Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*				R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*							
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	17.835	14.308	24.609	-	24.609	20.833	16.110	15.936	8.056	Continuing	Continuing
2196: *Design, Tools, Plans and Concepts*	0.618	0.529	0.540	-	0.540	0.550	0.488	0.499	0.502	Continuing	Continuing
3161: *NAVSEA Tech Authority*	17.217	13.779	24.069	-	24.069	20.283	15.622	15.437	7.554	Continuing	Continuing

A. Mission Description and Budget Item Justification

Explore alternative surface ship force structures, advanced surface ship and unmanned surface vehicles concepts, and the potential technologies for these force structures and advanced concepts in support of pre-acquisition mission needs analysis, mission area analysis, and planning. The objective is a more affordable, mission capable surface ship force including increased ship production capability; ships with reduce manning, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for surface ship force structure alternative studies, ship & unmanned vehicle concept studies, and the actual conduct of surface ship force structure alternative studies and advanced design concept studies for the ships that may become part of the shipbuilding plan.

Project 2196 - This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of
ship concept design and engineering tools, methods, and criteria.

Project 3161 - This project funds a prioritized portfolio of time-sensitive initiatives supporting NAVSEA Technical Authority through integrated efforts in Cross Platform Systems Development (CPSD), furthering Sea Enterprise through the development of support elements for Technical Warrant Holders and meeting relevant needs of the warfare community. The areas of exploration for CPSD include surface ship concept advanced development, submarine concepts, next generation unmanned surface vehicle, high speed ships/crafts, tool integration and technical data exchange, embedded interoperability engineering, and mission capability systems engineering. The research products developed by this project directly support and influence both immediate fleet requirements and future acquisition programs by providing a range of technically acceptable alternatives and evaluation of emerging technologies.

In particular, tasks within this project continue to directly support interoperability testing and certification for Littoral Combat Ship (LCS) and other platforms in deploying battle groups, development and certification of Safe Operating Envelope (SOE) tools for surface combatants (CG 47, DDG 51, DDG 1000), American Bureau of Shipping (ABS) pilot program to determine engineering-based combatant service life values based on fatigue and other structural analyses, implementation of Component Commonality in current Navy ship acquisition to reduce total ownership and maintenance costs, Total Ownership Cost (TOC) pilot programs, and development of specifications and processes to reduce production costs of platforms.

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy	DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603563N: *Ship Concept Advanced Design*

Tasks within this project continue to directly support the Test and Evaluation Master Plan (TEMP) execution for multiple ship classes including, LCS, JHSV, and DDG 1000 reducing Live Fire Test and Evaluation (LFT&E) costs, furthered validation of hydrodynamic simulation tool supporting DDG 1000 Hull Form Plan (HFP), have increased technology readiness level for aluminum combatants, developed tools to execute the CG 47 Cracking Task Force recommendations, increased situational awareness for deploying strike groups, and conducted feasibility studies of future Railgun capabilities. This project supports NAVSEA's core mission and enhances its ability to conduct independent technical authority which allows for improved performance and reduced cost of current and future naval platforms.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	17.883	14.308	14.114	-	14.114
Current President's Budget	17.835	14.308	24.609	-	24.609
Total Adjustments	-0.048	-	10.495	-	10.495
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.465	-			
• SBIR/STTR Transfer	-0.402	-			
• Program Adjustments	-	-	10.592	-	10.592
• Rate/Misc Adjustments	-	-	-0.097	-	-0.097
• Congressional General Reductions Adjustments	-0.111	-	-	-	-

Change Summary Explanation

Added funds in FY 2013 to properly price DDG 1000 hull form plan.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 2196: *Design, Tools, Plans and Concepts*	

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
2196: *Design, Tools, Plans and Concepts*	0.618	0.529	0.540	-	0.540	0.550	0.488	0.499	0.502	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

This project provides the foundation for an affordable and mission capable surface ship force. It also supports the next step in the development of a transformed naval force by accomplishing the pre-milestone A (especially pre-concept decision) efforts for all potential surface ships and craft. These efforts are the required first step in the integration of total ship systems, including combat systems, weapons systems and Hull, Mechanical and Electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design, construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts and technologies may never even be considered and our greatest potential ship design advances never realized. Designs and technologies must meet the threat. This project supports this requirement.

This project funds concept development engineering, mission effectiveness analysis, and other analyses for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria are also funded in this project.

