baseline. EC: EMW-FY16-01 DENSIFIED PROPELLANT FIRE FROM ENCLOSURE - CONFINED SPACE (FFE/CS) PROPULSION TECHNOLOGIES - Initiate Densified Propellant Fire From Enclosure - Confined Space (FFE/CS) Propulsion Technologies - Integrate rocket motor igniters with micro-electromechanical system ignition safety devices and multi-stage igniter plug designs to achieve warhead launch parameters. ***FY 2016 OCO Plans:*** N/A					
Title: FORCE HEALTH PROTECTION (FHP) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Force Health Protection (FHP) FNC pillar. The FHP Pillar develops deliverable technologies that provide new capabilities that provide Sailors and Marines with the best possible protection from operational threats by reducing morbidity and mortality when casualties occur. The FY 2015 to FY 2016 increase was due primarily to the planned ramp-up of FHP-FY13-03, FHP-FY14-01 and FHP-FY14-03.	14.148	15.623	16.797	-	16.797

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
FY 2014 Accomplishments: EC: FHP-FY10-01 HUMAN INJURY & TREATMENT MODEL - Complete Human Injury & Treatment Model - Complete advanced development to deliver and transition the integrated model for predicting human injury, incapacitation, and medical response requirements associated with blast events in shipboard environments. EC: FHP-FY11-01 MULTIFUNCTIONAL BLOOD SUBSTITUTE (MFBS) - Continue Multifunctional Blood Substitute (MFBS) - Formulate a multi-component, complete, and shelf-stable resuscitation fluid. EC: FHP-FY12-01 AUTOMATED CRITICAL CARE SYSTEM (ACCS) - Continue Automated Critical Care System (ACCS) - Integrate software algorithms and hardware and perform Food and Drug Administration (FDA) tests/trials as required. EC: FHP-FY12-02 SAVING LIVES WITH EMERGENCY MEDICAL PERFLUOROCARBONS IN THE FIELD (SEMPER FI) FOR SEA, AIR & LAND DYSOXIA - Continue Saving Lives with Emergency Medical Perfluorocarbons in the Field (SEMPer Fi) for Air Dysoxia - Perform advanced studies for documentation required for initial Food and Drug Administration meeting for treatment of pulmonary hypoxia/hypoxemia. - Continue Saving Lives with Emergency Medical Perfluorocarbons in the Field (SEMPer Fi) for Land Blast Kit - Perform studies for documentation required for initial Food and Drug Administration (FDA) meeting for immediate treatment of blast overpressure, including injury to the brain and internal organs. EC: FHP-FY13-03 EXTREME OPERATIONS: MITIGATING OXYGEN IMBALANCE AT ALTITUDE AND AT DEPTH - Continue Hypoxia Alert and Mitigation System - Evaluate and adapt hypoxia alert system hardware/software with Human Systems Integration (HSI) considerations. EC: FHP-FY14-01 ACUTE CARE COVER FOR SEVERELY INJURED LIMBS (ACCSIL) - Initiate Acute Care Cover for Severely Injured Limbs (ACCSIL) - Develop test design for animal pharmaceutical efficacy studies and begin to develop materials to meet military suitability requirements.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: FHP-FY14-03 BLAST LOAD ASSESSMENT: SENSE AND TEST (BLAST) - Initiate Algorithm - Begin development of test criteria for 'beta' algorithm. - Initiate Neuro-Functional Assessment Tool - Begin development of neuro-cognative assessment tool subsystems, and begin test design for prototype. - Initiate Sensor - Begin test design in order to validate and develop sensor data inputs.					
FY 2015 Plans: EC: FHP-FY11-01 MULTIFUNCTIONAL BLOOD SUBSTITUTE (MFBS) - Continue Multifunctional Blood Substitute (MFBS) - Formulate a resuscitation fluid that provides volume expansion and improves clotting in hemorrhaging combat casualties. EC: FHP-FY12-01 AUTOMATED CRITICAL CARE SYSTEM - Continue Automated Critical Care System (ACCS) - Formulate autonomous hardware and software system to monitor and maintain combat causalities with minimal human intervention during a 2-6 hour Casualty Evacuation (CASEVAC) scenario. EC: FHP-FY12-02 SAVING LIVES WITH EMERGENCY MEDICAL PERFLUOROCARBONS IN THE FIELD (SEMPER FI) FOR SEA, AIR & LAND DYSOXIA - Continue SEMPer Fi for Air Dysoxia - Research candidate drugs based on small and large animal testing for treatment of pulmonary hypertension. - Continue SEMPer Fi for Land Blast Kit - Determine window of therapeutic intervention and dosing with hypothermia for immediate treatment of blast overpressure in small and large animals, including injury to the brain and/or internal organs. EC: FHP-FY13-03 EXTREME OPERATIONS: MITIGATING OXYGEN IMBALANCE AT ALTITUDE AND AT DEPTH - Continue Hypoxia Alert and Mitigation System - Test algorithms to detect/predict onset of hypoxia or hypoxia-like symptoms for mountain operators, casualties, and aviators. EC: FHP-FY14-01 ACUTE CARE COVER FOR SEVERELY INJURED LIMBS (ACCSIL) - Continue Acute Care Cover for Severely Injured Limbs (ACCSIL) - Establish efficacy test parameters for a fieldable wound cover to include novel outer cover materials and internal pharmaceutical coating that improve the clinical outcome of severe wounds.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: FHP-FY14-03 BLAST LOAD ASSESSMENT: SENSE AND TEST (BLAST) - Continue Algorithm - Determine, establish and design test parameters for an algorithm that integrates blast intensity data with cognitive impairment data to predict likelihood of brain injury after a given blast event. - Continue Neuro-Functional Assessment Tool - Establish testing paradigm and sensory modality for a non-psychometric device that detects and estimates severity of traumatic brain injury. - Continue Sensor - Develop metrics for a self powered blast sensor that detects and quantifies acceleration, pressure, and impulse from a given blast event and outputs the data electronically.					
FY 2016 Base Plans: EC: FHP-FY11-01 MULTIFUNCTIONAL BLOOD SUBSTITUTE (MFBS) - Complete Multifunctional Blood Substitute (MFBS) - Formulate a resuscitation fluid that provides volume expansion and improves clotting in hemorrhaging combat casualties.					
EC: FHP-FY12-01 AUTOMATED CRITICAL CARE SYSTEM - Continue Automated Critical Care System (ACCS) - Integrate down-selected hardware with an autonomous software system to monitor and maintain combat causalities with minimal human intervention during a 2-6 hour Casualty Evacuation scenario.					
EC: FHP-FY12-02 SAVING LIVES WITH EMERGENCY MEDICAL PERFLUOROCARBONS IN THE FIELD (SEMPER FI) FOR SEA, AIR & LAND DYSOXIA - Complete SEMPer Fi for Air Dysoxia - Perform down-select of candidate drugs based on small and large animal testing for treatment of pulmonary hypertension. - Complete SEMPer Fi for Land Blast Kit - Demonstrate an optimal treatment application and overall duration of therapeutic hypothermia for immediate treatment of blast overpressure in small and large animals, including injury to the brain and/or internal organs.					
EC: FHP-FY13-03 EXTREME OPERATIONS: MITIGATING OXYGEN IMBALANCE AT ALTITUDE AND AT DEPTH - Continue Hypoxia Alert and Mitigation System - Execute laboratory testing to optimize hypoxia-detection algorithms intended for use in high altitude operations.					
