CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION						DATE February 2008	
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**			R-1 ITEM NOMENCLATURE **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	44.651	43.529	4.003	7.781	6.062	6.956	7.110
0000 / UNDIST	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2465 / DC/SURVIVABILITY	1.842	1.664	0.000	0.000	0.000	0.000	0.000
2468 / Undersea Warfare	1.236	0.000	0.000	0.000	0.000	0.000	0.000
2469 / Open System Architecture (OSA)	1.717	1.591	0.866	1.709	0.000	0.779	0.812
2470 / ITD-Integrated Topside Design	0.462	0.406	0.011	0.396	0.431	0.438	0.446
2471 / Integrated Power Systems (IPS)	6.924	5.587	3.126	5.676	5.631	5.739	5.852
4019 / Radar Upgrades	1.521	0.000	0.000	0.000	0.000	0.000	0.000
9999 / CONGRESSIONAL ADDS	30.949	34.281	0.000	0.000	0.000	0.000	0.000

A. MISSION DESCRIPTION:

This PE funds the development of shipboard system components and technologies for the future surface combatant family of ships and focuses on the following efforts: (1) development of DDG 1000 specific and future surface combatant survivability and damage control/firefighting systems and features that reduce vulnerability against weapons, (2) demonstration and validation of technology through build-test-build process for surface sonar and combat system application, (3) implements modular standard open systems architecture at the total ship/system level and supports reduced manning efforts through automation, (4) develops technologies to achieve a total integrated topside design focused on DDG 1000 and other future surface ships, (5) supports the Integrated Power System effort that provides total ship electric power, including electric propulsion , power conversion and distribution, combat system and mission load interfaces to the electric power system and (6) future upgrades/technology insertion efforts for the Dual Band Radar (DBR) system.

The following Congressional adds are contained in this Program Element:

FY 07 Congressional Adds

Project 9999 - Congressional Adds: $30,949-This project consists of the following FY 07 Congressional adds: MTTC/IPI and National Surface Treatment Center, Carbon foam program, Intelligent Systems Consortium NASEA-Carderock/SHSU, Shipboard wireless maintenance assistant (SWMA), Smart machinery spaces system, Water mist fire protection systems,Advanced fluid controls for shipboard applications, Advanced repair technology for Expeditionary Navy, Advanced steam turbine, Air gun shock testing of naval vessels, Braided ropes for US Navy Ship Salvage, Carrier Strike Group Forward Sensor Network,Fuel contaminate detection system, High efficiency quiet electric drive, Integrated power system converter, Propulsor manufacturing technology development and Smart valve.

FY 08 Congressional Adds

Project 9999 - Congressional Adds: $34,281-This project consists of the following FY 08 Congressional adds: Advanced Navy Boat Lift (13,000-24,000 lbs) Research and Development, Advanced fluid controls for shipboard applications, Advanced repair technology for Expeditionary Navy, Air gun ship shock testing of naval vessels, Circuit breaker for Navy shipboard power distribution, High efficiency quiet electric drive, High temperature superconducting motor for DDG 1000, Integrated power system converter, Internet protocol over power line carrier technology, Naval flywheel energy storage system, Smart valve, Shipboard wireless Maintenance Assistant, Advanced steam turbine, DDG-51 Homopolar hybrid drive, MTTC/IPI and National surface treatment center,Power conversion equipment for high density power, Propulsor Manufacturing technology development, and high temperature superconductor AC synchronous propulsion motor.