This project accomplishes the following: (1) Develops alternative surface ship force structure concepts including the ships and unmanned vehicles; (2) Evaluates the mission capability effectiveness and costs for these alternative surface fleet architectures; (3) Performs fleet war fighting/mission effectiveness assessment studies; (4) Identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (5) Investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (6) Provides design methods and automated design tools to develop and evaluate ship concepts; and (7) Supports development of Initial Capabilities Documents (ICD) and analogous early requirements documents for future ships. These efforts are done to support mission analysis; mission needs development and technology assessment in support of future fleet concepts and potential ship acquisition programs. These efforts are fundamental to the Navy's formulation of the future fleet.

Supports concept exploration and mission needs assessment for potential future ship acquisition programs, however, these are not direct efforts for specific, authorized shipbuilding programs. This project supports and maintains this country's naval ship design and engineering capabilities in the area of very early stage (Concept Design) design tools, criteria, and methods.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Ship Concepts and Mission Need Analysis	0.531	0.456	0.465
Articles:	0	0	0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 2196: *Design, Tools, Plans and Concepts*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: Develop ship concepts and perform analysis for potential ships and Force Architecture 5-10 years out in shipbuilding plan. ***FY 2011 Accomplishments:*** Completed concept designs for small and medium surface combatants with a broad mix of gun, missile, and other emerging weapon topics (high energy, etc.) FY11 Accomplishments also included a trend analysis for unmanned offboard vehicles, a future medium surface combatant follow-on study, and a study on surface ship energy efficiency improvements for reductions in total ownership cost (TOC). ***FY 2012 Plans:*** Continuation of concept designs for small and medium surface combatants with a broad mix of gun, missile, and other emerging weapon topics (high energy, etc), also to include energy and cost reducing technologies and concepts as related to ship systems. ***FY 2013 Plans:*** Continuation of concept designs for small and medium surface combatants that develop agile, fuel efficient and flexible platforms capable of operating in required environments. These efforts will enable the design of future affordable surface combatants with increased reliable, efficient, long range, high speed and optimized payload capabilities.			
Title: Total Ship Technology Assessment (TSTA)	0.087	0.073	0.075
Articles:	0	0	0
Description: Analyze the benefits and impacts of new ship, Hull, Mechanical & Electrical (HM&E) concepts, technologies and warfare systems. ***FY 2011 Accomplishments:*** Expanded TSTA methodology to Advanced Ship Warfare (ASW), Advanced Ship Undersea Warfare (ASUW) products developed under FY10 Concepts and Mission Needs Analysis. FY11 accomplishments also included a future force fleet Small Waterplane Area Twin Hull (SWATH) and a maximum speed study for the fleet of the future. ***FY 2012 Plans:*** Continuation of expanded TSTA methodology with ASW, ASUW products developed under FY11 Concepts and Mission Needs Analysis, also to include energy and cost-reducing technologies and concepts as related to ship systems. ***FY 2013 Plans:*** Continuation of FY12 TSTA tasks as well as integration of design of an advanced total platform energy monitoring system as well as reduced manning capabilities.			
Accomplishments/Planned Programs Subtotals	0.618	0.529	0.540

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 2196: *Design, Tools, Plans and Concepts*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDTEN/0204202N: *DDG-1000*	348.763	257.580	124.655	0.000	124.655	168.047	163.576	99.767	101.693	0.000	1,771.823
• RDTEN/0603512N: *Carrier Systems Development*	99.704	54.072	106.871	0.000	106.871	67.139	46.567	47.337	48.185	0.000	641.316
• RDTEN/0603564N: *Ship Preliminary Design/Feasibility*	10.087	22.210	13.710	0.000	13.710	14.112	6.717	0.000	12.450	0.000	110.214
• RDTEN/0604567N: *Ship Contract Design/Live Fire T&E*	157.828	121.089	196.737	0.000	196.737	184.183	95.939	52.980	51.997	0.000	952.524
• RDTEN/0603582N: *Combat System Integration*	33.323	34.123	56.551	0.000	56.551	36.592	32.827	33.569	34.157	0.000	281.964
• RDTEN/0605152N: *Studies And Analysis Support*	9.451	17.435	20.963	0.000	20.963	26.507	27.885	28.210	28.682	0.000	159.133

D. Acquisition Strategy

This is a non acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments.

