Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603673N: *(U)Future Naval Capabilities Advanced Tech Dev*

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	256.382	247.931	-	247.931	250.656	257.538	252.001	253.022	Continuing	Continuing
3346: *Future Naval Capabilities Adv Tech Dev*	0.000	0.000	256.382	247.931	-	247.931	250.656	257.538	252.001	253.022	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	0.000	256.382	249.852	-	249.852
Current President's Budget	0.000	256.382	247.931	-	247.931
Total Adjustments	0.000	0.000	-1.921	-	-1.921
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	0.000	0.000	-1.921	-	-1.921

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Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603673N: *(U)Future Naval Capabilities Advanced Tech Dev*	PROJECT 3346: *Future Naval Capabilities Adv Tech Dev*	

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
3346: *Future Naval Capabilities Adv Tech Dev*	0.000	0.000	256.382	247.931	-	247.931	250.656	257.538	252.001	253.022	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 2012	FY 2013	FY 2014
Title: CAPABLE MANPOWER (CMP)	0.000	17.508	18.320
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 2013 Plans: EC: CMP-FY10-01 Information Architecture for Improved Decision Making - Continue Data Triage - Conduct advanced development of mission performance optimizations that encompass task centered design and advanced human performance modeling to achieve the requisite manning, both in numbers and capabilities, for the complex ships and systems of the future fleet.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Display Information with Uncertainty - Develop a prototype with the capability to fuse imaging, electronic warfare, and inorganic and acoustic sensor inputs into integrated, fused, and intuitive displays that enhance the presentation and command level understanding of uncertain information. EC: CMP-FY10-02 Adaptive Training to Enhance Individual and Team Learning and Performance - Continue Adaptive Training for Combat Information Center Teams - Develop prototypes of effective, adaptive training system components to enhance individual and team training for surface ship Combat Information Center (CIC) training. - Continue Adaptive Training for Submarine Navigation & Piloting Teams - Develop prototypes of effective, adaptive training system components to enhance individual and team training for submarine navigation and piloting skills training. EC: CMP-FY11-01 Naval Next-generation Immersive Technology (N2IT) - Continue Augmented Immersive Team Training (AITT) - Demonstrate software and hardware technologies to enable collective, immersive squad level infantry training without a fixed facility or role players. - Continue Perceptual Training Systems and Tools (PercepTs) - Design and demonstrate the technology components to deliver combat/tactical perceptual training in relevant environments. EC: CMP-FY11-02 Performance Shaping Functions for Environmental Stressors - Continue Performance Shaping Functions - Develop and demonstrate environmental stressor metrics and algorithms, and integrate them into systems engineering tools. EC: CMP-FY12-01 Live, Virtual, & Constructive Training Fidelity - Continue Cognitive Fidelity Synthetic Environment - Conduct advanced development of optimal characteristics of virtual simulations to elicit the appropriate perceptual-cognitive responses for Naval aviation training. - Continue Tactics & Speech Capable Semi-Automated Forces - Conduct advanced development of virtual-constructive representations on live avionics displays. - Continue Virtual-Constructive Representations on Live Avionics Displays - Conduct advanced development of design guidelines for effective and safe representation of virtual and constructive assets on live displays, including developing the symbology used during experimentation and validation efforts. EC: CMP-FY13-02 Simulation Toolset for Analysis of Mission, Personnel and Systems (STAMPS) - Initiate/Complete Manpower Planning and Optimization Toolset - Conduct advanced development of a toolset for assessing manpower planning and allocations.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate Platform Design and Acquisition Toolset - Conduct advanced development of an acquisition toolset for assessing and comparing platform designs. ***FY 2014 Plans:*** 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. 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 - Continue 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. 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.			