B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY08 Pres Controls)	49.993	9.450	9.561
Current President's Budget (FY09 Pres Controls)	44.651	43.529	4.003
Total Adjustments	- 5.342	34.079	- 5.558
(U) Summary of Adjustments			
Congressional Program Reductions	- 4.300		
Congressional Rescissions			
Congressional Increases		34.500	
Reprogrammings			
SBIR/STTR Transfer	-1.040		
Undistributed General Reductions	- 0.002	-0.421	
Technical Adjustment			
Program Adjustments			-5.558
Pricing Adjustments			
Subtotal	-5.342	34.079	-5.558

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **2465/DC/SURVIVABILITY**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.842	1.664	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project funds development of DDG 1000 specific and future surface combatant survivability and damage control (DC)/ firefighting systems and features that reduce vulnerability against weapons (e.g., missiles, mines, torpedoes) and enables effective recovery of mission capability under reduced manning conditions. Additionally, this project supports development of systems that reduce susceptibility to magnetic and acoustic influence mines. The requirements for this project are based on the need to develop affordable, balanced survivability designs that address recent wartime lessons learned and emerging and future threats.

System development areas include: 1) development of electrical fault isolation control methods that enable the rapid detection and isolation of combat-induced faults ensuring an effective DC response after damage, 2) wireless machinery control system technologies that will reduce installation costs through the elimination of wires and significantly increase the survivability of control systems ensuring the availability of mission critical systems following damage, and 3) development of electromagnetic signature reduction technologies that provide for jamming sweep resistant magnetic influence mines using advanced degaussing and impressed cathodic protection systems and a closed-loop deamping system that uses existing cathodic protections systems to reduce the near field electric signatures emanating from a steel hulled surface ship.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **2465/DC/SURVIVABILITY**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.300	0.000	0.000
RDT&E Articles Quantity	0	0	0

In FY 07, completed development of fault isolation control system approaches/algorithms for medium voltage electrical systems that enable bus level combat induced faults to be rapidly isolated ensuring power to combat systems and transitioned to the DDG-1000 program

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.778	0.701	0.000
RDT&E Articles Quantity	0	0	0

In FY 07through 08, develop wireless machinery control system approaches and architectures that significantly improve survivability and reduce installation costs through the elimination of cabling.In FY 07, continued development of wireless control options. In FY 08 integrate a commercial wireless fire detection system/sensors with a representative ship level supervisory control system and finalize architecture options.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.764	0.963	0.000
RDT&E Articles Quantity	0	0	0

In FY 07 finalized advanced degaussing system software and transitioned to DDG 1000 and LPD -17 programs.
In FY 07 completed rapid prototype code development that identified safe operating areas as a function of mine threat.
In FY 08 develop advanced electromagnetic (EM) signature reduction technology requirements and architecture options for a closed-loop deamping system that reduces the near field electric signature and a system for jamming magnetically influenced mines.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:
Government Field Activities - Naval Surface Warfare Center, Carderock, Md.

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **2468/Undersea Warfare**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.236	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Undersea Warfare (USW) project provides advanced development demonstration and validation of technology through a build-test-build process for potential surface sonar and combat system application. Efforts focus on resolution of technical issues associated with providing capability against the year 2010 and beyond threat with emphasis on shallow water/littoral area USW and on Demonstration and Validation (DEM/VAL) of DDG 1000 Integrated Undersea Warfare (IUSW-21) Advanced Development Model (ADM). The key technology areas being investigated include: (1) improvements in signal processing, (2) advanced information processing, (3) multi-sensor data fusion, (4) towed array technology, (5) hull array technology and (6) transducer technology to improve target detection and classification performance and reduce system manning requirements for anti-submarine, torpedo defence and in-stride mine avoidance. FY 2007 focused on major technological and performance thrusts for DDG 1000 USW, which will define surface combatant USW capability for the Navy in the next century.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **2468/Undersea Warfare**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.113	0.000	0.000
RDT&E Articles Quantity	0	0	0

FY07 conductedrisk reduction tasks in support of build-test-build process.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.509	0.000	0.000
RDT&E Articles Quantity	0	0	0

IUSW-21 ADM/EDM Development - Performed Integrated Peer Group (IPG) engineering reviews of IUWS-21 advanced technologies. In FY07, continued development and integration ofIUSW.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.614	0.000	0.000
RDT&E Articles Quantity	0	0	0

In FY07,initiated test preparation for test event.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

In Contract Phase IV responsibility for IUSW ADM/EDM development for in-water tests rests with the DDG 1000 Design Agent.