EC: FHP-FY14-01 ACUTE CARE COVER FOR SEVERELY INJURED LIMBS (ACCSIL)					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Acute Care Cover for Severely Injured Limbs (ACCSIL) - Integrate outer cover materials and an internal pharmaceutical coating into a single system to improve the clinical outcome of severe wounds on the battlefield. EC: FHP-FY14-03 BLAST LOAD ASSESSMENT: SENSE AND TEST (BLAST) - Continue Algorithm - Refine developmental algorithms using experimental data to integrate blast intensity data with cognitive impairment data to predict the likelihood of brain injury after single or multiple blast exposures. - Continue Neuro-Functional Assessment Tool - Identify and refine a non-psychometric device that detects and estimates the severity of traumatic brain injury. - Continue Sensor - Conduct optimization and testing of a self-powered blast sensor that detects and quantifies acceleration, pressure and impulse from a given blast event. ***FY 2016 OCO Plans:*** N/A					
Title: FORCENET (FNT) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Forcenet (FNT) FNC Pillar. The FNT pillar develops deliverable technologies that provide new capabilities in Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), networking, navigation, sensors, decision support, cyber-space, intelligence, and space technologies that will provide the architectural framework for naval warfare in the information age. The FY15 to FY16 decrease was due primarily to the completion of FNT-FY09-04. ***FY 2014 Accomplishments:*** EC: FNT-FY10-02 ACTIONABLE INTELLIGENCE ENABLED BY PERSISTENT SURVEILLANCE - Continue Autonomous Unmanned Aerial Vehicle (UAV) Collision Avoidance System - Prepare to demonstrate autonomous collision avoidance system performance for all classes of aircraft or Unmanned Aerial Vehicles (UAV) in the National Airspace System (NAS). - Complete Operational Adaptation Enterprise Services - Design and demonstrate an end-to-end system prototype tactical enterprise service bus that provides tools that expose hidden enemy networks, an information enterprise, and application services for hybrid complex operations.	53.354	53.454	51.657	-	51.657

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Ultra Wide Field of View (FOV) Area Surveillance System - Develop and commence integrating flight-test optical hardware and image processing software into a prototype payload assembly. EC: FNT-FY10-03 SATELLITE COMMUNICATIONS (SATCOM) VULNERABILITY MITIGATION - Continue Multi-Link Common Data Link (CDL) System - Conduct system integration and prepare to demonstrate a Multi-Link Common Data Link (CDL) System. EC: FNT-FY11-01 PRO-ACTIVE COMPUTER NETWORK DEFENSE AND INFORMATION ASSURANCE - Continue Common Operational Security Decision System - Develop implementation of a network security policy management engine to support automated policy discovery as well as human-driven policy origination and deployment. - Continue Next Generation Security and Security Management Protocols - Develop implementation of a secure asynchronous mesh with context-aware path selection to support secure collaboration amongst Computer Network Defense platforms. - Continue Next Generation Sensors and Gateways - Develop implementation of programmable hardware-accelerated network data extraction and identification system. EC: FNT-FY11-02 FAST MAGIC - Continue Fast Magic Product 1 - Develop real-time algorithms (details classified). - Continue Fast Magic Product 2 - Develop real-time algorithms (details classified). EC: FNT-FY11-05 NRL SPACE - Continue Multi-INT Tracking - Develop real-time fusion algorithms and visualization techniques to detect, track and visualize current and historical maritime vessel track data. - Continue Tagging - Develop real-time data tagging algorithms utilizing key parametric values used in the Maritime environment. EC: FNT-FY12-01 ADVANCED TACTICAL DATA LINK (ATDL) - Continue Mission-Based Waveform Controls & Networking - Complete a bench prototype for initial testing. EC: FNT-FY12-02 AUTONOMOUS PERSISTENT TACTICAL SURVEILLANCE - Continue Autonomous Information-Based Surveillance Control - Demonstrate and continue development of unmanned aerial vehicles information collection and retasking.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Contextual Enterprise Information - Adapt the analytical services framework for transition by developing real-time enterprise exploitation algorithms. - Continue Mobile Autonomous Intelligence, Surveillance, Reconnaissance (ISR) to Command and Control (C2) Synchronization - Design and demonstrate an enterprise distributed software system that will manage complex event processing and ensure that the Intelligence, Surveillance, Reconnaissance (ISR) to Command and Control (C2) synchronization is maintained. EC: FNT-FY13-01 ELECTRONIC WARFARE BATTLE MANAGEMENT (EWBM) FOR SURFACE DEFENSE - Continue Electronic Warfare Battle Management (EWBM) - Develop components and software used to coordinate Electronic Warfare (EW) Electronic Attack and deception techniques and provide a technology demonstration of Electronic Warfare Battle Management. EC: FNT-FY13-03 SILK THREAD - Initiate Product 1- Conduct advanced technology development (details classified). - Initiate Product 2 - Conduct advanced technology development (details classified). EC: FNT-FY13-04 DETECTION AND FUSION FOR REMOTE SENSORS - Continue Adaptive Multi-Int Correlation & Identification (AMICA) - Develop, test and modify algorithms to enable cross-domain information fusion and optimize use of remote sensing assets. - Continue Detection & Classification Algorithms (DCA) - Develop, test and modify algorithms to provide enhanced detection and classification metrics and robust performance under stressing environmental conditions. EC: FNT-FY14-02 ADAPTIVE TASKING, COLLECTION, PROCESSING, EXPLOITATION AND DISSEMINATION (TCPED) SERVICES - Initiate Adaptive Tasking, Collection, Processing, Exploitation and Dissemination (TCPED) for Anti-Submarine Warfare (ASW) Services - Develop algorithms and software to assure network connectivity for low latency data sharing and autonomous and adaptive Command and Control (C2) services for coordination of data collection and sharing. - Initiate Data Exfiltration and Networked Platform Interaction - Details classified. ***FY 2015 Plans:*** EC: FNT-FY10-02 ACTIONABLE INTELLIGENCE ENABLED BY PERSISTENT SURVEILLANCE					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Autonomous Unmanned Aerial Vehicle (UAV) Collision Avoidance System - Demonstrate autonomous collision avoidance system performance for all classes of aircraft or Unmanned Aerial Vehicles (UAV) in the National Airspace System (NAS). - Complete Ultra Wide Field of View (FOV) Area Surveillance System - Finish integration of flight-test optical hardware and image processing software into a prototype payload assembly. EC: FNT-FY10-03 SATELLITE COMMUNICATIONS (SATCOM) VULNERABILITY MITIGATION - Complete Multi-Link Common Data Link (CDL) System - Complete system integration and demonstration of a Multi-Link Common Data Link (CDL) System. EC: FNT-FY11-01 PRO-ACTIVE COMPUTER NETWORK DEFENSE AND INFORMATION ASSURANCE - Complete Common Operational Security Decision System - Develop interactive controls for map-based visualization of Computer Network Defense policy deployments. - Complete Next Generation Security and Security Management Protocols - Develop path-aware trusted routing algorithm for maximizing Information Assurance of security management communications. - Complete Next Generation Sensors and Gateways - Develop adaptive learning and decision algorithms for pro-active defense mechanisms and for creating Computer Network Defense policy. EC: FNT-FY11-02 FAST MAGIC - Complete Fast Magic Product 1 - Develop real-time algorithms and integrate into Fleet systems. - Complete Fast Magic Product 2 - Develop real-time algorithms and integrate into Fleet systems. EC: FNT-FY11-05 NRL SPACE - Complete Multi-INT Tracking - Develop real-time fusion algorithms and visualization techniques to detect, track and visualize current and historical maritime vessel track data. - Complete Tagging - Develop real-time fusion algorithms and visualization techniques to detect, track and visualize current and historical maritime vessel track data. EC: FNT-FY12-01 ADVANCED TACTICAL DATA LINK (ATDL) - Continue Mission-Based Waveform Controls & Networking - Integrate completed waveforms into host terminal having NSA certification for field testing demonstration. EC: FNT-FY12-02 AUTONOMOUS PERSISTENT TACTICAL SURVEILLANCE					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Autonomous Information-Based Surveillance Control - Integrate and test information based algorithms for UAV routing and patching. - Continue Contextual Enterprise Information - Adapt the analytical services framework and continue development of real-time enterprise exploitation algorithms