Title: ENTERPRISE AND PLATFORM ENABLERS (EPE) ***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 FY14 decrease was due primarily to the completion of EPE-FY07-02 and EPE-FY09-03, and the planned ramp-down of EPE-FY08-08, EPE-FY09-01, EPE-FY10-01, EPE-FY10-03 and EPE-FY11-01. ***FY 2013 Plans:*** EC: EPE-FY07-02 Maritime Prepositioning Force Future Marine Expeditionary Brigade Force Closure - Continue 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 - Continue 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). - Continue Turbine Engine Technology Demonstrations (Materials) - Conduct materials research for aviation engines.	0.000	39.017	33.938

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
EC: EPE-FY09-01 Affordable Common Radar Architecture - Continue Affordable Common Radar Architecture - Develop, fabricate, integrate and test a low cost surface radar replacement system. EC: EPE-FY09-03 Air Platforms Safety and Affordability Technologies - Complete Adaptive Expert System for the Autonomous Detection of Aviation Mishap Leading Indicators - Develop and validate adaptive expert system requisite analytical techniques using flight data from Fleet aircraft - Complete Advanced Rotor Blade Erosion Protection - Demonstrate erosion-resistant coatings. EC: EPE-FY09-07 Affordable Submarine Propulsion and Control Actuation - Continue Advanced Material Propeller - Develop the structural design and prototype multiple pitch-adapting composite blades, hubs, and propellers culminating in large-scale manufacture of prototype propellers. EC: EPE-FY10-01 Advanced Shipboard Water Desalination - Continue Desalination System - Develop, fabricate and test desalination system demonstrators. - Continue Pretreatment System - Develop, fabricate and test seawater pretreatment system demonstrators. EC: EPE-FY10-02 Affordable Modular Panoramic Photonics Mast - Continue Compact Hyper-spectral Scanning Imager - Develop, fabricate and test hyperspectral sensors and algorithms to improve SSN surface situational awareness using faster image acquisition rates. - Continue Compact Low Light Level Short Wave Infrared (SWIR) Video Camera - Develop, fabricate and test Shortwave infrared sensors and algorithms to improve SSN surface situational awareness using faster image acquisition rates. - Continue Modular Photonics Mast Housing - Conduct integration and test of Short Wave Infrared (SWIR) sensors into a SSN/SSGN photonics mast for improved surface situational awareness and autonomous detection and classification. EC: EPE-FY10-03 Corrosion and Corrosion Related Signature Technologies for Increased Operational Availability - Continue Advanced Active Shaft Grounding System (ASGS)/Shaft Current Sensor - Evaluate, design and demonstrate an advanced active shaft grounding system with condition based maintenance and signature control. - Continue Advanced-Robust Impressed Current Cathodic Protection (ICCP) Anodes and Reference Cells - Evaluate, design, and conduct large scale testing and demonstration of impressed current cathodic protection components. - Continue Dual-Use Corrosion/Signature Sensor for Ballast Tanks - Evaluate, design and demonstrate dual-use impressed current cathodic protection and novel sensor technology for condition based maintenance and closed-loop deamping.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
EC: EPE-FY11-01 Flight Deck Thermal Management - Continue Advanced Thermal Management System - Integrate and test a large-scale thermal management system. - Continue Integrated Thermal Management System Design - Conduct land-based testing of large-scale thermal management system panels and modifications as necessary. EC: EPE-FY12-01 Corrosion Mitigation Technologies and Design Integration - Continue Corrosion Resistant Surface Treatment - Conduct scale up of interstitial hardening to large bulk components for application on surface combatant propulsion materials. - Continue Sprayable Acoustic Damping Systems - Test and evaluate new sprayable acoustic damping coatings system to characterize corrosion and acoustic damping properties. EC: EPE-FY12-02 Integrated Hybrid Structural Management System (IHSMS) - Continue Distributed Structural Micro-Sensor Nodes - Conduct research in wireless energy harvesting sensors, architecture, and diagnostics 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 - Initiate Tools for Predicting Array Operational Loading and Distribution - Develop a methodology for applying modeling tools in a towed array system design to produce an accurate prediction of system reliability and test a subset of towed array components, or modules, as suggested by failure data, existing design limitations, and newly developed reliability models.			
FY 2014 Plans: EC: EPE-FY07-02 Maritime Prepositioning Force Future Marine Expeditionary Brigade Force Closure - 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 (TET) Demonstrations (Engines) - Finish detail design, initiate long-lead hardware procurement and start engine fabrication for the XTE69/LFU1 durability demonstrator engine (F-135 based). - Complete Turbine Engine Technology (TET) Demonstrations (Materials) - Finish materials research for aviation engines. EC: EPE-FY09-01 AFFORDABLE COMMON RADAR ARCHITECTURE			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Complete 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 - Complete 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 - 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 - Complete Advanced Thermal Management System - Conduct materials and heat transfer test leading to initial design of intermediate/large scale panels. - 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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. - Initiate Aluminum Alloy Corrosion Prediction Tool - Evaluate and select Degree of Sensitization (DoS) detectors.			
