Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy										DATE: February 2010	
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 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	36.240	22.387	17.883	0.000	17.883	17.254	17.009	16.515	17.563	Continuing	Continuing
2196: *Design, Tools, Plans and Concepts*	3.361	0.678	0.621	0.000	0.621	0.642	0.660	0.680	0.620	Continuing	Continuing
3161: *NAVSEA Tech Authority*	28.092	21.709	17.262	0.000	17.262	16.612	16.349	15.835	16.943	Continuing	Continuing
9999: *Congressional Adds*	4.787	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.682

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 ships with reduced manning, increased producibility, 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 shipbuliding 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/craft, tool integration and technical data exchange, embedded interoperability engineering, and mission capability system engineering. The research products developed by this project directly influence future acquisition programs by providing a range of technically acceptable alternatives and evaluation of emerging technologies.

Project 9999: Congressional Adds

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
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*

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	30.970	22.541	0.000	0.000	0.000
Current President's Budget	36.240	22.387	17.883	0.000	17.883
Total Adjustments	5.270	-0.154	17.883	0.000	17.883
• Congressional General Reductions		-0.094			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	-0.060			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-1.593	0.000			
• SBIR/STTR Transfer	-0.317	0.000			
• Program Adjustments	0.000	0.000	17.883	0.000	17.883
• Congressional Recision Adjustments	-0.020	0.000	0.000	0.000	0.000
• Congressional Add Adjustments	7.200	0.000	0.000	0.000	0.000

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Project: 9999: *Congressional Adds*		
Congressional Add: *LOW SIGNATURE MODULAR WEAPON PLATFORM*	3.191	0.000
Congressional Add: *Analytics for Shipboard Monitoring Systems*	1.596	0.000
Congressional Add Subtotals for Project: 9999	4.787	0.000
Congressional Add Totals for all Projects	4.787	0.000

Change Summary Explanation

FY09 - Reflects the realignment of Low Signature Modular Weapon Platform congressional add.

FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
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 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
2196: *Design, Tools, Plans and Concepts*	3.361	0.678	0.621	0.000	0.621	0.642	0.660	0.680	0.620	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 develops and explores alternative surface ship force structures, advanced surface ship and unmanned surface vehicles concepts, and the potential technologies for these force structures, along with 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 ships with reduced manning, increased producibility, 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, surface ship mission effectiveness studies, and advanced design concept studies for the ships that may become part of the shipbuilding plan.

(U) 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.

(U) 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.

(U) 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 warfighting/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

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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.

(U) 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 is the only R&D effort (Government or commercial) that 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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Ship Concepts and Mission Need Analysis	1.579	0.483	0.534	0.000	0.534
(U) Develop ship concepts and perform analysis for potential ships and Force Architecture 5-10 years out in shipbuilding plan. *FY 2009 Accomplishments:* Accomplished concept designs for Navy Expeditionary Combat Command/Expeditionary Security Force (NECC/ESF) Gap Analysis; Concept designs for future surface combatants; Competition for New Risk Area Projects. *FY 2010 Plans:* Concept designs for Surface Combatant Anti Submarine Warfare (ASW), Anti Surface Warfare (ASuW) and Maritime Presence Gap Analyses; Competition for New Risk Area Projects. *FY 2011 Base Plans:* Concept designs for small and medium surface combatants with a broad mix of gun, missile, and other emerging weapon topics (high energy, etc.)					
Total Ship Technology Assessment	0.595	0.101	0.087	0.000	0.087
(U) Analyze the benefits and impacts of new ship, Hull, Mechanical & Electrical (HM&E) concepts, technologies and warfare systems.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: Supported LSD Replacement Design Team with technical assessment, selection, and monitoring using Technology Knowledge Management Systems (TKMS); Analyze TKMS needs of Tanker Auxiliary Oiler (TAO) Replacement; Competition for New Risk Area Projects. *FY 2010 Plans:* Expand Total Ship Technology Assessment (TSTA) to ongoing surface combatant concept and Auxiliary Tug Fleet Salvage Ship (ATFSS) Design Team with technical assessment, selection and monitoring using TKMS. *FY 2011 Base Plans:* Expand TSTA methodology to ASW, ASUW products developed under FY10 Concepts and Mission Needs Analysis.					
Ship Concept Design and Engineering Tools, Methods, and Criteria (U) Improve capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. *FY 2009 Accomplishments:* Validated the Advanced Ship Synthesis Evaluation Tool (ASSET) Expanded Capability; Leading Edge Advanced Prototyping System (LEAPS) Distribution System Modeling (II; LEAPS Apps for Small Craft. *FY 2010 Plans:* Testing of ASSET for ongoing and emerging ship concepts; including new hullforms and technologies, emerging combat system concepts.	0.765	0.044	0.000	0.000	0.000
Mission Systems Interface Development and Demonstration	0.415	0.050	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
(U) Requirements development to counter asymmetric, peer and littoral enemies with tailored, modularized mission systems. *FY 2009 Accomplishments:* Expeditionary Strike Force modular mission package defined; Small combatant in-theater rearming concept development; Continued concept development of small combatant unmanned vehicle ASW sensor system; Ship ballistic missile defense system level integration analysis. *FY 2010 Plans:* Open-ocean ASW technology insertion analysis.					
DAWDF Defense Acquisition Workforce Development Fund. *FY 2009 Accomplishments:* N/A	0.007	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	3.361	0.678	0.621	0.000	0.621

