Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy			DATE: February 2012
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)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
Total Program Element	-	-	256.382	-	256.382	249.852	247.431	245.694	250.833	Continuing	Continuing
3346: *Future Naval Capabilities Adv Tech Dev*	-	-	256.382	-	256.382	249.852	247.431	245.694	250.833	Continuing	Continuing

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 generated 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 is a new PE for FY 2013 that consolidates all Navy 6.3 FNC Program investments into a single Navy 6.3 PE. Marine Corps FNC 6.3 investments are already 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 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	256.382	-	256.382
Total Adjustments	-	-	256.382	-	256.382
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	-	-	250.529	-	250.529
• Rate/Misc Adjustments	-	-	5.853	-	5.853

Change Summary Explanation

Technical: Not applicable.

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy	DATE: February 2012
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*

Schedule: Not applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
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)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
3346: *Future Naval Capabilities Adv Tech Dev*	-	-	256.382	-	256.382	249.852	247.431	245.694	250.833	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 2011	FY 2012	FY 2013
Title: CAPABLE MANPOWER (CMP)	-	-	17.508
Description: This R-2 Activity, new for FY13, contains 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 reflects the sum total of all FNC Program BA 6.3 CMP efforts. All BA 6.3 CMP efforts were funded by PE 0603236N in FY 2011 and FY 2012. Efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Human Systems Design' and 'Training Systems' R-2 Activities of PE 0603236N. Starting in FY 2013, all BA 6.3 CMP efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***FY 2013 Plans:*** EC: CMP-FY10-01 Information Architecture for Improved Decision Making			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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. - 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)			

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- Initiate Manpower Planning and Optimization Toolset - Conduct advanced development of a toolset for assessing manpower planning and allocations. - Initiate Platform Design and Acquisition Toolset - Conduct advanced development of an acquisition toolset for assessing and comparing platform designs.			
Title: ENTERPRISE AND PLATFORM ENABLERS (EPE) ***Description:*** This R-2 Activity, new for FY13, contains 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. FY 2013 reflects the sum total of all FNC Program BA 6.3 EPE efforts. All FNC BA 6.3 EPE efforts were funded by PEs 0603123N, 0603236N and 0603271N in FY 2011 and FY2012. Efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Surface Ship and Submarine Hull Mechanical and Electrical (HM&E)' R-2 Activity of PE 0603123N, the 'Airframe/Ship Corrosion/Cost Reduction Technologies,' 'Littoral Combat/Power Projection (LC/PP),' 'Sea Base Mobility and Interfaces' and 'Turbine Engine Technology' R-2 Activities of PE 0603236N, and the 'Electronic and Electromagnetic Systems' R-2 Activity of PE 0603271N. Starting in FY 2013, all BA 6.3 EPE efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***FY 2013 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 - 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). - Initiate Turbine Engine Technology Demonstrations (Materials) - Conduct materials research for aviation engines. 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-FY09-03 Air Platforms Safety and Affordability Technologies	-	-	39.017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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 - Complete 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. 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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.			
Title: EXPEDITIONARY MANEUVER WARFARE (EMW)	-	-	4.782
Description: This R-2 Activity, new for FY13, 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. FY 2013 reflects the sum total of all Navy FNC Program BA 6.3 EMW efforts. Additional Marine Corps BA 6.3 EMW efforts are funded in PE 0603640M. All Navy BA 6.3 EMW efforts were funded by PEs 0603236N and 0603271N in FY 2011 and FY 2012. Navy efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Electronic and Electromagnetic Systems' R-2 Activity of PE 0603271N. Starting in FY 2013, all Navy BA 6.3 EMW efforts will be shown in this PE under this R-2 Activity to better convey the Navy funded portion of exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***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.			

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- Continue Integrated Counter-RCIED EW (ICEW) - Develop, fabricate and test counter-radio controlled improvised explosive device demonstrators. 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.			
Title: FORCE HEALTH PROTECTION (FHP) ***Description:*** This R-2 Activity, new for FY13, contains 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. FY 2013 reflects the sum total of all FNC Program BA 6.3 FHP efforts. All BA 6.3 FHP efforts were funded by PE 0603279N in FY 2011 and FY 2012. Efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Casualty Care and Management' and 'Casualty Prevention' R-2 Activities of PE 0603729N. Starting in FY 2013, all BA 6.3 FHP efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***FY 2013 Plans:*** 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.	-	-	16.377

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- Complete Pharmacologic Resuscitation - Compare low-volume resuscitation with histone deacetylase inhibitors versus 'standard of care' in animals. EC: FHP-FY08-04 Warfighter Restoration - 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). - Initiate Wound Healing - Develop a drug that targets the appropriate myostatin receptor through the most effective delivery route. 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) - 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.			
Title: FORCENET (FNT)	-	-	53.187

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013

Description: This R-2 Activity, new for FY13, 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 reflects the sum total of all FNC Program BA 6.3 FNT efforts. All BA 6.3 FNT efforts were funded by PEs 0603235N and 0603271N in FY 2011 and FY 2012. Efforts in this PE that have been continued from FY12 into FY13 were previously funded in the 'Knowledge Superiority and Assurance (KSA)' R-2 Activity of PE 0603235N and the 'Electronic and Electromagnetic Systems' R-2 Activity of PE 0603271N. Starting in FY 2013, all BA 6.3 FNT efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years.