E. Performance Metrics

None

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 3161: *NAVSEA Tech Authority*	

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
3161: *NAVSEA Tech Authority*	17.217	13.779	24.069	-	24.069	20.283	15.622	15.437	7.554	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

This project has been established to support NAVSEA Technical Authority through coordinated, collaborative, cross-platform systems development resulting in advanced capabilities across business lines through development adaptation and extension of processes, procedures, and tools necessary to develop and explore alternative surface ship and submarine force structures; advanced submarine, surface ship and unmanned surface vehicle concepts; interoperability; and development of systems level engineering criteria and options to support these force structures and advanced concepts as part of pre-acquisition mission needs analysis, mission area analysis, SCN, and R&D planning. The objective is the coordination of ongoing early-stage concept design and development efforts for cross-platform applicability to result in a more affordable, mission-capable, and interoperable surface ship and submarine forces including ships and submarines with reduced manning, increased ability to produce, reduced operating and support costs, and greater utilization of the latest technology.

NAVSEA Tech Authority efforts under Project 3161, known as the Cross Platform Systems Development (CPSD) Program enhance ongoing efforts within Project 2196 and transition directly to early-stage ship design for Ship and Submarine Preliminary Design and Feasibility Studies and other Program Executive Office (PEO) ship and submarine design programs. While these efforts support concept exploration and mission needs assessment for potential future ship and submarine acquisition programs, they are not direct efforts for specific, authorized shipbuilding programs. This project is the only R&D effort (Government or commercial) that provides a coordinated, collaborative approach to the development of cross-platform naval ship, submarine, and weapon system design and engineering capabilities in the areas of design tools, criteria, and methods. This project also provides innovative solutions for current Fleet issues involving Technical Authority, such as current interoperability issues with new systems or platforms.