for transition and participation in Cloud LTE - Continue Mobile Autonomous ISR to C2 Synchronization - Develop enterprise distributed software and begin work on a generalized solution. EC: FNT-FY13-01 EW BATTLE MANAGEMENT FOR SURFACE DEFENSE - Continue EW Battle Management (EWBM) - Integrate distributed EW communication and coordination techniques with operational Naval Command and Control and Combat Systems used on surface platforms. EC: FNT-FY13-03 SILK THREAD - Continue Product 1 - Conduct Advanced Technology Development. - Continue Product 2 - Conduct Advanced Technology Development. EC: FNT-FY13-04 DETECTION AND FUSION FOR REMOTE SENSORS - Continue Adaptive Multi-Int Correlation & Identification (AMICA) - Develop, test and modify algorithms to enable cross-domain information fusion and optimize use of remote sensing assets. - Continue Detection & Classification Algorithms (DCA) - Develop, test and modify algorithms to provide enhanced detection and classification metrics and robust performance under stressing environmental conditions. EC: FNT-FY14-02 ADAPTIVE TASKING, COLLECTION, PROCESSING, EXPLOITATION AND DISSEMINATION (TCPED) SERVICES - Continue Adaptive TCPED for ASW Services - Integrate new methods and demonstrate via simulation performance in limited bandwidth environments. - Continue Data Exfiltration and Networked Platform Interaction - Integrate components and evaluate performance in a size, weight and power package consistent with a sonobuoy. EC: FNT-FY15-01 ADVANCED AIRBORNE EARLY WARNING ELECTRONIC PROTECTION (AAEWEP) - Initiate Advanced AEW Electronic Protection - Integrate and test E2-D electronic protection techniques. EC: FNT-FY15-02 DATA FOCUSED NAVAL TACTICAL CLOUD					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Initiate Naval Tactical Cloud Analytics (formerly know as ASW Naval Tactical Cloud, EXW Naval Tactical Cloud and IAMD Naval Tactical Cloud) - Develop, integrate and validate, through Limited Technology Experiments , enhanced ASW, Expeditionary Warfare (EXW) and IAMD situational awareness, decision support analytics, and widgets through mission focused exploitation of all relevant cross-domain data within the Naval Tactical Cloud. EC: FNT-FY15-04 SCALABLE INTEGRATED RF SYSTEM FOR UNDERSEA PLATFORMS (SIRFSUP) - Initiate Compact, Scalable Integrated RF (Compact-SIRF) - Integrate new techniques for data conversion and distribution in low size, weight and power analog RF and digital hardware within compact system design. - Initiate Electronic Warfare Tactical Decision Aid (EW-TACAID) - Integrate an intuitive EW display with an onboard integrated adaptive high fidelity training capability to improve the warfighters' ability to manage increasingly complex RF environments. - Initiate Scalable Integrated RF for Submarines (SIRF-Sub) - Integrate new techniques for data conversion and distribution with RF and digital hardware components for insertion into the next generation submarine EW system.					
FY 2016 Base Plans: EC: FNT-FY12-01 ADVANCED TACTICAL DATA LINK (ATDL) - Continue Mission-Based Waveform Controls & Networking - Port baseline waveform and Anti-Access/Area Denial enhancements to reference implementation hardware for field testing and demonstration. EC: FNT-FY12-02 AUTONOMOUS PERSISTENT TACTICAL SURVEILLANCE - Complete Autonomous Information-Based Surveillance Control - Complete integration and testing of information based algorithms for Unmanned Aerial Vehicle (UAV) routing and pathing. - Complete Contextual Enterprise Information - Adapt the analytical services framework and finalize development of real-time enterprise exploitation algorithms for transition and participation in cloud-oriented limited technology experiments. - Complete Mobile Autonomous ISR to C2 Synchronization - Transition to MARCORSYSCOM a service that can track mission task readiness as a function of addressed information fulfillments and unaddressed information deficits. EC: FNT-FY13-01 EW BATTLE MANAGEMENT FOR SURFACE DEFENSE - Continue EW Battle Management (EWBM) - Integrate interactive Electronic Warfare displays and alternate communications methods into Navy surface ship combat systems and command and control doctrine.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: FNT-FY13-03 SILK THREAD - Continue Silk Thread Product 1 - Conduct advanced technology development. - Continue Silk Thread Product 2 - Conduct advanced technology development. EC: FNT-FY13-04 DETECTION AND FUSION FOR REMOTE SENSORS - Continue Adaptive Multi-Int Correlation & Identification (AMICA) - Develop, test and modify algorithms to enable cross-domain information fusion and optimize use of remote sensing assets. - Continue Detection & Classification Algorithms (DCA) - Develop, test and modify algorithms to provide enhanced detection and classification metrics and robust performance under stressing environmental conditions. EC: FNT-FY14-02 ADAPTIVE TASKING, COLLECTION, PROCESSING, EXPLOITATION AND DISSEMINATION (TCPED) SERVICES - Continue Adaptive TCPED for ASW Services - Integrate new methods and demonstrate their performance via simulation in limited bandwidth environments. - Continue Data Exfiltration and Networked Platform Interaction - Integrate components with selected waveforms and evaluate communication performance in packages consistent with the size, weight and power constraints of sonobuoys and unmanned underwater vehicles. EC: FNT-FY15-01 ADVANCED AIRBORNE EARLY WARNING ELECTRONIC PROTECTION (AAEWEP) - Continue Advanced AEW Electronic Protection - Conduct integration and testing of E-2D Advanced Hawkeye electronic protection techniques. EC: FNT-FY15-02 DATA FOCUSED NAVAL TACTICAL CLOUD - Continue Data Focused Naval Tactical Cloud (formerly called Naval Tactical Cloud Analytics) - Develop, integrate and validate through Limited Technology Experiments, enhanced ASW, IAMD and EXW situational awareness, decision support analytics and planning algorithms and widgets through mission focused exploitation of all relevant cross-domain data within the Naval Tactical Cloud. EC: FNT-FY15-04 SCALABLE INTEGRATED RF SYSTEM FOR UNDERSEA PLATFORMS (SIRFSUP) - Continue Compact, Scalable Integrated RF (Compact-SIRF) - Demonstrate in the laboratory an initial modular Radio Frequency functionality for Size, Weight and Power (SWaP) restricted platforms.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Electronic Warfare Tactical Decision Aid (EW-TACAID) - Demonstrate an Electronic Warfare display with an onboard, integrated, and adaptive high fidelity training capability to improve the warfighters' ability to manage increasingly complex Radio Frequency environments. - Continue Scalable Integrated RF for Submarines (SIRF-Sub) - Demonstrate in the laboratory initial techniques for high speed data conversion and multi-function Radio Frequency processing. EC: FNT-FY16-01 BUGLE - Initiate Bugle - Develop and test algorithms for integration into communication systems. EC: FNT-FY16-02 COMBINED EO/IR SURVEILLANCE AND RESPONSE SYSTEM (CESARS) - Initiate Multispectral EO/IR Countermeasures against Advanced Threats (MEIRCAT) - Develop and test an integrated, multiband laser and sensor architecture that is scalable and modular. - Shipboard Panoramic EO/IR Cueing and Surveillance System (SPECSS) - Develop and test an open architecture design for a panoramic, staring, imaging system. ***FY 2016 OCO Plans:*** N/A					
Title: POWER AND ENERGY (P&E) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Power and Energy (P&E) FNC pillar. The P&E Pillar develops deliverable technologies that provide new capabilities in energy security, efficient power and energy systems, high energy and pulse power. The FY 2014 to FY 2015 increase was due primarily to the planned ramp-up of P&E-FY12-03 and P&E-FY14-01, and the initiation of P&E-FY15-03. The FY 2015 to FY 2016 decrease was due primarily to the planned ramp-down of P&E-FY12-03. ***FY 2014 Accomplishments:*** EC: P&E-FY12-01 RENEWABLE-SUSTAINABLE EXPEDITIONARY POWER - Continue Renewable Thermal Engine - Initiate fabrication and prototype assembly to include signature and susceptibility requirements as well as deployment/stowage mechanisms.	5.320	11.084	10.024	-	10.024