E. MAJOR PERFORMERS:

Government Field Activities - Naval Undersea Warfare Center, Newport, Ri .

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **2469/Open System Architecture (OSA)**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.717	1.591	0.866	1.709	0.000	0.779	0.812
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Architectures, Interfaces & Modular Systems (AIMS): This funding supports PEO Ships implementation of Modular Standard Open Systems Architecture (MOSA) at the total system/ship level. These modular interfaces facilitate mission and market adaptability, technology refresh and insertion, and competition. This funding supports the market surveillance and technology and other projections, cost and logistics analyses, process development, industry partnering, demonstrations and assessments necessary to translate into total ship acquisition.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **2469/Open System Architecture (OSA)**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.320	0.000	0.000
RDT&E Articles Quantity	0	0	0

Implementation: Transition with industry common Architectures, Interfaces, and Modular Systems (AIMS) for shipboard zones.

A. Open Offboard Vehicle Zone, FY07: Interfaced.

B. Open C&C Zone, FY07: Interface Implementation Cross platform development..

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.451	0.300	0.276
RDT&E Articles Quantity	0	0	0

Implementation: Transition with industry common Architectures, Interfaces, and Modular Systems (AIMS) for shipboard zones.

A. Open Sensors Zone: FY07 Concept developed. FY07-09 Architecture Development, FY09 Interface Development.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.000	0.555	0.393
RDT&E Articles Quantity	0	0	0

Implementation: Transition with industry common Architectures, Interfaces, and Modular Systems (AIMS) for shipboard zones.

A. Open Machinery Zone: FY08-09 Architecture Concept.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.946	0.736	0.197
RDT&E Articles Quantity	0	0	0

Implementation: Transition with industry common Architectures, Interfaces, and Modular Systems (AIMS) for shipboard zones.

A. Open Weapons/Power Projection Zone:FY07-08: Interface development, FY09: Interface Implementation

C. OTHER PROGRAM FUNDING SUMMARY:

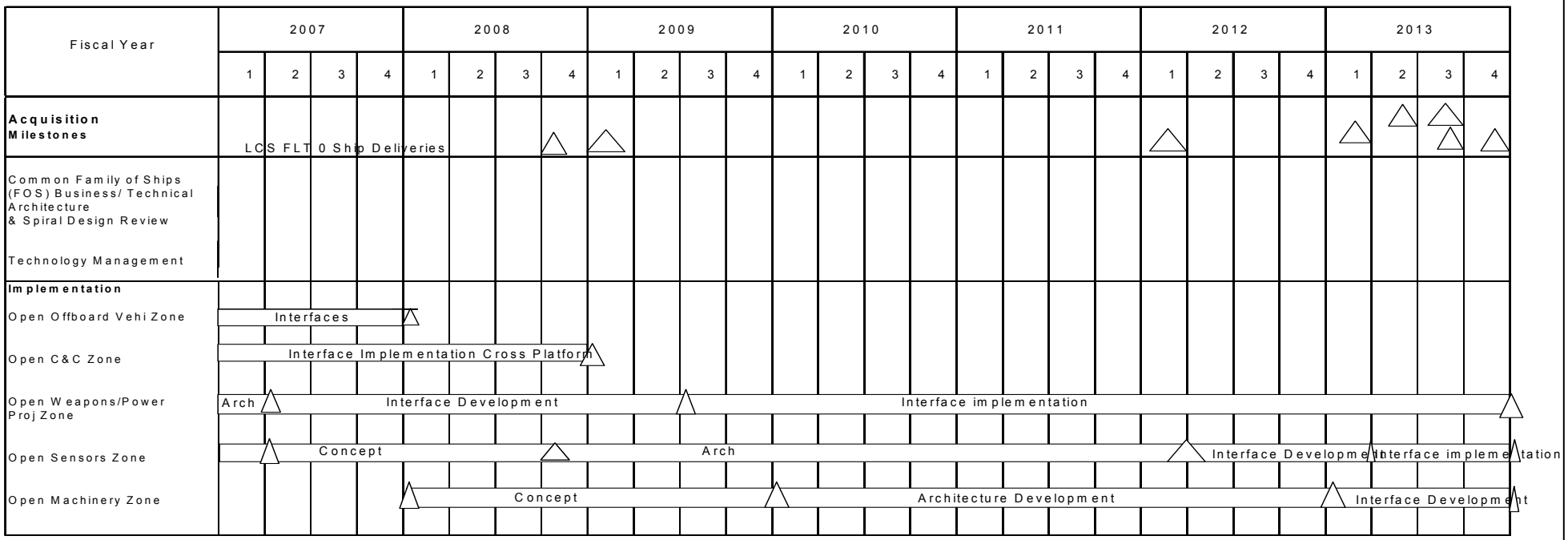
D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