Naval Ship System Engineering Tech Authority recapitalization and product development consolidates platform advanced concept development and design tool development in CPSD 1.0 (Platform Concept Advanced Development) and CPSD 2.0 (Platform Design and Certification Tools/Engineering and Tech Data Exchange Development); and aligned standards and requirements development for modularity and system / component commonality within CPSD 3.0 (Ship Systems Engineering/Modular Ship Systems Development). Program product areas support: platform-centric force architecture and concept development and tools (CPSD 1.0, CPSD 2.0), engineering products and system development (CPSD 3.0, CPSD 5.0), and system interoperability and mission capability for delivering ships and submarines (CPSDs 6.0, 8.0, 9.0). CPSD develops and transitions products to Technical Warrant Holder (TWH) community and develop prioritized plans and activities for future products from emerging cross platform technical requirements and associated capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Platform Concept Advanced Development (CPSD 1.0)	2.176	0.705	1.616
Articles:	0	0	0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 3161: *NAVSEA Tech Authority*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Description: This effort directly supports the Navy's ability to understand risk and associated cost of surface and submarine warfare assets; Pre-Milestone A ship, craft, and unmanned surface vehicle (USV) design and analysis. ***FY 2011 Accomplishments:*** Expanded Capability assessment begun in FY10 to other warfare areas; Continued operational assessment of Long Range Endurance prototype and Autonomous Health Monitoring and Recovery prototype; Continued development of USV interoperability concepts and architectures including technical architectures for USV operations aboard manned and unmanned surface combatants; Continued platform design processes and Standards in development support of next generation submarine concept exploration; Continue development of cross-platform, common modular payload and interface concepts. Continued supporting DDG Flight III upgrade study and requirements development. Identified decisions and best practices in the early stage design process that decrease the overall total ownership costs associated with US Navy warships, including both beneficial and detrimental design decisions from recent ship design and acquisition programs. ***FY 2012 Plans:*** Continue to identify areas of improvement for the processes of identifying hull selection, general arrangement, machinery arrangement, structural density, access and other decisions and best practices in early stage design that decrease the overall total ownership costs associated with US Navy warships, supporting the Navy's goal of an affordable future fleet. ***FY 2013 Plans:*** Develop the NAVSEA ship concept development processes for supporting the Long Range Shipbuilding Strategy (LRSS), Capability Based Analyses (CBAs), Analyses of Alternatives (AoAs), and new technology impact assessment. It will develop design space exploration methods that leverage previous Navy design tool investments by employing behavior models of higher fidelity, but more time consuming techniques. This will allow much more comprehensive trade studies in support of Capabilities Based Assessments and Analyses of Alternatives. Continue next generation surface ship, submarine and unmanned vehicle concept exploration.			
Title: Platform Design and Certification Tools/Engineering and Tech Data Exchange (CPSD 2.0)	3.634	0.925	3.678
Articles:	0	0	0
Description: This effort supports the development of validation tools to certify the safety and mission capability of platform concepts and subsequently ships and submarines; establishes the integrated NAVSEA too suite to support the execution of NAVSEA Tech Authority. This effort advances platform design methods, design validation tools, cost tools, manpower tools, and tools to aid in rapid total platform definition.			
FY 2011 Accomplishments:			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Continued Technical Warrant Holder Concept Validation Support; continue Concept Design Tool Development - implementation and validation; Continued integration of analytical tools supporting high performance naval ship technologies; Continued assessment of data exchange standards between Live Fire Test and Evaluation (LFT&E) Modeling and Simulation (M&S) and shipbuilder Computer Aided Design (CAD) environments; Continued expansion of M&S integrated environment to additional engineering disciplines. Coordinated data development and data exchange requirements to minimize data regeneration and modification efforts between disciplines and support reuse through design and acquisition process. ***FY 2012 Plans:*** Continue the Advanced Ship Synthesis and Evaluation Tool (ASSET) synthesis program development to modularize its architecture to accommodate insertion of new modules and updating existing needed for advanced ship concepts and emerging ship technology. Continue concept design tool development - implementation and validation; begin certification process. ***FY 2013 Plans:*** Transition the tool development to aide in early stage concept design including Advanced Ship Synthesis and Evaluation Tool (ASSET) and Leading Edge Architecture for Prototyping Systems (LEAPS) to the CONFORM line (PE 0605152N) for funding and execution. Continue to develop tools that allow for reliable, efficient, long range, high speed platforms with optimized payload capabilities. Continue to develop early stage ship design tools supporting total ownership cost reductions through enhancements of performance based cost models and manpower assessments tools.			
Title: Ship Systems Engineering /Modular Ship Systems Development (CPSD 3.0)	3.043	1.585	2.782
Articles:	0	0	0
Description: This effort supports Ship system development with a focus on technology transition, modularity, ship system technology integration, and design standards for new ship classes for pre-Alternative of Analysis (AoA) studies and ongoing program of record (PoR) ship and submarine development. ***FY 2011 Accomplishments:*** Continued Cost Analysis modeling and simulation via improved cost estimating relationships that include concepts of fabrication complexity; continued survivability, recoverability and vulnerability analyses; Continued developing hydrodynamic safe operating envelope analysis methods and design processes; articulated development of combat system architectures in terms of ship system impacts and cost; Included emerging power, propulsion and auxiliary system architectures and technologies into Modeling Baselines; incorporated integrated power and combat system architectures; Developed open and modular system technical architectures for various platforms development transition of open architecture standards and tools to NAVSEA community. Continued supporting DDG Flight III upgrade study and requirements development. Furthered the development of an aluminum sensitization probe selected as top priority by the CNO's CG-47 Cracking Task Force necessary to support upcoming			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
modernization availabilities to reduce stress corrosion cracking repair costs and enable CG-47 class to meet and exceed ship service life. ***FY 2012 Plans:*** Initiate data population interface for previously developed design tools including Systems Engineering Application for Quickly Evaluating Shipboard Technologies (SEAQUEST)/LEAPS interface enabling the combination of multiple cross-disciplinary models and applications together in a simulation process flow. Continue analysis of fracture mechanics assessment for failure of aluminum structure after a cracking incident to determine inspection periodicity and temporary repair techniques for in-service LCS and JHSV platforms. Develop Deck Simulating Shock Machine technology. ***FY 2013 Plans:*** Improve processes for technology upgrades during midlife overhauls that allow for affordable fleet/force modernization. Allow for long term strategic use of platform and system modularity to enable an affordable future fleet.			
Title: High Speed Ships and Craft Engineering (CPSD 5.0) ***Articles:*** ***Description:*** This effort supports the development of concepts for future high speed ships and craft that promise improved mission effectiveness in mobility, survivability, and warfare mission areas. ***FY 2011 Accomplishments:*** Reliability Based Structural Design of Aluminum Ships - Helsinki Class Life Time Loads and Fatigue analyses; Composite propulsor construction and testing; Trials, testing, numeric modeling, guidelines supporting for early stage design of High Speed Ships and Craft. Supported verification and validation of ship stopping as part of current NATO mission. Continued validation testing of Tempest hydrodynamic simulation tool that will help define safe operating envelopes for all ship classes, currently supporting DDG 1000 Hull Form Plan. ***FY 2012 Plans:*** Continue the development of an advanced hydrodynamic simulation tool that has adequate fidelity for all environmental conditions required to define a Safe Operating Envelope (SOE). The effort addresses this need for an analytic approach, which will be verified and validated through correlation with data obtained from analytic tests, sub-scale trials, and ultimately full scale trails. Initial development of analytical tools, complete a prescribed set of model tests and extensive analyses over the next several years to support development of surface ship Safe Operating Envelope (SOE) and Heavy Weather (HW) Guidance products. ***FY 2013 Plans:*** Begin development of improved platform stealth and survivability. Develop a R&D engineering model to supporting the development, design, acquisition, R&D testing and acceptance of a future modular mission ice capable surface combatant.	1.759 0	9.979 0	11.052 0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Continue development of analytical tools, complete a prescribed set of model tests and extensive analyses over the next several years to support development of surface ship Safe Operating Envelope (SOE) and Heavy Weather (HW) Guidance products. The analytical methods will include development of a simulation tool required to characterize ship motions in environments not within ability to test. The initial HW Guidance will develop from model scale testing and will not be certified. In addition to the development of the Heavy Weather Guidance and SOE, the Hull Form Plan will support the integration of the capability on the ship and associated training guidance for ships crew. This includes the development of the requirements for Human System Integration (HSI), Human Computer Interface (HCI), and training.			
Title: Alternative Power Systems Engineering (CPSD 6.0) ***Articles:*** ***Description:*** This effort investigates concepts for ships and craft with alternative power/propulsion systems evaluating effectiveness in mobility, survivability, and warfare mission areas. ***FY 2011 Accomplishments:*** Commenced Commercial Pod Foreign Comparative Testing numeric simulations, purpose built podded propulsion design to vulnerability; next generation Integrated prop systems engineering; Shaft and strut hydro numeric modeling of lateral plane force and moment effects on ship stability. ***FY 2012 Plans:*** Continue investigation of alternative power/propulsion systems evaluating effectiveness in mobility, survivability and warfare mission areas. Begin targeted implementation of weapon systems roadmap. Support modeling of propulsor out of plane force and moment modeling needed for Safe Operating Envelope ship dynamics simulations. This work area supports hydrodynamic capabilities from design through certification. ***FY 2013 Plans:*** Begin volumetric vulnerability analysis as a part of the Alternate Propulsion Study. Algorithms will be used to refine the estimates of ship damage associated with specified weapons effects supporting early stage design decisions for ship vulnerability.	1.680 0	0.200 0	1.312 0
Title: Embedded Interoperability (I/O) Engineering (CPSD 8.0) ***Articles:*** ***Description:*** This effort establishes and executes a dedicated process for evaluating the interoperability performance of warfare systems early in the acquisition cycle, prior to certification. Embedded I/O ensures that fewer mission critical system failures degrade the ultimately fielded war fighting capability. Focus on emerging Open Architecture warfare systems, including LCS 1 and 2. ***FY 2011 Accomplishments:***	2.392 0	-	1.745 0