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: P&E-FY12-03 LONG ENDURANCE UNDERSEA VEHICLE PROPULSION - Continue Air Independent Propulsion System - Conduct full-scale system component procurement for the Phase II demonstration culminating in a critical design review. EC: P&E-FY14-01 EFFICIENT AND POWER DENSE ARCHITECTURE AND COMPONENTS - Initiate High Power Solid State Circuit Protection for Power Distribution and Energy Storage - Design test scenarios suitable for analytical and reduced scale testing of candidate protection methods in a relevant power system environment. ***FY 2015 Plans:*** EC: P&E-FY12-01 RENEWABLE-SUSTAINABLE EXPEDITIONARY POWER - Continue Renewable Thermal Engine - Continue fabrication and prototype assembly to include signature and susceptibility requirements as well as deployment/stowage mechanisms. EC: P&E-FY12-03 LONG ENDURANCE UNDERSEA VEHICLE PROPULSION - Continue Air Independent Propulsion System - Integrate system components for packaging and demonstration in a prototype Unmanned Underwater Vehicle energy section hull. EC: P&E-FY14-01 EFFICIENT AND POWER DENSE ARCHITECTURE AND COMPONENTS - Continue High Power Solid State Circuit Protection for Power Distribution and Energy Storage - Conduct testing to Phase 1 metrics, select Phase 2 performer, and initiate Phase 2 development, to include reduced scale testing of candidate protection methods in a relevant power system environment. EC: P&E-FY15-03 MULTIFUNCTION ENERGY STORAGE FOR NAVY / USMC APPLICATIONS TO MAXIMIZE OPERATIONAL EFFECTIVENESS AND EFFICIENCY - Initiate Compact High Density Tactical Energy Storage - Develop multifunction energy storage module control, interface, thermal management and containment subcomponents for tactical application. - Initiate Multi-Function High Density Shipboard Energy Storage - Develop full scale ship multifunction energy storage module control, interface, thermal management and containment subcomponents for shipboard applications. ***FY 2016 Base Plans:*** EC: P&E-FY12-01 RENEWABLE-SUSTAINABLE EXPEDITIONARY POWER					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Renewable Thermal Engine - Conduct full-scale testing and a TRL 6 demonstration, and deliver tactical power system prototype to USMC transition sponsor. EC: P&E-FY12-03 LONG ENDURANCE UNDERSEA VEHICLE PROPULSION - Complete Air Independent Propulsion System - Conduct Phase II fuel cell energy system integration into a UUV energy section and conduct TRL-6 land-based testing and transition planning. EC: P&E-FY14-01 EFFICIENT AND POWER DENSE ARCHITECTURE AND COMPONENTS - Continue High Power Solid State Circuit Protection for Power Distribution and Energy Storage - Develop final Phase II design for prototype circuit protection devices and initiate development of the devices and the associated test environment. EC: P&E-FY15-03 MULTIFUNCTION ENERGY STORAGE FOR NAVY / USMC APPLICATIONS TO MAXIMIZE OPERATIONAL EFFECTIVENESS AND EFFICIENCY - Continue Compact High Density Tactical Energy Storage - Develop and test a multifunction energy storage module system, which integrates target subcomponent technologies. - Continue Multi-Function High Density Shipboard Energy Storage - Develop a subscale ship multi-function energy storage module integrated system and conduct initial shipboard testing. ***FY 2016 OCO Plans:*** N/A					
Title: SEA BASING (BAS) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Sea Basing (BAS) FNC pillar. The BAS Pillar develops deliverable logistics, shipping and at-sea transfer technologies that provide new capabilities for projecting expeditionary force from the sea base and providing sea based joint operational independence through improved connector, at-sea transfer and shipboard logistical capabilities. The FY 2015 to FY 2016 decrease was due primarily to the completion of BAS-FY07-02 and the planned ramp-down of BAS-FY11-01. ***FY 2014 Accomplishments:*** EC: BAS-FY07-02 Surface Connector Vehicle Transfer	11.140	12.223	3.934	-	3.934

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Interface Ramp Technologies development, American Bureau of Shipping (ABS) certification, and testing of the JHSV ramp. EC: BAS-FY11-01 CONNECTORS AND THE SEA BASE - Continue Advanced Mooring System - Construct and execute at-sea demonstration. - Continue Environmental Ship Motion Forecasting - Develop wave and ship motion forecasting technologies. ***FY 2015 Plans:*** EC: BAS-FY11-01 CONNECTORS AND THE SEA BASE - Continue Advanced Mooring System - Conduct integration, testing, and demonstration of the Advanced Mooring System S&T demonstrator at full-scale in a relevant environment. - Continue Environmental Ship Motion Forecasting - Complete integration and testing of environmental and ship motion sensor and forecasting system. ***FY 2016 Base Plans:*** EC: BAS-FY11-01 CONNECTORS AND THE SEA BASE - Complete Advanced Mooring System - Demonstrate a fully capable advanced mooring system and transition it to sponsors. - Complete Environmental Ship Motion Forecasting - Develop wave and ship motion forecasting technologies. ***FY 2016 OCO Plans:*** N/A					
Title: SEA SHIELD (SHD) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE that are aligned to the Sea Shield (SHD) FNC pillar. The SHD Pillar develops deliverable technologies that provide new capabilities in theater air and missile defense, anti-submarine warfare, mine countermeasures, defensive surface warfare, global defensive assurance, anti-terrorism, and fleet/force protection. The FY 2014 to FY 2015 increase was due primarily to the initiation of SHD-FY15-07 and the planned ramp-up of SHD-FY13-07 and SHD-FY-14-02.	59.647	71.569	80.572	-	80.572

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
The FY 2015 to FY 2016 increase was due primarily to the planned ramp-up of SHD-FY14-04 and SHD-FY14-08, the delayed initiation of SHD-FY15-03, and the initiation of SHD-FY16-04, SHD-FY16-05, SHD-FY16-06, SHD-FY16-07 and SHD-FY16-OSD. ***FY 2014 Accomplishments:*** EC: SHD-FY09-06 Countermeasure Technologies for Anti-Ship Missile Defense (ASMD) - Complete Enhanced Nulka Payload - Conduct final testing required for transition EC: SHD-FY10-01 ANTI-SHIP MISSILE DEFENSE TECHNOLOGIES - Continue Enhanced Lethality Guidance Algorithms (ELGA) - Continue development and testing of STANDARD Missile motor and thrust vector control for advanced maneuvering threats. - Continue Enhanced Maneuverability Missile Airframe (EMMA) - Continue development and testing of STANDARD Missile motor and thrust vector control for advanced maneuvering threats. EC: SHD-FY10-02 HIGH FIDELITY ACTIVE SONAR TRAINING - Complete Anti-Submarine Warfare (ASW) Command Level Training - Develop training capabilities based on algorithms to be used at-sea and in shore training sites that will improve the training realism provided to Anti-Submarine Warfare (ASW) Commanders and their Aircraft Carrier support personnel. - Complete Operator Training - Develop and implement algorithms to provide enhanced training to operators by improving simulated submarine target realism, environmental clutter and reverberation for use in an active sonar training system. EC: SHD-FY10-03 ADVANCED SONAR TECHNOLOGY FOR HIGH CLEARANCE RATE MINE COUNTERMEASURES (MCM) - Continue Long Range Low Frequency Broadband (LFBB) Sonar (Autonomous Underwater Vehicle (AUV) Platform Option) - Demonstrate at-sea performance of the Long Range Low Frequency Broadband (LFBB) Sonar in a relevant environment. - Continue Integrated Forward looking Sonar - Dual Frequency Synthetic Aperture Sonar (FLS-DFSAS) - Conduct forward looking sonar - dual frequency synthetic aperture sonar algorithm development and conduct experimentation. - Continue Very Shallow Water (VSW) Acoustic Color-Imaging Sonar - Develop and test prototype acoustic projectors, receivers, and processing algorithms.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: SHD-FY10-04 NEXT GENERATION COUNTERMEASURE TECHNOLOGIES FOR SHIP MISSILE DEFENSE - Complete Next Generation Countermeasure Technologies for Ship Missile Defense - Demonstrate compact, net-enabled, open architecture Electronic Attack (EA) systems with threat adaptive processing and response in realistic at-sea environments. EC: SHD-FY10-05 AFFORDABLE VECTOR SENSOR TOWED ARRAY AND SIGNAL PROCESSING - Continue Vector Sensor Towed Array - Develop and build a Vector Sensor Towed Array that provides thin-line twin line towed array performance in a single thin-line towed array for at-sea testing. - Continue Vector Sensor Towed Array Signal Processing - Develop and implement algorithms in a system to demonstrate at-sea performance of noise reduction and signal processing algorithms when deployed with a Vector Sensor Towed Array. EC: SHD-FY11-01 TORPEDO COMMON HYBRID FUZING SYSTEM - Continue Torpedo Common Hybrid Fuzing System - Conduct system integration and field test planning and execution. EC: SHD-FY12-01 FORCE LEVEL RADAR RESOURCE MANAGEMENT FOR INTEGRATED AIR AND MISSILE DEFENSE (IAMD) - Continue Radar Resource Manager for Integrated Air and Missile Defense (IAMD) - Develop and test algorithms for management and coordination of force level AEGIS radar resources. EC: SHD-FY12-03 SONAR AUTOMATION - Continue Active Sonar Automation - Develop tools, utilizing new algorithms, for use in current active sonar systems that improve operator performance and reduce workload in high clutter. - Continue Passive Sonar Automation - Develop tools, utilizing new algorithms, for use in current passive sonar systems that improve operator performance and reduce operator workload when used against quiet submarines in the presence of clutter. EC: SHD-FY12-04 DETECTION AND NEUTRALIZATION OF NEAR-SURFACE DRIFTING-OSCILLATING MINES					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Compact Modular Sensor-Processing Suite (CMSS) - Integrate sensors into a compact modular configuration and initiate data collection flight tests. EC: SHD-FY13-01 COOPERATIVE NETWORKED RADAR - Continue Cooperative Networked Radar - Develop, refine, integrate, and test algorithms to enable real-time integration of multiple shipboard radars. EC: SHD-FY13-02 GROUND BASED AIR DEFENSE ON-THE-MOVE (GBAD-OTM) - Complete Ground Based Air Defense On-the Move (GBAD-OTM) High Energy Laser Demonstrator - Design, fabricate and demonstrate a radar-cued high energy laser system capable of detecting low radar cross section threats and performing soft and hard kills of unmanned aerial systems while on-the-move. EC: SHD-FY13-05 HIGH ALTITUDE ANTI SUBMARINE WARFARE (HAASW) FROM THE P-8 - Continue Next Generation Multistatic Active Capability (NGMAC) - Conduct development effort to integrate improved active sources and to provide a state estimation capability in the current multi-static active coherent Anti-Submarine Warfare (ASW) sonobuoy system. - Continue Unmanned Targeting Air System (UTAS) - Conduct development effort to integrate a magnetic sensor and algorithms for use on an unmanned aerial vehicle that is sized for deployment from a P-8 aircraft and needed to target a submarine. EC: SHD-FY13-07 UNMANNED SURFACE VEHICLE (USV) PAYLOADS FOR SINGLE SORTIE MINE COUNTERMEASURES - Continue Drifting Mine Neutralization Technology - Develop and modify processing and hardware for neutralization technologies - Continue Mine Countermeasures (MCM) Payload Automation - Develop and modify processing, autonomy, and control technologies for mine warfare environmental decision aid library and mine countermeasure automatic target recognition. - Continue Single Sortie Mine Countermeasures (MCM) Detect-to-Engage Payload - Design and develop launch, recovery, communication, recharging systems, and associated algorithms/vehicle payload support hardware. EC: SHD-FY14-02 FULL SECTOR TORPEDO DEFENSE - Initiate ATT Timeline Compression (ATTTC) - Begin in-water sub-component testing and data collection. - Initiate Concept C Countermeasure - Refine transducer design and integration.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: SHD-FY14-04 ADVANCED UNDERSEA WEAPON SYSTEM (AUWS) - Initiate Autonomous Threat Detection and Localization - Develop low-power compact sensor nodes and integrate them to the node deployment module. - Initiate Remote Command & Control - Develop communications packages and integrate them to the sensor, weapon and gateway nodes. - Initiate Tactical Positioning & Fire Control - Develop sensor, weapon and gateway node deployment modules, and integrate them to a Large Diameter Unmanned Undersea Vehicle (UUV) test-bed. EC: SHD-FY14-08 TERMINATOR (T3) (FORMERLY KNOWN AS TIER 3 HIGH VALUE UNIT (HVU) SELF-DEFENSE) - Initiate Terminator S (formerly known as Adaptive Hypothesis-based Fire Control) - Develop and test fire control solutions using modern electronic support data. - Initiate Terminator E (formerly known as Advanced ESSM Guidance) - Develop and test guidance algorithms to increase lethality over the maximum outer self-defense kinematic envelope. - Initiate Terminator R (formerly known as Advanced Rolling Airframe Missile (RAM) Block 2 Guidance) - Develop and test guidance algorithms to increase lethality over the maximum inner self-defense kinematic envelope.					
FY 2015 Plans: EC: SHD-FY10-01 ANTI-SHIP MISSILE DEFENSE TECHNOLOGIES - Continue Enhanced Lethality Guidance Algorithms (ELGA) - Conduct hardware-in-the-loop testing of the ELGA guidance algorithm. - Continue Enhanced Maneuverability Missile Airframe (EMMA) - Conduct risk reduction rocket motor testing to demonstrate performance against exit criteria. EC: SHD-FY10-03 ADVANCED SONAR TECHNOLOGY FOR HIGH CLEARANCE RATE MCM - Complete Integrated Forward looking Sonar - Dual Frequency Synthetic Aperture Sonar (FLS-DFSAS) - Conduct forward looking sonar dual frequency synthetic aperture sonar algorithm development and conduct at-sea experimentation and demonstration. - Continue Long Range LFBB Sonar (AUV Platform Option) - Demonstrate at-sea performance of the Long Range LFBB sonar in a relevant environment.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete Very Shallow Water (VSW) Acoustic Color-Imaging Sonar - Conduct final testing required for transition. EC: SHD-FY10-05 AFFORDABLE VECTOR SENSOR TOWED ARRAY AND SIGNAL PROCESSING - Complete Vector Sensor Towed Array - Develop and deliver a thin-line Vector Sensor Towed Array (VSTA) system and demonstrate thin-line twin-line capability in a single array. - Complete Vector Sensor Towed Array Signal Processing - Deliver sonar signal processing hardware and software for experimentation and transition into the Advanced Processor Build for FY-17. EC: SHD-FY11-01 TORPEDO COMMON HYBRID FUZING SYSTEM - Complete Torpedo Common Hybrid Fuzing System - Conduct system integration, field testing and demonstration of a prototype system, and transition the system to acquisition for engineering development. EC: SHD-FY12-01 FORCE LEVEL RADAR RESOURCE MANAGEMENT FOR INTEGRATED AIR AND MISSILE DEFENSE (IAMD) - Continue Radar Resource Manager for IAMD - Conduct end-to-end testing to validate algorithms. EC: SHD-FY12-03 SONAR AUTOMATION - Continue Active Sonar Automation - Develop tools, utilizing new algorithms, for use in current active sonar systems that improve operator performance and reduce workload. - Continue Passive Sonar Automation - Develop tools utilizing new algorithms for use in current passive sonar systems that improve operator performance and reduce operator workload when used against quiet submarines in the presence of clutter. EC: SHD-FY12-04 DETECTION AND NEUTRALIZATION OF NEAR-SURFACE DRIFTING-OSCILLATING MINES - Continue Compact Modular Sensor-Processing Suite (CMSS) - Integrate LIDAR into compact configuration and initiate data collection flight tests. EC: SHD-FY13-01 COOPERATIVE NETWORKED RADAR - Continue Cooperative Networked Radar - Integrate and test cross platform radar operation. EC: SHD-FY13-05 HIGH ALTITUDE ASW (HAASW) FROM THE P-8					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Next Generation Multistatic Active Capability (NGMAC) - Improve and evaluate the performance of hardware and software for use in improving the Multistatic Active Capability sonobuoys and P-8A signal processing. - Continue Unmanned Targeting Air System (UTAS) - Integrate Compact magnetometers into the Unmanned Air System (UAS) candidates and develop test plans for a maneuver table to compare Tier 1 and Tier 2 UAS's for the ASW mission. EC: SHD-FY13-07 USV PAYLOADS FOR SINGLE SORTIE MINE COUNTERMEASURES - Continue USV-based Mine Neutralization (formerly called Drifting Mine Neutralization Technology) - Develop and modify processing and hardware for neutralization technologies. - Continue MCM Payload Automation - Integrate and modify processing, autonomy, and control technologies for mine warfare environmental decision aid library and mine countermeasures automatic target recognition. - Continue Single Sortie MCM Detect-to-Engage Payload - Design and develop launch, recovery, communication, recharging systems, and associated algorithms/vehicle payload support hardware. EC: SHD-FY14-02 FULL SECTOR TORPEDO DEFENSE - Continue ATT Timeline Compression (ATTTC) - Conduct real-time coding of bistatic detection and automatic preset/launch sequence. - Complete Concept C Countermeasure - Conduct hardware fabrication. - Initiate HVU Mounted Sonar - Begin component prototype development of transducer array and electronics. EC: SHD-FY14-04 ADVANCED UNDERSEA WEAPON SYSTEM (AUWS) - Continue Autonomous Threat Detection and Localization - Build initial AUWS sensor nodes and integrate them into the Build initial AUWS sensor nodes. - Continue Remote Command & Control - Build and integrate the AUWS communications packages into the AUWS nodes, and conduct functional testing. - Continue Tactical Positioning & Fire Control - Build the AUWS node deployment modules, integrate into a UUV test-bed, and conduct functional testing. EC: SHD-FY14-08 TERMINATOR (T3) - Continue Terminator S - Conduct modeling and simulation testing of the algorithm in a realistic environment. - Continue Terminator E - Conduct modeling and simulation testing of the algorithm in a realistic environment. - Continue Terminator R - Conduct modeling and simulation testing of the algorithm in a realistic environment.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: SHD-FY15-07 HYPER VELOCITY PROJECTILE - Initiate Hyper Velocity Projectile - Design, fabricate and begin assembly of hypervelocity projectiles in preparation for full-up launch to validate common interfaces for powder gun and railgun launch.					