Title: EXPEDITIONARY MANEUVER WARFARE (EMW) ***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 FY14 increase was due primarily to the initiation of EMW-FY14-01 and the planned ramp-up of EMW-FY13-01. ***FY 2013 Plans:*** EC: EMW-FY12-02 Future Joint Counter Radio-Controlled IED Electronic Warfare (JCREW) - Continue Distributed Counter-Radio Controlled Improvised Explosive Device (C-RCIED) - Develop, fabricate and test network data links and message sets for coordinated distributed counter-radio controlled improvised explosive device resources. - Continue Integrated Counter-RCIED EW (ICEW) - Develop, fabricate and test counter-radio controlled improvised explosive device demonstrators.	0.000	4.782	9.074

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
EC: EMW-FY13-01 Azimuth and Inertial MEMS Navigation System - Initiate MEMS Inertial Navigation System - Design, fabricate and demonstrate a full navigation system for hand-held targeting systems that will reduce target location error. ***FY 2014 Plans:*** 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, 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) - 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. - Initiate Compact Wide Area Reconnaissance and Spectral Sensor (CWARSS) - Demonstrate a baseline for automated processing for spectral exploitation and dissemination.			
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 FY14 decrease was due primarily to the completion of FHP-FY08-01, FHP-FY08-02 and FHP-FY08-03, and the planned ramp-down of FHP-FY08-04 and FHP-FY11-01. ***FY 2013 Plans:***	0.000	16.377	14.818

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
EC: FHP-FY08-01 Casualty Prevention - Complete Models of Head and Cervical Spine - Incorporate animal and post-mortem human specimen data into a finite element model for injury prediction. EC: FHP-FY08-02 Advanced Forward Care - Complete Closed Loop Fluid Delivery System - Integrate software algorithms and hardware and perform FDA tests/trials as required. - Complete Non-Pulmonary Oxygenation - Integrate the hydrogen-peroxide catalyses into a low pressure container that meets air certification and FDA requirements. EC: FHP-FY08-03 Rapid Blood Treatment - Complete Hemostatic Agents - Conduct physiological testing of the efficacy of hemostatic materials in stopping hemorrhage in animal models. - Complete Pharmacologic Resuscitation - Compare low-volume resuscitation with histone deacetylase inhibitors versus 'standard of care' in animals. EC: FHP-FY08-04 Warfighter Restoration - Continue Wound Healing - Develop a drug that targets the appropriate myostatin receptor through the most effective delivery route. - Complete Hearing Loss Prevention and Treatment - Develop methodologies, standards and technologies for personal in-ear noise dosimeters and inner ear scanning for production of personal hearing protection. - Complete Post Traumatic Stress Mitigation - Develop prototype devices and training methodologies for the mitigation of fatigue and combat stress. - Complete Repetitive Neurotrauma Mitigation - Develop pharmacological treatments against the biological substrates of mild Traumatic Brain Injury (mTBI). EC: FHP-FY10-01 Human Injury & Treatment Model - Continue Human Injury & Treatment Model - Conduct advanced development to assess personnel survivability, optimal personnel treatment, and restoration of ship operational capabilities. EC: FHP-FY11-01 Multifunctional Blood Substitute (MFBS) - Continue Multifunctional Blood Substitute (MFBS) - Develop a multi-component, complete, and shelf-stable resuscitation fluid. EC: FHP-FY12-01 Automated Critical Care System (ACCS)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Automated Critical Care System (ACCS) - Integrate software algorithms and hardware and perform 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 SEMPer Fi for Air Dysoxia - Conduct preclinical evaluation of potential therapeutics for immediate treatment of pulmonary hypoxia/hypoxemia. - Continue SEMPer Fi for Land Blast Kit - Conduct preclinical evaluation of potential therapeutics 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 - Initiate Hypoxia Alert and Mitigation System - Develop a hypoxia alert system that can mitigate conditions associated with a hypoxic environment based on individual susceptibility to performance decrements in hypoxic conditions.			