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Continued interoperability test and assessment of DDG 1000 and CVN 21 (CVN 78); Completed interoperability efforts for LPD 17 (class). Significantly supported the Strike Group Interoperability Capabilities and Limitations (Caps&Lims) documentation process and enhanced the situational awareness of deploying strike groups. Developed an automated method for updating the Caps and Lims documents, which improved the strike groups rapid system interoperability updates. ***FY 2013 Plans:*** Focus on development of high performance, low cost communication solutions for improved information dominance and interoperability.			
Title: Mission Capability Systems Engineering (CPSD 9.0)	2.533	0.385	1.884
Articles:	0	0	0
Description: This effort supports the development of force-level systems engineering criteria and guidance at the Systems of Systems (SoS) and Family of Systems (FoS) level. This effort allows for the enhanced warfighter and system performance with reduced personnel costs. ***FY 2011 Accomplishments:*** Continued to provide technical standards, definitions and requirements for integrated architecture views for warfare systems of systems, independent technical analysis of warfare systems design and development options and the development of technical artifacts and associated products required by applicable source references by using specially selected Technical Authority Warrant Holders. ***FY 2012 Plans:*** Develop and establish the standards and processes required to develop, test, and deploy Open Architecture as well as Automated Software Test and the Tactical Situation (TACSIT) systems to the Fleet. ***FY 2013 Plans:*** Create design engineering standards incorporating human capacities into system performance. Incorporate the human element into design and control of autonomous and robotic systems. Improve standard that allow for the advancement of materials and improved design for lightweight body armor and equipment.			
Accomplishments/Planned Programs Subtotals	17.217	13.779	24.069