(U) Government Field Activities- Naval Surface Warfare Center, Carderock, Md. and Naval Surface Warfare Center, Dahlgren, Va.

CLASSIFICATION:	UNCLASSIFIED											
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS										DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**					PROJECT NUMBER AND NAME **2469/Open System Architecture (OSA)**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Primary Hardware Development	845/804	DDG 1000 Industry Teams	35.327	0.000		0.000		0.000		0.000	35.327	35.327
Primary Hardware Development	WR	NSWC CD Bethesda, MD	10.023	0.000		0.000		0.000		0.000	10.023	0.000
Primary Hardware Development	Various	Other Gov't Activities	4.987	0.000		0.000		0.000		0.000	4.987	0.000
Primary Hardware Development	Various	Other Contractors	2.735	0.000		0.000		0.000		0.000	2.735	2.735
Subtotal Product Development			**53.072**	**0.000**		**0.000**		**0.000**		**0.000**	**53.072**	**38.062**
Remarks:												
Subtotal Support Costs			**0.000**	**0.000**		**0.000**		**0.000**		**0.000**	**0.000**	**0.000**
Remarks:												
Subtotal Test and Evaluation			**0.000**	**0.000**		**0.000**		**0.000**		**0.000**	**0.000**	**0.000**
Remarks:												
Contractor Engineering Support	Various	Other Contractors	9.267	0.401	APR-07	0.000		0.200	OCT-08	CONT	CONT	0.000
Government Engineering Support	WR	NSWC CD Philadelphia, PA	3.763	0.000		0.000		0.000		0.000	3.763	0.000
Government Engineering Support	WR	NSWC Carderock, Md.	6.062	1.266	OCT-06	1.580	OCT-07	0.000		CONT	CONT	0.000
Government Engineering Support	Various	Other Gov't Activities	32.759	0.050	Various	0.011	Various	0.666	Various	CONT	CONT	0.000
Subtotal Management Services			**51.851**	**1.717**		**1.591**		**0.866**		**CONT**	**CONT**	**0.000**
Remarks:												
Total Cost			**104.923**	**1.717**		**1.591**		**0.866**		**CONT**	**CONT**	**38.062**

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-4, SCHEDULE PROFILE		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPM**	PROJECT NUMBER AND NAME **2469/Open System Architecture (OSA)**



CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-4a, SCHEDULE DETAIL					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**			PROJECT NUMBER AND NAME **2469/Open System Architecture (OSA)**			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Open Offboard Vehicles Zone Interfaces Defined	1Q-4Q	1Q					
Open C&C Zone Interfaces Implemented Cross-Platform	1Q-4Q	1Q-4Q	1Q				
Open Weapons Zone Arch Complete	1Q-2Q						
Open Weapons Zone Interfaces Defined	2Q-4Q	1Q-4Q	1Q				
Open Weapons Zone Interfaces Implemented			3Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q
Open Sensors Zone Concept Complete	2Q-4Q	1Q-4Q					
Open Sensors Zone Architecture Complete		4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q	
Open Sensors Zone Interfaces Development						1Q-4Q	1Q
Open Sensors Zone Interface Implementation							1Q-4Q
Open Machinery Zone Concept Complete		1Q-4Q	1Q-4Q	1Q			
Open Machinery Zone Architecture Complete				1Q-4Q	1Q-4Q	1Q-4Q	1Q
Open Machinery Zone Interface Development							1Q-4Q