FY 2014 Plans: EC: FHP-FY08-04 WARFIGHTER RESOLUTION - Complete Wound Healing - Complete development of a myostatin inhibitor for the treatment of combat wounds to accelerate healing. 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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. EC: FHP-FY14-03 BLAST LOAD ASSESSMENT: SENSE AND TEST (BLAST) - Initiate Algorithm - Begin development of test criteria for 'beta' algorithm. - Initiate Neuro-Cognitive 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.			
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. ***FY 2013 Plans:*** EC: FNT-FY08-05 Global War on Terror (GWOT) Focused Tactical Persistent Surveillance - Complete Communications Enhancements for Tactical Sensors - Test and demonstrate a full field-of-view Intelligence-Surveillance-Reconnaissance (ISR) Tactical Reachback Capability. EC: FNT-FY09-02 Dynamic Tactical Communications Networks	0.000	53.187	56.297

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Complete Assured Information Exchange - Mature and demonstrate strict priority queuing, adaptive routing and route control agent capabilities in trial events. - Complete Self-Organizing Networks - Mature and demonstrate policy-based network management, mobile adhoc networking routing enhancements, radio-router interfaces, and dynamic routing across in-line network encrypters in trial events. EC: FNT-FY09-04 Dynamic Command and Control (C2) for Tactical Forces and Maritime Operations Center (MOC) - Complete Dynamic C2 for Tactical Forces and Maritime Operations Center (MOC) - Develop real-time algorithms for the automated sharing of information between command and control and combat systems involving Surface Navy combat system open architecture and Service Oriented Architecture (SOA) capabilities within disconnected, intermittent and limited networks . EC: FNT-FY10-01 High-bandwidth Free-space Lasercomm - Continue Free-space Optical Terminal (FOT) - Develop, fabricate, test, and demonstrate an active optical communication system. - Complete Modulating Retro-reflector Unit (MRU) - Develop, fabricate, test, and demonstrate a passive optical communication system. EC: FNT-FY10-02 Actionable Intelligence Enabled by Persistent Surveillance - Continue Autonomous UAV Collision Avoidance System - Develop, fabricate and test a light weight, low cost sensor suite and autonomy algorithms to enable detection and avoidance of all classes of aircraft or Unmanned Aerial Vehicles. - Continue Operational Adaptation Enterprise Services - Design and demonstrate an end-to-end system prototype tactical enterprise service bus that provides tools that exposes hidden enemy networks, an information enterprise, and application services for hybrid complex operations. - Continue Ultra Wide Field-of-View (FOV) Area Surveillance System - Develop, fabricate and test unmanned aerial vehicle deployable, wide and narrow field-of-view electro-optic / infrared sensor payloads for persistent surveillance missions. EC: FNT-FY10-03 SATCOM Vulnerability Mitigation - Continue Airborne Communications Suite (ACS) - Develop new open architecture radio and system level components and integrate these components with previously developed high performance apertures and programmable radios into a high bandwidth, airborne networking infrastructure that is resistant to interference and can support all tactical activities. EC: FNT-FY11-01 Pro-Active Computer Network Defense and Information Assurance - Continue Common Operational Security Decision System - Develop real-time, network data fusion and correlation algorithms for mining critical security events in order to detect, identify, and remediate nation state sponsored activities.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Next Generation Security and Security Management Protocols - Develop real-time, network-based security reconfiguration and management protocols for enterprise components. - Continue Next Generation Sensors and Gateways - Develop real-time, flow control algorithms to monitor network traffic and detect illegal transactions. 