FY 2016 Base Plans: EC: SHD-FY10-01 ANTI-SHIP MISSILE DEFENSE TECHNOLOGIES - Complete Enhanced Lethality Guidance Algorithms (ELGA) - Demonstrate and validate the guidance algorithm with respect to exit criteria. - Complete Enhanced Maneuverability Missile Airframe (EMMA) - Demonstrate the dual pulse rocket motor and integrated thrust vector control, and deliver the final rocket motor design. EC: SHD-FY10-03 ADVANCED SONAR TECHNOLOGY FOR HIGH CLEARANCE RATE MCM - Complete Long Range LFBB Sonar (AUV Platform Option) - Perform final system demonstration and exit event. EC: SHD-FY12-01 FORCE LEVEL RADAR RESOURCE MANAGEMENT FOR INTEGRATED AIR AND MISSILE DEFENSE (IAMD) - Complete Radar Resource Manager for IAMD - Conduct a final demonstration of the Radar Resource Manager and validate the technology deliverable with respect to exit criteria. EC: SHD-FY12-03 SONAR AUTOMATION - Complete Active Sonar Automation - Evaluate and deliver algorithms for use in current active sonar systems that improve operator performance and reduce workload. - Complete Passive Sonar Automation - Evaluate and deliver algorithms for use in current passive sonar systems that improve operator performance and reduce workload when used against quiet submarines in the presence of clutter. EC: SHD-FY12-04 DETECTION AND NEUTRALIZATION OF NEAR-SURFACE DRIFTING-OSCILLATING MINES - Complete Compact Modular Sensor-Processing Suite (CMSS) - Demonstrate multi-sensor detection of ocean mines from a manned helicopter.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: SHD-FY13-01 COOPERATIVE NETWORKED RADAR - Continue Cooperative Networked Radar - Conduct integration and testing for cross platform radar operation. EC: SHD-FY13-05 HIGH ALTITUDE ASW (HAASW) FROM THE P-8 - Continue Next Generation Multistatic Active Capability (NGMAC) - Improve and evaluate the performance of hardware and software for use in improving the Multistatic Active Capability sonobuoys and P-8A signal processing. - Continue Unmanned Targeting Air System (UTAS) - Integrate compact magnetometers into Unmanned Air System (UAS) candidates and develop test plans for a maneuver table to compare Tier 1 and Tier 2 UAS's for the ASW mission. EC: SHD-FY13-07 USV PAYLOADS FOR SINGLE SORTIE MINE COUNTERMEASURES - Continue MCM Payload Automation for Data Analysis - Develop and extend adaptive Automatic Target Recognition approaches to advanced environmental models supporting Net-centric Sensor Analysis for MIW (NSAM). - Continue MCM Payload Automation for Planning - Develop and extend adaptive Automatic Target Recognition approaches to advanced environmental models supporting the Mine-warfare Environmental Decision-Aid Library (MEDAL). - Continue Single Sortie MCM Detect-to-Engage Payload - Design and develop launch, recovery, communications, and recharging systems, and associated algorithms and vehicle payload support hardware. - Continue USV-based Mine Neutralization - Develop and modify the processing and hardware for neutralization technologies. EC: SHD-FY14-02 FULL SECTOR TORPEDO DEFENSE - Complete Concept C Countermeasure - Complete installation and testing on a Self Defense Test Ship. - Continue ATT Timeline Compression (ATTTC) - Begin in-water demonstrations. - Continue HVU Mounted Sonar - Complete array electronics and fabricate the first transmit/receive panels, validating performance in a lake test. EC: SHD-FY14-04 ADVANCED UNDERSEA WEAPON SYSTEM (AUWS) - Continue Autonomous Threat Detection and Localization - Develop and integrate node deployment modules and the weapons payload, and conduct functional testing.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue Remote Command & Control - Develop communications package improvements and conduct functional component and system testing. - Continue Tactical Positioning & Fire Control - Conduct testing and evaluation, and integrate improved sensor node hardware and detection, classification, localization and targeting algorithms. EC: SHD-FY14-08 TERMINATOR (T3) - Continue Terminator S - Validate Ship Self-Defense System (SSDS) algorithms and the fire control loop concept using modeling & simulation tools. - Continue Terminator E - Validate Evolved Sea sparrow Missile (ESSM) algorithms concept using modeling & simulation tools. - Continue Terminator R - Validate the Rolling Airframe Missile (RAM) algorithm concept using modeling & simulation tools. EC: SHD-FY15-03 AUTOMATION FOR UXV-BASED MCM - Initiate MCM Task Force Planning - Extend algorithms for squadron-level planning and re-planning. - Initiate Expeditionary MCM Automated Data Analysis - Develop advanced automatic target recognition capabilities for Synthetic Aperture Sonar (SAS) and closed-aperture SAS. EC: SHD-FY15-07 HYPER VELOCITY PROJECTILE - Continue Hyper Velocity Projectile - Design, fabricate and begin assembly of hypervelocity projectiles in preparation for a full-up launch to validate common interfaces for powder gun and railgun launch. EC: SHD-FY16-04 SHIP-LAUNCHED EW EXTENDED ENDURANCE DECOY (SEWEED) - Initiate Ship-launched EW Extended Endurance Decoy (SEWEED) - Build mockups of the fuselage, rotor and antenna cavity for RF payload antenna isolation experiments. EC: SHD-FY16-05 SURFACE SHIP PERISCOPE DETECTION AND DISCRIMINATION (SSPDD) - Initiate Surface Ship Periscope Detection and Discrimination (SSPDD) - Customize hardware interfaces for assembly and integration of system level components. EC: SHD-FY16-06 NEXT GENERATION AIRBORNE PASSIVE SYSTEM (NGAPS) - Initiate Next Generation Airborne Passive System (NGAPS) - Develop algorithms and hardware for field communications control, health monitoring, mission planning and contact separation and correlation.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: SHD-FY16-07 SOFTKILL PERFORMANCE AND REAL-TIME ASSESSMENT (SPARTA) - Initiate Softkill Performance and Real-Time Assessment (SPARTA) - Develop and optimize performance assessment algorithms, and align them with a pending system requirements review. EC: SHD-FY16-OSD Advanced Sea Mines - Initate Advanced Sea Mines - Commence design of delivery and mooring approaches, technologies to integrate UUV-based and encapsulated undersea weapons, and prototyping of advanced sensors. ***FY 2016 OCO Plans:*** N/A					
Title: SEA STRIKE (STK) ***Description:*** This R-2 Activity contains all Future Naval Capabilities (FNC) Program Enabling Capability (ECs) investments in this PE. The Sea Strike (STK) FNC pillar develops deliverable technologies that provide new capabilities in power projection and deterrence, precise and persistent offensive power, weapons, aircraft, and expeditionary warfare. The FY 2014 to FY 2015 increase was due primarily to the planned ramp-up of STK-FY13-01, STK-FY13-02, STK-FY13-03, STK-FY13-04, STK-FY14-01 and STK-FY14-03, and the initiation of STK-FY15-01, STK-FY15-02 and STK-FY15-03. The FY 2015 to FY 2016 decrease was due primarily to the completion of STK-FY09-03, STK-FY11-01 and STK-FY11-02. ***FY 2014 Accomplishments:*** EC: STK-FY09-03 ENHANCED WEAPONS TECHNOLOGIES - Continue Counter Air Defense Improvements - Finish propulsion system, manufacture hardware, cast propellant grains, assemble rocket motors and test in both performance and insensitive munitions conditions. - Complete High Speed Components - Finish development and conduct final testing required for transition. EC: STK-FY10-02 MULTI-TARGET TRACK AND TERMINATE (MTTT) - Complete Multi-Target Laser Designation (MTLD) - Develop and integrate field-test and acceptance-test individual system components.	34.913	46.417	45.365	-	45.365