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **2470/ITD-Integrated Topside Design**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	0.462	0.406	0.011	0.396	0.431	0.438	0.446
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project develops the necessary technologies to achieve a total integrated topside design focused on DDG 1000 and other future surface combatant ships as well as supporting upgrades to existing ships in the Fleet. Technology focus areas include the development, enhancement, validation and verification of modeling and simulation (M&S) tools to support topside signature control, electronic warfare effectiveness, and electromagnetic engineering. This project also develops technical data to support the use of large-scale marine composites on surface combatants to facilitate topside signature control. Topside signature control and electronic warfare effectiveness M&S tools supported by this project enable Navy transformation efforts related to sea strike by facilitating the cost effective design, design approval, and Live Fire Test and Evaluation of low signature surface ships. The validated, integrated, physics-based, electromagnetic radiation (VIPER) M&S tool suite currently being developed under this project will provide the Navy with a state-of-the-art electromatgnetic engineering (EME) capability that is applicable to both new construction and existing ships in the Fleet. By providing the design community with tools able to accurately predict the optimum arrangement of topside sensors to minimize electromagnetic interference (EMI), this project enables Navy transformation efforts by facilitating FORCEnet, the connection of sensors, networks, weapons, decision aids and warriors from seabed to space. Development of marine composite technical data supports Navy transformation efforts by enabling the cost effective design of stealthy surface ship topsides that have improved corrosion control which, in turn enables optimized manning. This program is directed toward improved affordability, performance, reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and manning reductions for the existing and future Fleet.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **2470/ITD-Integrated Topside Design**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.462	0.406	0.011
RDT&E Articles Quantity	0	0	0

FY07: Released Ver 4.0 Advanced Antenna Design and Analysis (D&A) M&S Tool

FY08: Start Ver 5.0 Advanced Antenna Design and Analysis (D&A) M&S Tool Development

FY09: Continue development of Ver 5.0 Advanced Antenna Design and Analysis (D&A) M&S Tool

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

Government Field Activities-Naval Research Laboratory, Washington DC, and

Space and Naval Warfare Systems Center, San Diego, Ca.

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **2471/Integrated Power Systems (IPS)**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	6.924	5.587	3.126	5.676	5.631	5.739	5.852
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project supports the Integrated Power Systems (IPS) program. IPS provides total ship electric power, including electric propulsion, power conversion and distribution, combat system and mission load interfaces to the electric power system. IPS supports multiple ship class applications for future surface ships, with DDG 1000, DDG 1000 future flight upgrades, and CG(X) being the primary ship application target. On 6 January 2000, SECNAV announced Navy intent that DDG 1000 be an electric drive ship with integrated power architecture. IPS reduces acquisition and operating costs of naval ships and increases military effectiveness. IPS leverages investments in technologies that will be useable by both military and commercial sectors.

- (U) IPS has the potential to revolutionize the design, construction, and operation of U.S. naval ships by using electricity as the primary energy transfer medium aboard ship. The flexibility of electric power transmission allows power generating modules with various power ratings to be connected to propulsion loads and ship service in any arrangement that supports the ship's mission at lowest overall cost. Systems engineering in IPS is focused on increasing the commonality of components used across ship types and in developing modules which will be integral to standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased commonality is to reduce the total cost of ship ownership by using common modules composed of standard components and/or standard interfaces.