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 to detect and track maritime vessels. - Continue Tagging - Develop real-time algorithms for data tags based on key parametric values used in the maritime environment. EC: FNT-FY12-01 Advanced Tactical Data Link (ATDL) - Continue Mission Based Waveform Controls & Networking - Mature, test, and demonstrate waveform controls and networking capabilities in trial events. EC: FNT-FY12-02 Autonomous Persistent Tactical Surveillance - Continue Autonomous Information-Based Surveillance Control - Develop, integrate and test software for information based collection planning aboard unmanned aerial vehicles. - Continue Contextual Enterprise Information - Develop real-time enterprise exploitation algorithms and services to provide relevant target information extracted from Information Operations (IO) collection efforts to provide context-based services to augment Intelligence-Surveillance-Reconnaissance (ISR) sensor exploitation and analysis. - 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 ISR to C2 synchronization is maintained. EC: FNT-FY13-01 EW Battle Management for Surface Defense - Initiate EW Battle Management (EWBM) - Develop, fabricate and test electronic warfare data exchange techniques for Blue Force communication links in support of electronic warfare battle management. EC: FNT-FY13-04 Detection and Fusion for Remote Sensors			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate Adaptive Multi-INT Correlation & Identification (AMICA) - Develop algorithms to exploit multi-INT correlation capabilities between emerging Information Operations (IO) and new sensors at the tactical level. - Initiate Detection & Classification Algorithms (DCA) - Conduct Advanced Research to develop detection and classification algorithms. ***FY 2014 Plans:*** EC: FNT-FY10-01 HIGH-BANDWIDTH FREE-SPACE LASERCOMM - Complete Free-space Optical Terminal (FOT) - Integrate Free-Space Optical Terminal (FOT) components into a prototype and demonstrate performance in an exercise. EC: FNT-FY10-02 ACTIONABLE INTELLIGENCE ENABLED BY PERSISTENT SURVEILLANCE - 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 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. - Continue Ultra Wide Field of View (FOV) Area Surveillance System - Develop and integrate 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 - 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).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. - 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. EC: FNT-FY14-03 EXCHANGE OF ACTIONABLE INFORMATION AT THE TACTICAL EDGE (EAITE) - Initiate/Complete Actionable Information Tactical Applications - Development of an integrated, timely information product generation capability from multiple sources, responsive to user needs and condition of network resources. - Initiate/Complete Data Conditioning - Development of integrated capability to produce timely, usable information products on the sensor platform responsive to availability of network resources. - Initiate/Complete Network Adaptive Communication Services - Development of an integrated, efficient, content-based information dissemination capability based on aggregate, prioritized user needs and availability of network resources.			
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 FY14 increase was due primarily to the initiation of P&E-FY14-01 and the planned ramp-up of P&E-FY12-03. ***FY 2013 Plans:*** EC: P&E-FY12-01 Renewable-Sustainable Expeditionary Power - Continue Renewable Thermal Engine - Conduct lab-based demonstration efforts. EC: P&E-FY12-03 Long Endurance Undersea Vehicle Propulsion - Continue Air Independent Propulsion System - Conduct air-independent energy system, sub-scale component development, analysis, and benchtop testing. ***FY 2014 Plans:*** 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.	0.000	4.399	6.674

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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.			
Title: SEA BASING (BAS)	0.000	13.803	7.221
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 FY14 decrease was due to the completion of BAS-FY07-02 and BAS-FY08-03, and the planned ramp-down of BAS-FY11-01. ***FY 2013 Plans:*** EC: BAS-FY07-02 Surface Connector Vehicle Transfer - Continue Interface Ramp Technologies development, American Bureau of Shipping (ABS) certification, and testing of the JHSV ramp. EC: BAS-FY08-03 Sense and Respond Logistics - Complete Common Operating Picture Logistics Decision Support Tool - Integrate and test the information architecture for knowledge management and reasoning capability. EC: BAS-FY11-01 Connectors and the Sea Base - Continue Advanced Mooring System - Conduct model testing and planning of at-sea demonstration. - Continue Environmental Ship Motion Forecasting - Develop wave and ship motion forecasting technologies. ***FY 2014 Plans:*** EC: BAS-FY07-02 Surface Connector Vehicle Transfer - 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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Advanced Mooring System - Construct and execute at-sea demonstration. - Continue Environmental Ship Motion Forecasting - Develop wave and ship motion forecasting technologies.			