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• RDTEN/0204202N: *DDG-1000*	0.000	524.269	549.241	0.000	549.241	337.564	124.079	177.579	171.945	0.000	1,884.677
• RDTEN/0603512N: *Carrier Systems Development*	178.095	175.823	93.830	0.000	93.830	65.502	52.306	50.878	52.513	0.000	668.947
• RDTEN/0603513N: *Shipboard Systems Component Development*	35.748	30.224	0.051	0.000	0.051	0.699	0.728	0.747	0.762	0.000	68.959
	22.813	38.197	1.796	0.000	1.796	0.285	0.360	0.402	0.409	0.000	64.262

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• RDTEN/0603564N: *Ship Preliminary Design/Feasibility*											
• RDTEN/0604300N: *SC21 Total Ship Systems Engineering*	506.798	7.966	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	514.764
• RDTEN/0604567N: *Ship Contract Design/Live Fire T&E*	84.640	91.587	153.686	0.000	153.686	153.107	172.749	110.312	103.862	0.000	869.943
• RDTEN/0603582N: *Combat System Integration*	62.472	22.444	24.344	0.000	24.344	26.181	25.516	25.267	23.942	0.000	210.166

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

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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
3161: *NAVSEA Tech Authority*	28.092	21.709	17.262	0.000	17.262	16.612	16.349	15.835	16.943	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 & 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 producibility, 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.

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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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Platform Concept Advanced Development	2.363	1.887	2.190	0.000	2.190

(U) 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. (CPSD 1.0) Note: Formerly titled Ship Concept Advance Development in PB10.

FY 2009 Accomplishments:
Accomplished Auxiliary Ship Concept Designs; Future Expeditionary Warfare Concept Designs; Modular Architectures Integration; Competition for New Risk Area Projects including modularity and advanced signatures; Autonomous Health Monitoring and recovery prototype.

FY 2010 Plans:
Future Expeditionary Warfare Concept Study and capability assessment; Develop future surface combatant concept options incorporating emerging combat system, propulsor/propulsion, powering, and modular architectures; Develop future auxiliary concepts including replenishment and fleet support; Integrate future submarine concepts and force architecture options; Develop green/brown water support and presence concepts; Examine common cross platform architectures, interfaces, and modular approaches to leverage common mission capability and achieve producibility efficiencies; Develop High Speed Open Ocean concepts leveraging results of ongoing technology development; Competition for New Work Area Projects.

FY 2011 Base Plans:
Expand Capability assessment begun in FY10 to other warfare areas; Continue operational assessment of Long Range Endurance prototype and Autonomous Health Monitoring and Recovery prototype; Continue development of USV interoperability concepts and architectures including technical architectures for USV operations aboard manned and unmanned surface combatants; Continue platform design processes and Standards in development support of next generation