- (U) IPS addresses ship platform program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads; improved ship survivability and reduced vulnerability through increased arrangement flexibility and improved electrical system survivability; reduced manning through improved power management systems and reduced on-board maintenance requirements; improved ship signature characteristics; improved design adaptability to meet future requirements of multiple ship types or missions; integrating power management and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load management functions; simplified technology insertion which allows new technologies to be installed within IPS much less expensively than presently possible; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **2471/Integrated Power Systems (IPS)**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	5.150	2.226	1.689
RDT&E Articles Quantity	0	0	0

System Development: Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, ship integration, architecture design, ship electric architectures and high power weapons systems requirements, and related efforts. Evaluate emerging technologies for ship applications to determine future feasibility and development requirements. Emerging technologies include fuel cells, high-energy weapons, high power radars, and advanced power electronics. Performed preliminary design of high-speed generators and initiated detailed design with follow-on prototype fabrication planned.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	1.383	3.061	1.287
RDT&E Articles Quantity	0	0	0

System Test: Conducted Integrated Fight Through Power (IFTP) testing at NSWCCD, Philadelphia PA. Completed integration of IFTP and DDX IPS test sites. Mitigate potential risks associated with a fielded IPS system to reduce ship□s signature, improve survivability and efficiency by fabricating components, inserting into the IPS test site or an appropriate test platform. Conduct demonstrations to maintain and develop the critical engineering capability and capacity to insert future high power weapon systems (radars, lasers and electromagnetic launch weapons) into DDG 1000 and future ship classes including CG(X). Conduct demonstrations to show improved performance and potential to reduce combat system costs.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.391	0.300	0.150
RDT&E Articles Quantity	0	0	0

Platform Specific: Developed IPS configurations in support of all future surface ship programs. Develop/modify IPS ship configuration documentation including concepts of operations, System Level Description/Requirements, and module performance specifications as necessary to support power system requirements for CG(X), TAOE (X) and LHAR (X), MPF future, and COBRA JUDY. Improve ship power system smart product model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

IPS is a candidate system for DDG 1000 and all other future surface ships.

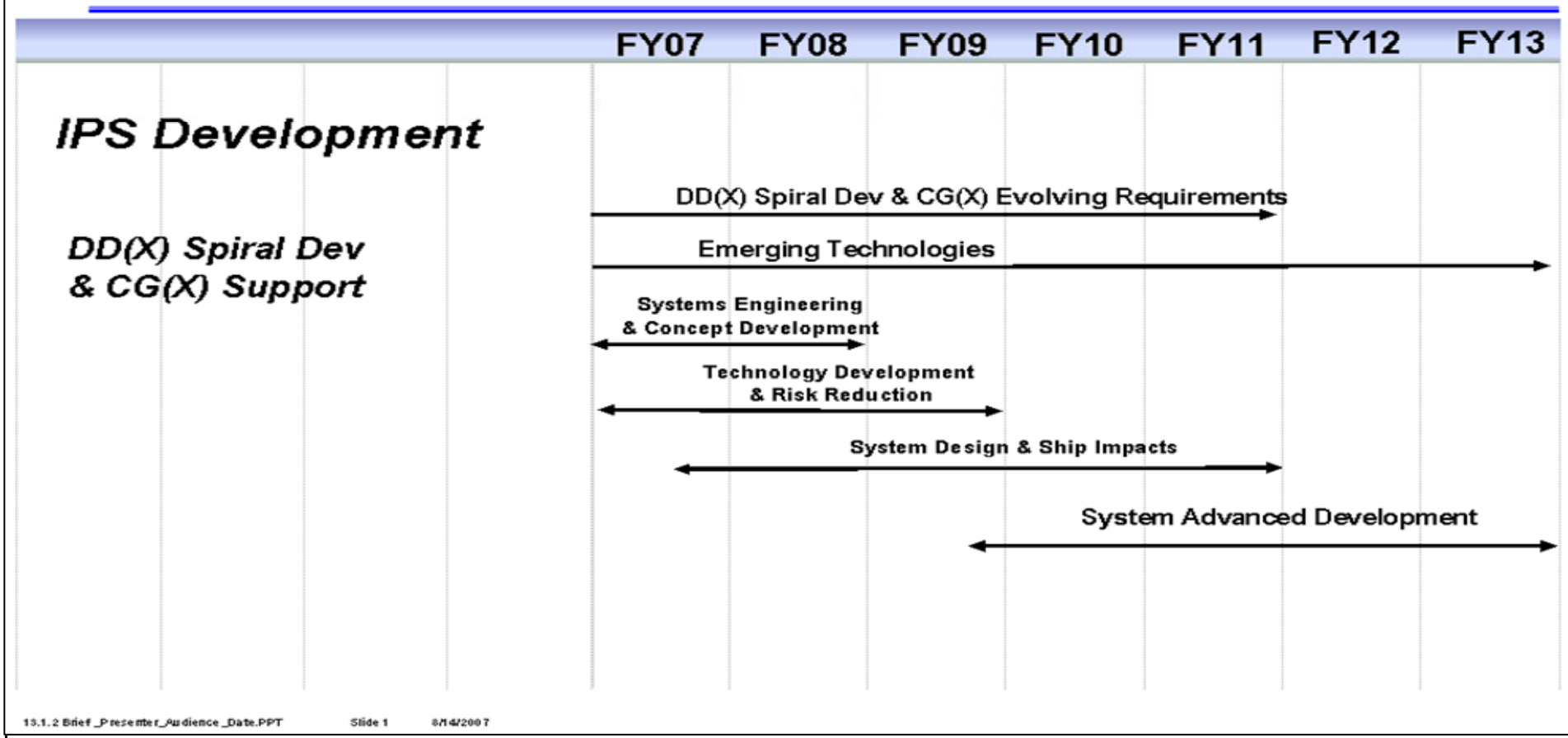
E. MAJOR PERFORMERS:

IPS DDG 1000 Design Agent, Ingalls Shipbuilding Iinc. General Atomics and DRS Power and Controls Technologies Inc., IPS IFTP contractors. Curtiss Wright, High Speed Generator

contractor. Northrop-Grumman Electronic Systems, power electronics contractor.

CLASSIFICATION:	UNCLASSIFIED											
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS										DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**					PROJECT NUMBER AND NAME **2471/Integrated Power Systems (IPS)**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Primary Hardware Development	C/CPAF	Lockheed M Syracuse, NY	23.572	0.000		0.000		0.000		0.000	23.572	23.572
Primary Hardware Development	Sec845/804	DDG 1000 Industry Teams	66.661	0.000		0.000		0.000		0.000	66.661	66.661
Primary Hardware Development	CPAF	DDG 1000 Design Agent	154.500	0.000		0.000		0.000		0.000	154.500	154.500
Primary Hardware Development	JS/UK MOU	DERA, UK	1.350	0.000		0.000		0.000		0.000	1.350	1.350
Primary Hardware Development	Sec845/804	IFTP Teams	53.911	0.000		0.000		0.000		0.000	53.911	0.000
Primary Hardware Development	C/CPAF	Anteon, Corp. Fairfax, VA	4.681	0.244	OCT-06	0.431	OCT-07	0.518	OCT-08	CONT	CONT	0.000
Primary Hardware Development	WR	NSWCCD Philadelphia, PA	25.387	1.354	OCT-06	0.402	OCT-07	0.664	OCT-08	CONT	CONT	0.000
Primary Hardware Development	WR	NSWCCD Dahlgren, Va.	2.826	0.000		0.000		0.000		0.000	2.826	0.000
Primary Hardware Development	Various	Other Contractors	10.053	0.000		0.000		0.000		0.000	10.053	0.000
Primary Hardware Development	Various	Other Govt Activities	1.895	0.000		0.000		0.000		0.000	1.895	0.000
Primary Hardware Development	C/CPFF	CW-EMD, Cheswick, PA	4.460	4.918	OCT-06	3.585	OCT-07	0.900	OCT-08	CONT	CONT	0.000
Primary Hardware Development	C/CPFF	NGES, Sunnyvale, CA	2.686	0.000		0.120		0.000		0.000	2.806	0.000
Award Fees	C/CPAF	Anteon, Corp. Fairfax, VA	0.164	0.000		0.047	JUN-08	0.057	JUN-09	CONT	CONT	0.000
Subtotal Product Development			**352.146**	**6.516**		**4.585**		**2.139**		**CONT**	**CONT**	**246.083**
Remarks:												
Subtotal Support Costs			**0.000**	**0.000**		**0.000**		**0.000**		**0.000**	**0.000**	**0.000**
Remarks:												
Developmental Test & Evaluation	WR	NSWC CD Philadelphia, PA	19.597	0.408	OCT-06	1.002	OCT-07	0.987	OCT-08	CONT	CONT	0.000
Subtotal Test and Evaluation			**19.597**	**0.408**		**1.002**		**0.987**		**CONT**	**CONT**	**0.000**
Remarks:												
Travel	Various	Various	0.604	0.000		0.000		0.000		0.000	0.604	0.000
Subtotal Management Services			**0.604**	**0.000**		**0.000**		**0.000**		**0.000**	**0.604**	**0.000**
Remarks:												
Total Cost			**372.347**	**6.924**		**5.587**		**3.126**		**CONT**	**CONT**	**246.083**