Title: SEA SHIELD (SHD)	0.000	68.927	64.870
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 FY14 decrease was due primarily to the completion of SHD-FY06-03, SHD-FY09-01, SHD-FY09-06 and SHD-FY09-08, and the planned ramp-down of SHD-FY10-01, SHD-FY10-02, SHD-FY10-03, SHD-FY10-04, SHD-FY10-05 and SHD-FY11-02. ***FY 2013 Plans:*** EC: SHD-FY06-03 MCM FOR Maneuver Spiral 2 - Complete Tactical UAV Sensor for Detection of Minefields (Buried Mines) in the Beach Zone data collection flight tests and demonstrate system level sensor reliability. EC: SHD-FY09-01 Operation of ASW Active Distributed Systems - Complete Mobile System Placement, Source Control, and Pattern Keeping Algorithm - Demonstrate at-sea performance of algorithms implemented in a Tactical Decision Aid to coordinate the search and track capability between mobile low frequency active ASW systems in real time. EC: SHD-FY09-06 Countermeasure Technologies for Anti-Ship Missile Defense (ASMD) - Complete Enhanced Nulka Payload - Extended one year to complete development and additional testing of transmitter chip sets. - Complete Enhanced Surface Electronic Warfare Improvement Program (SEWIP) Transmitter - Demonstrate full enhanced SEWIP array performance in a relevant field environment. EC: SHD-FY09-08 Four-Torpedo Salvo Defense - Complete Anti Torpedo Torpedo (ATT) for Surface Ship Defense Against Complex Salvo - Conduct in-water test and evaluation of the anti-torpedo torpedo sensor and controller. EC: SHD-FY10-01 Anti-Ship Missile Defense Technologies (Hardkill) - Continue Enhanced Lethality Guidance Algorithms (ELGA) - Develop and test STANDARD Missile guidance algorithms for advanced maneuvering missile threats.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Enhanced Maneuverability Missile Airframe (EMMA) - Develop and test STANDARD Missile motor and control techniques for advanced maneuvering threats. EC: SHD-FY10-02 High Fidelity Active Sonar Training - Continue ASW Command Level Training - Develop training capabilities based on algorithms to be used in at-sea and shore training sites that will improve the training realism provided to ASW Commanders and their staffs. - Continue Operator Training - Develop and implements 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 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 Long Range Low Frequency Broad Band (LFBB) Sonar (Autonomous Underwater Vehicle (AUV) Platform Option) - Develop advanced technology for the long range low frequency broadband sonar and perform a field demonstration. - Continue VSW Acoustic Color-Imaging Sonar - Develop and test prototype acoustic projectors, receivers, and processing algorithms. EC: SHD-FY10-04 Next Generation Countermeasure Technologies for Ship Missile Defense - Continue Next Generation Countermeasure Technologies for Ship Missile Defense - Develop, fabricate, test and integrate an electronic warfare payload into an unmanned aerial system and command and control link demonstrator. 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 field test planning and execution. EC: SHD-FY11-02 Integrated Hardkill-Softkill - Complete Integrated Active and Electronic Defense (IAED) - Develop and test optimized response combinations of kinetic and non-kinetic anti-ship missile defenses.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
EC: SHD-FY12-01 Force Level Radar Resource Management for Integrated Air and Missile Defense (IAMD) - Continue Radar Resource Manager for Integrated Air & 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 . - 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 sensors into a compact modular configuration and initiation of data collection flight tests. EC: SHD-FY13-01 Cooperative Networked Radar - Initiate Cooperative Networked Radar - Develop, implement and test software to enable real-time integration of multiple shipboard radars. EC: SHD-FY13-02 Ground Based Air Defense On-the-Move - Initiate 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 ASW (HAASW) from the P-8 - Initiate Next Generation Multistatic Active Capability (NGMAC) - Conduct development effort to integrate improved active sources and to provide a state estimation capability in the current multistatic active coherent ASW buoy system. - Initiate 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 conduct localization against a submarine. EC: SHD-FY13-07 USV Payloads for Single Sortie Mine Countermeasures - Initiate Drifting Mine Neutralization Technology - Develop and modify processing and hardware for neutralization technologies. - Initiate MCM Payload Automation - Develop and modify processing, autonomy, and control technologies for mine warfare environmental decision aid library and mine countermeasure automatic target recognition.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate Single Sortie MCM Detect-to-Engage Payload - Design and develop launch, recovery, communication, recharging systems, and associated algorithms/vehicle payload support hardware. ***FY 2014 Plans:*** 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. - Complete Very Shallow Water (VSW) Acoustic Color-Imaging Sonar - Develop and test prototype acoustic projectors, receivers, and processing algorithms. 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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 - 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. - Initiate High Value Unit (HVU) Mounted Sonar - Begin component prototype development of transducer array and electronics. 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 TIER 3 HIGH VALUE UNIT (HVU) SELF-DEFENSE - Initiate Adaptive Hypothesis-based Fire Control - Develop and test fire control solutions using modern electronic support data. - Initiate Advanced ESSM Guidance - Develop and test guidance algorithms to increase lethality over the maximum outer self-defense kinematic envelope. - Initiate Advanced Rolling Airframe Missile (RAM) Block 2 Guidance - Develop and test guidance algorithms to increase lethality over the maximum inner self-defense kinematic envelope.			