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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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
submarine concept exploration; Continue development of cross-platform, common modular payload and interface concepts.					
Platform Design and Certification Tools/Engineering and Tech Data Exchange	2.606	2.052	3.657	0.000	3.657
(U) Develop and validate tools to certify the safety and mission capability of platform concepts and subsequently ships and submarines; establish integrated NAVSEA tool suite to support execution of NAVSEA Tech Authority. (CPSD 2.0) Note: Formerly titled Ship Design & Cert Tools & Tech Data Exchange in PB10 *FY 2009 Accomplishments:* Extended and integrated analytical tools supporting high performance naval ship technologies; Demo tech data exchange between Live Fire Test & Evaluation Modeling & Simulation (LFT&E M&S) environment and shipbuilder CAD environments; Extended M&S integrated environmental to additional engineering disciplines; Competed for New Risk Area projects. *FY 2010 Plans:* Continue integration of analytical tools supporting high performance naval ship technologies; Continue assessment of data exchange standards between LFT&E M&S and shipbuilder CAD environments; begin certification process; Continue expansion of M&S integrated environment to additional engineering disciplines; Coordinate data development and data exchange requirements to minimize data regeneration and modification efforts between disciplines and support reuse through design and acquisition process. *FY 2011 Base Plans:* Continue Technical Warrant Holder Concept Validation Support; continue Concept Design Tool Development - implementation and validation; Continue integration of analytical tools supporting high performance naval ship technologies; Continue assessment of data exchange standards between LFT&E M&S and shipbuilder CAD environments; Begin certification process; Continue expansion					

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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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
of M&S integrated environment to additional engineering disciplines. Coordinate data development and data exchange requirements to minimize data regeneration and modification efforts between disciplines and support reuse through design and acquisition process.					
Ship Systems Engineering /Modular Ship Systems Development	2.505	1.975	3.062	0.000	3.062
(U) 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 POR ship and submarine development. (CPSD 3.0) Note: Formerly titled Advanced Ship Systems Development in PB10 *FY 2009 Accomplishments:* Validated Future Fleet Engineering Systems and Service Life Studies; Continued development and validation of Full Ship Finite Element Modeling Baseline and expand resolution for damage control assessment; Continued platform ballasting and deballasting design tool studies; Validated ship system commercial design rolls for advanced material handling and machining. *FY 2010 Plans:* Expand Full Ship Finite Element Modeling Baseline and expand resolution into survivability, vulnerability and recoverability analyses; Incorporate integrated topside design tool set and methodologies; Expand Cost Analysis modeling and simulation via improved cost estimating relationships that include concepts of equipment density and fabrication complexity; Articulate developing combat system architectures in terms of ship system impacts and cost; Include emerging power and propulsion system architectures into Modeling Baseline. *FY 2011 Base Plans:* Continue Cost Analysis modeling and simulation via improved cost estimating relationships that include concepts of fabrication complexity; continue survivability, recoverability and vulnerability analyses; Continue developing hydrodynamic safe operating envelope analysis methods and design					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
processes; articulate development of combat system architectures in terms of ship system impacts and cost; Include emerging power, propulsion and auxiliary system architectures and technologies into Modeling Baselines; incorporate integrated power and combat system architectures; Develop open and modular system technical architectures for various platforms development transition of open architecture standards and tools to NAVSEA community.					
Next Generation USV (U) Development and demonstration of Unmanned Surface Vehicle (USVs) with focus on autonomous behavior, modularity, new ship classes for pre Alternative of Analysis (AoA) studies. (CPSD 4.0) *FY 2009 Accomplishments:* Accomplished the Long Range Endurance prototype; Autonomous Health Monitoring and Recovery prototype; Competition for New Risk Area Projects. *FY 2010 Plans:* Conduct operational assessment of Long Range Endurance prototype and Autonomous Health Monitoring and Recovery prototype; Continue development of USV interoperability R-1 Line Item No 43 CLASSIFICATION: EXHIBIT R-2a concepts and architectures; development of open architecture & modular system and technical architectures for USV operations aboard manned and unmanned surface combatants; Competition for New Risk Area Projects.	1.613	1.316	0.000	0.000	0.000
High Speed Ships and Craft Engineering (U) Investigate concepts for future high speed ships and craft that promise improved mission effectiveness in mobility, survivability, and warfare mission areas. (CPSD 5.0) *FY 2009 Accomplishments:* Accomplished the Drag Reduction Transition to fleet demonstrator; AWJ-21 design tool validation and Naval Vessel Register (NVR) integration; Competition for New Risk Area Projects.	3.031	2.388	1.770	0.000	1.770