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDTEN/0204202N: *DDG-1000*	348.763	257.580	124.655	0.000	124.655	168.047	163.576	99.767	101.693	0.000	1,771.823

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 3161: *NAVSEA Tech Authority*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• RDTEN/0603512N: *Carrier Systems Development*	99.704	54.072	108.871	0.000	108.871	67.139	46.567	47.337	48.185	0.000	643.316
• RDTEN/0603564N: *Ship Preliminary Design/Feasibility Studies*	10.087	22.210	13.710	0.000	13.710	14.112	6.717	0.000	12.450	0.000	110.214
• RDTEN/0604567N: *Ship Contract Design/Live Fire T&E*	157.828	121.089	196.737	0.000	196.737	184.183	95.939	52.980	51.997	0.000	952.524
• RDTEN/0603582N: *Combat System Integration*	33.323	34.123	56.551	0.000	56.551	36.592	32.827	33.569	34.157	0.000	281.964
• RDTEN/0605152N: *Studies and Analysis Support*	9.451	17.435	20.963	0.000	20.963	26.507	27.885	28.210	28.682	0.000	159.133

D. Acquisition Strategy

This is a non acquisition program that develops, evaluates, and validates early stages of total ship concepts and technologies in support of SCN planning and potential future ship and submarine acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for those concept designs and assessments. This program supports the NAVSEA Technical Warrant Holders by providing validated engineering tools, methods, and criteria for ship, submarine and weapon system concept designs and assessments while fostering collaboration and coordination of efforts resulting in more effective use of funding.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603563N: *Ship Concept Advanced Design*	PROJECT 3161: *NAVSEA Tech Authority*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	Various Contractors:Various	13.701	0.360	Apr 2012	1.605	Apr 2013	-		1.605	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC, NUWC, CDSA:Various	37.491	7.321	Jan 2012	7.178	Jan 2013	-		7.178	Continuing	Continuing	Continuing
Engineering Development	C/CPFF	DRS:Stevensville, MD	-	0.942	Mar 2012	0.346	Oct 2012	-		0.346	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC, NUWC:Various	36.753	0.905	Mar 2012	7.215	Mar 2013	-		7.215	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC:Various	15.178	0.925	Feb 2012	2.018	Feb 2013	-		2.018	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	SPAWAR:Various	1.922	-	Mar 2012	0.090	Mar 2013	-		0.090	Continuing	Continuing	Continuing
Test and Evaluation	WR	NSWC:Various	-	3.226	Apr 2012	5.517	Oct 2012	-		5.517	Continuing	Continuing	Continuing
		Subtotal	105.045	13.679		23.969		-		23.969			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	NAVSEA HQ:Washington, DC	0.500	0.100	Sep 2012	0.100	Sep 2013	-		0.100	Continuing	Continuing	Continuing
DAWDF	Various	Not Specified:Not Specified	0.145	-		-		-		-	0.000	0.145	
		Subtotal	0.645	0.100		0.100		-		0.100			

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	105.690	13.779		24.069		-		24.069			

Remarks

Award Dates reflect estimated completion of incremental funding execution.

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603563N: *Ship Concept Advanced Design*	**PROJECT** 3161: *NAVSEA Tech Authority*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603563N: *Ship Concept Advanced Design*	**PROJECT** 3161: *NAVSEA Tech Authority*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3161				
Platform Concept Advanced Development	1	2011	4	2017
Platform Design and Certification Tools/Engineering and Tech Data Exchange Development	1	2011	4	2017
Ship Systems Engineering/Modular Ship Systems Development	1	2011	4	2017
High Speed Ships and Craft Engineering	1	2011	4	2017
Alternative Power Systems Engineering	1	2011	4	2017
Embedded Interoperability Engineering	1	2011	4	2017
Mission Capability Systems Engineering	1	2011	4	2017