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.	0.000	38.382	36.719

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
The FY14 decrease was due primarily to the completion of STK-FY08-04, STK-FY08-06, STK-FY09-05 and STK-FY09-07, and the planned ramp-down of STK-FY09-03 and STK-FY12-02. ***FY 2013 Plans:*** EC: STK-FY08-04 Next Generation Airborne Electronic Attack - Complete Next Generation Airborne Electronic Attack - Conduct a detailed evaluation of advanced component technologies that are capable of integration into the Next Generation Jammer program. EC: STK-FY08-06 Increased Capability Against Moving and Stationary Targets. - Complete Direct Attack Seeker Head - Develop and test the sensor subsystem packaged within a BRITE Star II turret. - Complete Multi-Mode Sensor Seeker - Develop and demonstrate the Multi-Mode Sensor/Seeker (MMSS) on the BRITE Star II. EC: STK-FY09-03 Enhanced Weapons Technologies - Continue High Speed Components - Demonstrate an advanced radome, fabrication of full scale radome and performance testing under relevant environmental conditions. - Continue Counter Air Defense Improvements - Demonstrate propulsion system, manufacture hardware, cast propellant grains, assemble rocket motors and test in both performance and insensitive munitions conditions. - Complete Counter Air Advanced Medium-Range Air-to-Air Missile (AMRAAM) Improvements - Demonstrate propulsion system, manufacture hardware, cast propellant grains, assemble rocket motors and test in both environmental and static conditions. EC: STK-FY09-05 Advanced Threat Aircraft Countermeasures - Complete Countermeasures for Advanced I2R - Conduct flight testing of the developed Counter-Imaging Infrared (I2R) techniques. - Complete Countermeasures for millimeter wave - Conduct detailed flight testing of the Ka- and W-band decoys. EC: STK-FY09-07 Helicopter Low-Level Operations (HELO) - Complete Distributed Millimeter Wave Sensor - Conduct final testing and demonstration of the millimeter wave sensor in a degraded environment. - Complete Laser Based Helicopter Landing Aids - Conduct final testing and demonstration of the LIDAR imaging capability in a degraded environment. EC: STK-FY10-02 Multi-Target Track and Terminate (MTTT)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Multi-Target Laser Designation (MTLD) - Develop advanced optical techniques to include algorithm, laser, and fast steering mirror development. 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) - Prototype and test advanced algorithms to counter adversary jammers. - Continue Network "Sentric" Electronic Protection (EP) - Develop, implement and test an advanced electronic protection solution. EC: STK-FY12-01 Submarine Survivability - Electronic Warfare - Continue Coherent Electronic Attack for Submarines (CEAS) - Develop, fabricate and test electronic warfare payload hardware and software for the submarine mast. EC: STK-FY12-02 High Energy Spectrally Beam Combined (SBC) Fiber Laser System - Continue High Energy Fiber Laser System - Demonstrate a high energy laser weapon system suitable for an airborne platform. EC: STK-FY13-02 Hostile Fire (HF) Suppression - Initiate Hostile Fire Suppression System - Develop, integrate and test advanced closed-loop tracking techniques with eye-safe laser technology to effectively dazzle hostile shooters to rotary-wing aircraft. EC: STK-FY13-04 AIM-9X Enablers (AXE) - Continue SMOKE - Develop an advanced kinematic improvement to the AIM-9X Sidewinder missile. ***FY 2014 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. - Complete High Speed Components - Demonstrate an advanced radome, fabrication of full scale radome and performance testing under relevant environmental conditions. EC: STK-FY10-02 MULTI-TARGET TRACK AND TERMINATE (MTTT)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue Multi-Target Laser Designation (MTLD) - Develop and integrate field-test and acceptance-test individual system components. 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 - Continue 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. EC: STK-FY14-01 PASSIVE SENSOR SURVEILLANCE (PASS)			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate PAssive Sensor Surveillance (PASS) - 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.			
Accomplishments/Planned Programs Subtotals	0.000	256.382	247.931

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.