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: Weapon Effects Testing of Aluminum Structures (MOA - FIN-GER USA) tri lateral testing of Ship 2 of Helsinki Class Fast Missile Craft; High Speed Ships tools, guidelines, validation data sets and training: High speed human systems (trials, testing, numeric modeling, guidelines for early stage design); Light Weight Structures cooperative research with NATO partners; Light Weight Structures Shock (Helsinki Class) Shock Trial. *FY 2011 Base Plans:* 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.					
Alternative Power Systems Engineering (U) Investigate concepts for ships and craft with alternative power/propulsion systems evaluating effectiveness in mobility, survivability, and warfare mission areas. (CPSD 6.0) *FY 2009 Accomplishments:* Completed the Fuel Cell At Sea Demonstration prototype construction; Rim Driven Ducted Propulsor prototype construction; Competition for New Risk Area Projects. *FY 2010 Plans:* Alternate propulsion tools, guidelines, validation data sets and training: Extreme wave modeling cooperative research project with NATO partners; Hydrodynamics force and moment modeling supporting dynamic stability simulation; Next Generation Integrated Propulsion systems architecting, survivability and propulsor.	2.857	2.236	1.627	0.000	1.627

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 Base Plans: Commercial Pod Foreign Comparitive 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.					
Future Submarine Design (U) Develop ship concept studies and evaluate technologies to define the Next Generation Submarine, common SSN-SSBN Hull and Payload Modularity. (CPSD 7.0) Note: Titled CPSD 8 in PB10 *FY 2009 Accomplishments:* Completed Navy After Next Tech Validations; Technical Warrant Holder Concept Validation Support; SUBCODE Concept Design Tool Dev - phase 4; Submarine Design Processes and Standards Development. *FY 2010 Plans:* Navy After Next Tech Validations; Technical Warrant Holder Concept Validation Support; SUBCODE Concept Design Tool Dev - integration and testing phase; Submarine Design Processes and Standards Development; next generation submarine concept exploration; modular payload and interface concept development.	3.777	2.924	0.000	0.000	0.000
Embedded Interoperability (I/O) Engineering (U) 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 warfighting capability. Focus on emerging Open Architecture warfare systems. (CPSD 8.0) Note: Titled CPSD 9 in PB10	3.980	3.060	2.407	0.000	2.407

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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 Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: Completed the Develop Tactics, Techniques and Procedures (TTP) for CVN 77 and DDG Modernization based on FY 08 work; Pre-certification for the interoperability test and assessment of LCS 1 & 2 and CG Modernization, DDG 1000 and CVN 21 (CVN 78). Completed the Development of the TTP for LCS 1 & 2 based on FY 09 work. *FY 2010 Plans:* Complete development of TTP for CVN 77 and DDG Modernization; continue pre-certification for the interoperability test and assessment of LCS, CG Modernization, DDG 1000 and CVN 21 (CVN 78); Complete interoperability efforts LPD 17 (class); Complete TTP for LCS 1 & 2. *FY 2011 Base Plans:* Continue interoperability test and assessment of CG Modernization, DDG 1000 and CVN 21 (CVN 78); Complete interoperability efforts LPD 17 (class).					
Mission Capability Systems Engineering (U) Develop force level systems engineering criteria and guidance at the Systems of Systems (SoS) and Family of Systems (FoS) level. (CPSD 9.0) Note: Titled CPSD 10 in PB10 *FY 2009 Accomplishments:* Provided technical standards, definitions and requirements for National Security Systems, specifically Navy Single Integrated Air Picture (SIAP), Naval Integrated Fire Control Counter Air (NIFC-CA), and Information Assurance (IA); Provided independent technical review of radar and RF systems under development, Standard Missile (SM-6) and the Amphibious Improvement Program (AIP); Completed development of air launcher torpedo battle system for improved weapon performance.	4.186	2.979	2.549	0.000	2.549

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: Continue to provide technical standards, definitions and requirements for National Security Systems (NSS), 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 2011 Base Plans:* Continue to provide technical standards, definitions and requirements for National Security Systems (NSS), 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; Expand independent technical analysis of warfare systems design and development options to additional Technical Authority Warrant Holders.					
Ship Engineering & Analysis Technology Center (U) Provides Government activities, shipbuilders, academia and contractors the following: (CPSD 10.0) Note: Titled CPSD 7 in PB10 *FY 2009 Accomplishments:* Completed the High performance computing systems; Commercial and research software libraries; Classified and unclassified connectivity; High end data visualization and collaboration tools/Centralized data repository; Provided the framework of continued world class computing upon which specific task funding will build. (project 2196 in FY06) *FY 2010 Plans:* Expand high performance computing system efforts; leveraging commercial and research software and connectivity; Develop security, visualization and collaborative processes to leverage common	1.029	0.892	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
centralized data storage; Conduct hydrodynamic analyses of emerging ship and craft concepts in various mission performance and geographic regimes; Conduct airwake analysis of emerging high-speed ship concepts including impact of modular mission and payload architectures and configurations.					
DAWDF Defense Acquisition Workforce Development Fund. *FY 2009 Accomplishments:* N/A	0.145	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	28.092	21.709	17.262	0.000	17.262