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: STK-FY11-01 STRIKE ACCELERATOR - Continue Strike Accelerator - Demonstrate new technologies that enable utilizing tactical aircraft Radar and forward looking infrared sensors to quickly identify and target maritime threats. EC: STK-FY11-02 RADAR ELECTRONIC ATTACK PROTECTION (REAP) - Continue Identification and Defeat of EA Systems (IDEAS) - Develop system components and/or software for Electronic Support and Electronic Protection techniques and provide a technology demonstration of these components. - Continue Network "Sentric" Electronic Protection (EP) - Develop, implement, test and demonstrate an electronic protection solution. EC: STK-FY12-01 SUBMARINE SURVIVABILITY - ELECTRONIC WARFARE. - Continue Coherent Electronic Attack for Submarines (CEAS) - Perform threat assessment analysis, effects modeling, radar system baselining, detection/classification techniques and builder improvements. EC: STK-FY12-02 HIGH ENERGY SBC FIBER LASER SYSTEM - Complete High Energy Fiber Laser System - Demonstrate a high energy laser weapon system suitable for an airborne platform. EC: STK-FY13-01 LONG RANGE RF FIND, FIX AND ID - Initiate Long Range Find, Fix and ID - Develop, implement, and test software to implement long range RF localization and identification from airborne radars. EC: STK-FY13-02 HOSTILE FIRE (HF) SUPPRESSION - Continue Hostile Fire Suppression System - Develop highly efficient low weight multi-band laser source. EC: STK-FY13-03 ANTI-SURFACE WARFARE (ASUW) WEAPON UPGRADE - Initiate Anti-Surface Warfare (ASuW) Weapon Upgrade - Begin initial laboratory testing and evaluation. EC: STK-FY13-04 AIM-9X ENABLERS (AXE) - Continue SMOKE - Develop an advanced kinematic improvement to the AIM-9X Sidewinder missile.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: STK-FY14-01 BANK SHOT - Initiate Bank Shot - Develop software architecture and associated algorithms that provide for fusion of exploration of sensor data. EC: STK-FY14-03 INTELLIGENT COLLABORATIVE ENGAGEMENT (ICE) - Initiate Collaborative Anti-Surface Warfare Engagement (CASE) - Initiate the demonstration of feasibility and an assessment of software operability and inter-operability for flexible weapon behaviors at the salvo level in an Anti-Access / Area Denial environment. - Initiate Collaborative Electronic Attack (CEA) - Perform Trade Studies and Analysis on Command and Control (C2) Data Types and Networking Requirements. EC: STK-FY16-01 EXTENDED-RANGE TARGETING (E-RAT) - Initiate Extended-Range Targeting (E-RAT) - Design subsystem models to assess the feasibility and operability of new technologies for targeting and fire control modes at extended ranges.					
FY 2015 Plans: EC: STK-FY09-03 ENHANCED WEAPONS TECHNOLOGIES - Complete Counter Air Defense Improvements - Finish propulsion system, manufacture hardware, cast propellant grains, assemble rocket motors and test in both performance and insensitive munitions conditions. EC: STK-FY11-01 STRIKE ACCELERATOR - Complete Strike Accelerator - Transition new technologies that enable utilizing tactical aircraft Radar and forward looking infrared sensors to quickly identify and target maritime threats at extended range. EC: STK-FY11-02 RADAR ELECTRONIC ATTACK PROTECTION (REAP) - Complete Identification and Defeat of EA Systems (IDEAS) - Integrate and test highly robust EW techniques that protect U.S. forces from Advanced Electronic Attack Systems. - Complete Network "Sentric" Electronic Protection (EP) - Integrate and test techniques for APG-79 electronic protection. EC: STK-FY12-01 SUBMARINE SURVIVABILITY - ELECTRONIC WARFARE - Continue Coherent Electronic Attack for Submarines (CEAS) - Integrate robust and highly advanced electronic attack techniques to provide a collaborative electronic attack capability against surface targets.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: STK-FY13-01 LONG RANGE RF FIND, FIX AND ID - Continue Long Range Find, Fix and ID - Integrate and test algorithms for moving maritime RF identification. EC: STK-FY13-02 HOSTILE FIRE (HF) SUPPRESSION - Continue Hostile Fire Suppression System - Continue visible dazzle effectiveness requirements experiments. EC: STK-FY13-03 ANTI-SURFACE WARFARE (ASUW) WEAPON UPGRADE - Continue Anti-Surface Warfare (ASuW) Weapon Upgrade - Conduct Phase I demonstration. EC: STK-FY13-04 AIM-9X ENABLERS (AXE) - Continue SMOKE - Develop an advanced kinematic improvement to the AIM-9X Sidewinder missile. EC: STK-FY14-01 BANK SHOT - Continue Bank Shot - Develop the software architecture and associated algorithms that provide for fusion of passive sensor data. EC: STK-FY14-03 INTELLIGENT COLLABORATIVE ENGAGEMENT (ICE) - Continue Collaborative Anti-Surface Warfare Engagement (CASE) - Demonstrate software operability and inter-operability for flexible weapon behaviors at the salvo level in an Anti-Access, Area Denial environment. - Continue Collaborative Electronic Attack (CEA) - Integrate robust and highly advanced electronic attack techniques to provide a collaborative electronic attack capability against surface targets. EC: STK-FY15-01 SYNTHETIC APERTURE RADAR ELECTRONIC PROTECTION (SAREP) - Initiate Synthetic Aperture Radar Electronic Protection - Integrate and test synthetic aperture radar electronic protection algorithms and techniques. EC: STK-FY15-02 ROTOR-CRAFT ADVANCED PROTECTION FROM IR/EO/RPG (RAPIER) - Initiate Helicopter Active RPG Protection (HARP) - Demonstrate the technological feasibility of a Rocket Propelled Grenade (RPG) hard-kill defense system and its component operability on the MV-22. - Initiate Multi-Spectral EO/IR Seeker Defeat - Integrate existing and developmental EO/IR diode sources into the existing Counter Measure Jammer free space and fiber based optical designs.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: STK-FY15-03 EXTENDED RANGE MODULAR UNDERSEA HEAVYWEIGHT VEHICLE (ER MUHV) - Initiate MUHV Autonomy Suite - Initiate open-loop testing of the autonomy suite. - Initiate MUHV Sensors, Navigation and Guidance - Initiate communication system open-loop testing. EC: STK-FY16-01 EXTENDED-RANGE TARGETING (E-RAT) - Continue Extended-Range Targeting (E-RAT) - Develop concept and technology demonstration plans of subsystem models to assess the feasibility and operability of new technologies for targeting and fire control modes at extended ranges.					