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
- 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.
- Continue Modulating Retro-reflector Unit (MRU) - Develop, fabricate, test, and demonstrate a passive optical communication system.

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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. - 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)			

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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 ASW Detection and Fusion for Remote Sensors - 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.			
Title: POWER AND ENERGY (P&E) ***Description:*** This R-2 Activity, new for FY13, contains 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. FY 2013 reflects the sum total of all Navy FNC Program BA 6.3 P&E efforts. Additional Marine Corps BA 6.3 P&E efforts are funded in PE 0603640M. All Navy BA 6.3 P&E efforts were funded by PE 0603123N in FY 2011 and FY 2012. Navy efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Surface Ship and Submarine Hull Mechanical and Electrical (HM&E)' R-2 Activity of PE 0603123N. Starting in FY 2013, all Navy BA 6.3 P&E efforts will be shown	-	-	4.399

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
in this PE under this R-2 Activity to better convey the Navy funded portion of exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***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.			
Title: SEA BASING (BAS) ***Description:*** This R-2 Activity, new for FY13, contains 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. FY 2013 reflects the sum total of all FNC Program BA 6.3 BAS efforts. All BA 6.3 BAS efforts were funded by PE 0603236N in FY 2011 and FY 2012. Efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Sea Base Planning, Operations, and Logistics' R-2 Activity of PE 0603236N. Starting in FY 2013, all BA 6.3 BAS efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***FY 2013 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-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	-	-	13.803

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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.			
Title: SEA SHIELD (SHD) ***Description:*** This R-2 Activity, new for FY13, contains 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. FY 2013 reflects the sum total of all Navy FNC Program BA 6.3 SHD efforts. Additional Marine Corps BA 6.3 SHD efforts are funded in PE 0603640M. All Navy BA 6.3 SHD efforts were funded by PEs 0603123N, 0603271N, 0603747N and 0603782N in FY 2011 and FY 2012. Navy efforts in this R-2 Activity that have been continued from FY12 into FY13 were previously funded in the 'Fleet Force Protection and Defense against Undersea Threats' and 'Missile Defense' (MD) R-2 Activities of PE 0603123N, the 'Electronic and Electromagnetic Systems' R-2 Activity of PE 0603271N, the 'Anti-Submarine Warfare (ASW) Surveillance,' 'Anti-Submarine Warfare (ASW) Performance Assessment,' 'Anti-Submarine Warfare (ASW) Distributed Search' and 'Undersea Weaponry' R-2 Activities of PE 0603747N and the 'Mine/Obstacle Detection' R-2 Activity of PE 0603782N. Starting in FY 2013, all Navy BA 6.3 SHD efforts will be shown in this PE under this R-2 Activity to better convey the Navy funded portion of exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***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.	-	-	68.927

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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. - 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.			

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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*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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 - Continue Integrated Active and Electronic Defense (IAED) - Develop and test optimized response combinations of kinetic and non-kinetic anti-ship missile defenses. 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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. - Initiate Single Sortie MCM Detect-to-Engage Payload - Design and develop launch, recovery, communication, recharging systems, and associated algorithms/vehicle payload support hardware.			
Title: SEA STRIKE (STK)	-	-	38.382
Description: This R-2 Activity, new for FY13, 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. FY 2013 reflects the sum total of all FNC Program BA 6.3 STK efforts. All BA 6.3 STK efforts were funded by PEs 0603114N, 0603123N, and 0603271N in FY 2011 and FY 2012. Efforts in this PE that have been continued from FY12 into FY13 were previously funded in the 'Strike and Littoral Combat Technologies' R-2 Activity of PE 0603114N, the 'Fleet Force Protection and Defense against Undersea Threats' R-2 Activity of PE 0603123N, and the 'Electronic and Electromagnetic Systems' R-2 Activity of PE 0603271N. Starting in FY 2013, all BA 6.3 STK efforts will be shown in this PE under this R-2 Activity to better convey exactly what the Office of Naval Research intends to deliver to acquisition programs over the next several years. ***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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
- 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. - Complete 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. 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) - 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013
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) - Initiate Future IR Enhancement (FIRE) - Develop an advanced aerodynamic dome and corrective optics for the AIM-9X Sidewinder missile. - Continue Sidewinder Mission Optimized Kinematic Enhancement (SMOKE) - Develop an advanced kinematic improvement to the AIM-9X Sidewinder missile.			
Accomplishments/Planned Programs Subtotals	-	-	256.382

C. Other Program Funding Summary ($ in Millions)

N/A

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.