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• RDTEN/0204202N: *DDG-1000*	0.000	524.269	549.241	0.000	549.241	337.564	124.079	177.579	171.945	0.000	1,884.677
• RDTEN/0603512N: *Carrier Systems Development*	178.095	175.823	93.830	0.000	93.830	65.502	52.306	50.878	52.513	0.000	668.947
• RDTEN/0603513N: *Shipboard Systems Component Development*	35.748	30.224	0.051	0.000	0.051	0.699	0.728	0.747	0.762	0.000	68.959
• RDTEN/0603564N: *Ship Preliminary Design/Feasibility Studies*	22.813	38.197	1.796	0.000	1.796	0.285	0.360	0.402	0.409	0.000	64.262
• RDTEN/0604300N: *SC21 Total Ship Systems Engineering*	506.798	7.966	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	514.764
• RDTEN/0604567N: *Ship Contract Design/Live Fire T&E*	84.640	91.587	153.686	0.000	153.686	153.107	172.749	110.312	103.862	0.000	869.943
	62.472	22.444	24.344	0.000	24.344	26.181	25.516	25.267	23.942	0.000	210.166

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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• RDTEN/0603582N: *Combat System Integration*											

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

None

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy		DATE: February 2010
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)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	Various/ Various	Various Contractors Various	9.527	2.190	Apr 2010	2.036	Apr 2011	0.000		2.036	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC, NUWC, CDSA Various	23.180	8.097	Jan 2010	6.350	Jan 2011	0.000		6.350	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC, NUWC Various	22.234	8.290	Mar 2010	6.361	Mar 2011	0.000		6.361	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC Various	10.007	2.922	Feb 2010	2.305	Feb 2011	0.000		2.305	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	SPAWAR Various	1.710	0.110	Mar 2010	0.110	Mar 2011	0.000		0.110	Continuing	Continuing	Continuing
		Subtotal	66.658	21.609		17.162		0.000		17.162			

Remarks

Management Services ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	NAVSEA HQ Washington, DC	0.300	0.100	Sep 2010	0.100	Sep 2011	0.000		0.100	Continuing	Continuing	Continuing
DAWDF		Not Specified	0.145	0.000		0.000		0.000		0.000	0.000	0.145	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Navy		DATE: February 2010
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2010 Cost	FY 2010 Award Date	FY 2011 Base Cost	FY 2011 Base Award Date	FY 2011 OCO Cost	FY 2011 OCO Award Date	FY 2011 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
	Various/ Various	Not Specified											
		Subtotal	0.445	0.100		0.100		0.000		0.100			

Remarks

	Total Prior Years Cost	FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	67.103	21.709		17.262		0.000		17.262			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2011 Navy		DATE: February 2010
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*