FY 2016 Base Plans: EC: STK-FY12-01 SUBMARINE SURVIVABILITY - ELECTRONIC WARFARE - Complete Coherent Electronic Attack for Submarines (CEAS) - Develop prototype hardware and software for insertion of advanced electronic support and electronic attack techniques into a payload form factor consistent with compact applications, including submarine masts. EC: STK-FY13-01 LONG RANGE RF FIND, FIX AND ID - Continue Long Range Find, Fix and ID - Conduct integration and testing for moving maritime Radio Frequency identification algorithms. EC: STK-FY13-02 HOSTILE FIRE (HF) SUPPRESSION - Complete Hostile Fire Suppression System - Demonstrate real-time reactive hostile shooter suppression in a field test demonstration. EC: STK-FY13-03 ANTI-SURFACE WARFARE (ASUW) WEAPON UPGRADE - Continue Anti-Surface Warfare (ASuW) Weapon Upgrade - Demonstrate and evaluate relevant algorithms during at-sea testing. EC: STK-FY13-04 AIM-9X ENABLERS (AXE) - Continue SMOKE - Design, develop and demonstrate an advanced propulsion system for a future Air-to-Air missile. EC: STK-FY14-01 BANK SHOT - Continue Bank Shot - Develop the software architecture and associated algorithms that provide for data fusion.					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
EC: STK-FY14-03 INTELLIGENT COLLABORATIVE ENGAGEMENT (ICE) - Continue Collaborative Anti-Surface Warfare Engagement (CASE) - Demonstrate software operability and inter-operability for flexible weapon behaviors at the salvo level in an Anti-Access, Area-Denial environment. - Continue Collaborative Electronic Attack (CEA) - Integrate and test highly advanced electronic attack techniques to provide an advanced collaborative electronic attack capability against surface targets. EC: STK-FY15-01 SYNTHETIC APERTURE RADAR ELECTRONIC PROTECTION (SAREP) - Continue Synthetic Aperture Radar Electronic Protection - Conduct integration and testing of synthetic aperture radar electronic protection algorithms and techniques. EC: STK-FY15-02 ROTOR-CRAFT ADVANCED PROTECTION FROM IR/EO/RPG (RAPIER) - Continue Helicopter Active RPG Protection (HARP) - Demonstrate the technological feasibility of a Rocket Propelled Grenade (RPG) hard-kill defense system and its component operability on the MV-22. - Continue Multi-Spectral EO/IR Seeker Defeat - Develop Electro-Optical/Infrared (EO/IR) countermeasure high power sources and supporting optics that can be integrated into Joint and Allied systems. EC: STK-FY15-03 EXTENDED RANGE MODULAR UNDERSEA HEAVYWEIGHT VEHICLE (ER MUHV) - Continue MUHV Autonomy Suite - Conduct in-water autonomy open-loop testing. - Continue MUHV Sensors, Navigation and Guidance - Conduct in-water navigation system demonstrations (open and closed loop). EC: STK-FY16-01 EXTENDED-RANGE TARGETING (E-RAT) - Continue Extended-Range Targeting (E-RAT) - Conduct concept and technology demonstrations of subsystem models to assess the feasibility and operability of new technologies for targeting and fire control modes at extended ranges. EC: STK-FY16-02 REACTIVE ELECTRONIC ATTACK MEASURES (REAM) - Initiate Reactive Electronic Attack Measures (REAM) - Develop a test bed for testing enhanced Radio Frequency sensing algorithms and an integration strategy for targeted transition systems.					
FY 2016 OCO Plans:					

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A					
Accomplishments/Planned Programs Subtotals	236.652	255.847	258.860	-	258.860

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

As discussed in Section A, there are a significant number of FNC technology products within this PE. In all cases, these technology products support the Department of the Navy's FNC Program and are managed at the Office of Naval Research. All FNC investments in this PE are subjected to management oversight by 2-star chaired Integrated Product Teams (IPTs) that control the naval pillars of Sea Shield, Sea Strike, Sea Basing, Forcenet, Naval Expeditionary Maneuver Warfare, Enterprise and Platform Enablers, Power and Energy, Capable Manpower, and Force Health Protection. Each EC is aligned to a pillar and each technology product is aligned to an EC. At the lowest level, each technology product is measured against both technical and financial milestones on a monthly basis. Annually, each technology product is reviewed in depth for technical performance and development status by the Chief of Naval Research against goals that have been approved by the Navy's 3-star Technology Oversight Group (TOG). Also annually, each technology product is reviewed by its 2-star chaired pillar IPT for transition planning and adequacy and transition commitment level. Products must meet TOG required transition commitment levels for S&T development to continue. Transition issues and required adjustments are reported annually by the Chief of Naval Research to the TOG, which establishes investment priorities for the FNC Program.

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
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COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
9999: *Congressional Adds*	-	5.000	5.000	-	-	-	-	-	-	-	-	10.000

A. Mission Description and Budget Item Justification

The efforts described in this Project address the Advanced Technology Development associated with the Future Naval Capabilities (FNC) Program. The FNC Program represents the requirements-driven, delivery-oriented portion of the Navy's Science and Technology (S&T) portfolio. FNC investments respond to Naval S&T Gaps that are identified by the Navy and Marine Corps after receiving input from Naval Research Enterprise (NRE) stakeholders. The Enabling Capabilities (ECs) and associated technology product investments of the FNC Program are competitively selected by a 3-star Technology Oversight Group (TOG), chartered by the S&T Corporate Board and representing the requirements, acquisition, research and fleet/forces communities of the Navy and the Marine Corps.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2014	FY 2015
Congressional Add: ASW Research Prog - Cong	5.000	5.000
FY 2014 Accomplishments: - Acoustic waves may be detected by the particle motions of small parcels of seawater as the longitudinal wave passes a point. Lasers hold the promise of very finely detecting these particle motions, but this detection has to overcome large amounts of ambient particle motions which are not due to acoustic energy at particular frequencies. Research experimentation is attempting to overcome these extraneous signals. - Recent at-sea efforts showed that refracted acoustic energy in the upper ocean leads to regions which are quieter than others. This phenomenon will be examined further with experiments at higher latitudes. The physical nature of these quiet regions will be investigated to construct a predictive model. - Details of the ocean surface wave field hold clues to signatures of shallow submerged objects. Fluid dynamical studies of wave-wave and wave-turbulent interactions over larger areas, to connect with remote sensing methods, are being incorporated into parallel algorithmic formulations for rapid processing. Such modeling holds the promise of reducing clutter for the remote sensing methodologies.		
FY 2015 Plans: ASW surveillance has been the primary topic of this program. Efforts have been successfully used to address field experimentation and algorithm development. FY2015 Details are classified but involve understanding upper ocean acoustic structure to address passive detection opportunities, numerical modeling to understand ocean clutter impeding detection and creating false alarms, and new sensor opportunities.		
Congressional Adds Subtotals	5.000	5.000

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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

In all cases, FNC technology products support the Department of the Navy's FNC Program and are managed at the Office of Naval Research. All FNC investments in this PE are subjected to management oversight by 2-star chaired Integrated Product Teams (IPTs). Each EC is aligned to a pillar and each technology product is aligned to an EC. At the lowest level, each technology product is measured against both technical and financial milestones on a monthly basis. Annually, each technology product is reviewed in depth for technical performance and development status by the Chief of Naval Research against goals that have been approved by the Navy's 3-star Technology Oversight Group (TOG). Also annually, each technology product is reviewed by its 2-star chaired pillar IPT for transition planning and adequacy and transition commitment level. Products must meet TOG required transition commitment levels for S&T development to continue. Transition issues and required adjustments are reported annually by the Chief of Naval Research to the TOG, which establishes investment priorities for the FNC Program.