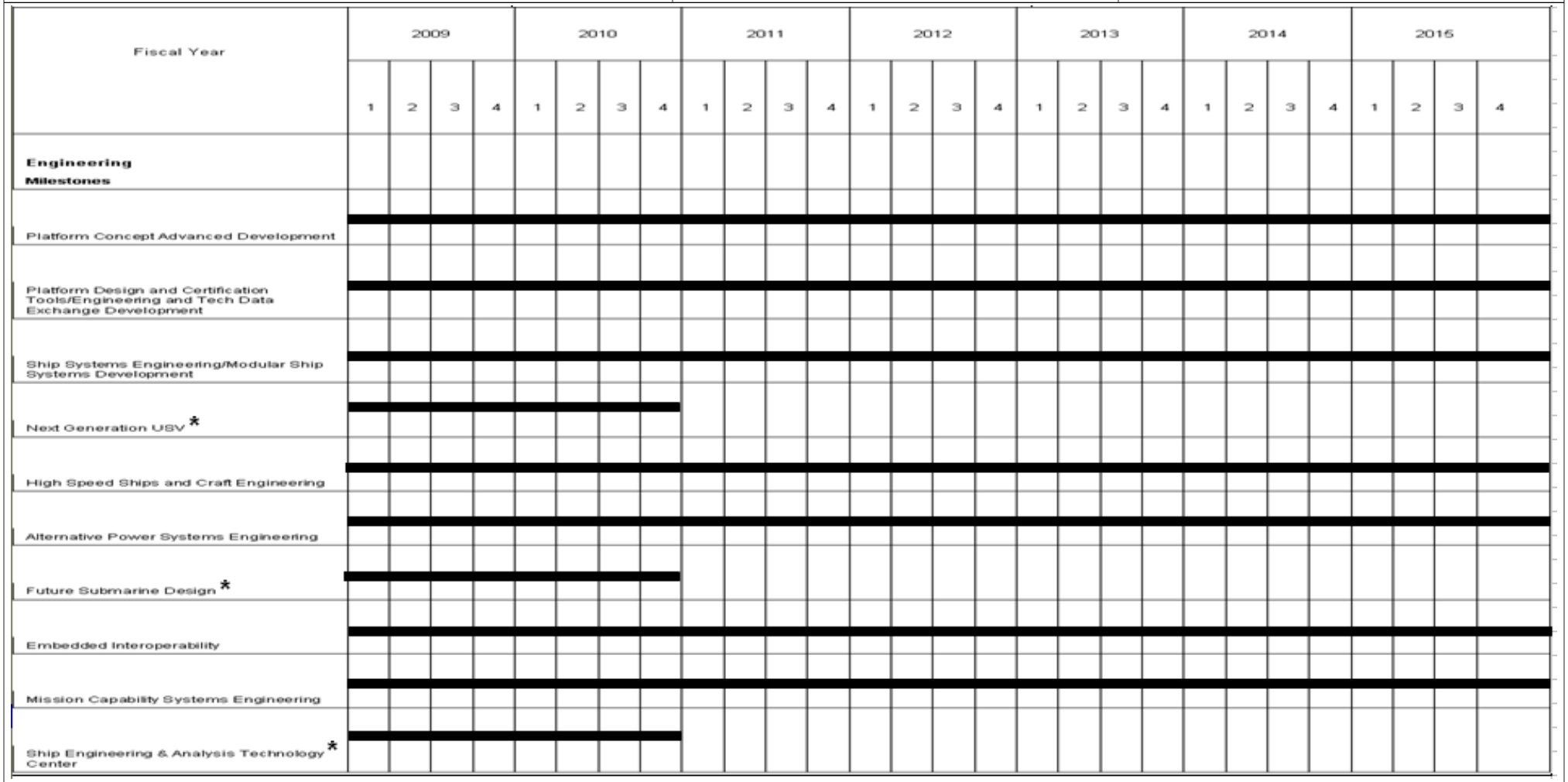

Exhibit R-4A, RDT&E Schedule Details: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603563N: *Ship Concept Advanced Design*	**PROJECT** 3161: *NAVSEA Tech Authority*

Schedule Details

	Start		End	
Event	**Quarter**	**Year**	**Quarter**	**Year**
Platform Concept Advanced Development	1	2009	4	2015
Platform Design and Certification Tools/Engineering and Tech Data Exchange Development	1	2009	4	2015
Ship Systems Engineering/Modular Ship Systems Development	1	2009	4	2015
Next Generation USV	1	2009	4	2010
High Speed Ships and Craft Engineering	1	2009	4	2015
Alternative Power Systems Engineering	1	2009	4	2015
Future Submarine Design	1	2009	4	2010
Embedded Interoperability Engineering	1	2009	4	2015
Mission Capability Systems Engineering	1	2009	4	2015
Ship Engineering & Analysis Technology Center	1	2009	4	2010

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
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COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
9999: *Congressional Adds*	4.787	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.682
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Congressional Adds.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Add: LOW SIGNATURE MODULAR WEAPON PLATFORM *FY 2009 Accomplishments:* (U) This effort will support the seal delivery vehicle (SDV) as technology demonstrators to explore enhanced seakeeping performance, payload modularity, integrated command and control, advanced construction techniques, reliability and maintainability. This task will conduct a craft survey and report of the Sealion I vessel and extend the length of Sealion I to mirror Sealion II.	3.191	0.000
Congressional Add: Analytics for Shipboard Monitoring Systems *FY 2009 Accomplishments:* (U) Analytics for Shipboard Monitoring Systems (ASMS) is an open architecture model that will enhance legacy and new ship capabilities while saving acquisition dollars and yield workload reduction. Moving from stove piped and proprietary systems to open systems will streamline current processes, reduce supporting infrastructure and will support rapid deployment of emerging diagnostic technologies to optimize Fleet readiness and maintenance funds allocation.	1.596	0.000
Congressional Adds Subtotals	4.787	0.000

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C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Adds.