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-4, SCHEDULE PROFILE		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPM**	PROJECT NUMBER AND NAME **2471/Integrated Power Systems (IPS)**



CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-4a, SCHEDULE DETAIL					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**			PROJECT NUMBER AND NAME **2471/Integrated Power Systems (IPS)**			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
DD(X) Spiral Dev & CG(X) Evolving Requirements	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q		
Emerging Technologies	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1-Q-4Q
Systems Engineering & Concept Development	1Q-4Q	1Q-4Q					
Technology Development & Risk Reduction	1Q-4Q	1Q-4Q	1Q-4Q				
System Design & Ship Impacts	3Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q		
System Advanced Development			3Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q	1Q-4Q

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMENT**				PROJECT NUMBER AND NAME **4019/Radar Upgrades**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.521	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Radar Upgrades will fund future upgrades/technology insertion efforts for the Multi-Function Radar (MFR)/Volume Search Radar (VSR)/Dual Band Radar (DBR) suite. Upgrades and technology inserts are required to maintain the level of force protection needed for ship defense against all threats envisioned in the littoral environment. The upgrades will include all aspects of the radar system/subsystems, including hardware and software. Specific subsystem areas include the Array, T/R module, Receiver/Exciter, Signal Data Processor and power/cooling systems.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **4019/Radar Upgrades**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.679	0.000	0.000
RDT&E Articles Quantity	0	0	0

Provided Radar Upgrades and Technology Insertion for the MFR/VSR/DBR hardware and software. Commenced Radar Upgrades studies and analysis in FY 07.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.742	0.000	0.000
RDT&E Articles Quantity	0	0	0

Government Engineering Services and Program Management support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Performed oversight and assessment of efforts associated with this phase of the program.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	0.100	0.000	0.000
RDT&E Articles Quantity	0	0	0

Provided Program Management in support of radar upgrades and technology insertion.

C. OTHER PROGRAM FUNDING SUMMARY:

D. ACQUISITION STRATEGY:

E. MAJOR PERFORMERS:

Northrop Grumman Ship Systems, Raytheon and Lockheed Martin.

CLASSIFICATION:	UNCLASSIFIED		
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION			DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **9999/CONGRESSIONAL ADDS**	

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
XXXXN High Temperature Superconductor AC Synchronous Propulsion Motor	0.000	1.987	0.000
RDT&E Articles Quantity	0	0	0

Funding for the High Temperature Superconducting AC Synchronous Motor will be used for the continued testing of the high temperature superconducting motor up to full power.

	FY 2007	FY 2008	FY 2009
XXXXN Naval Flywheel Energy Storage System	0.000	0.596	0.000
RDT&E Articles Quantity	0	0	0

Funds for Naval Flywheel Energy Storage System will be used to develop and test a flywheel energy storage system with greater power density and output that is fully adapted to the shipboard environment.

	FY 2007	FY 2008	FY 2009
XXXN DDG-51 Homopolar Hybrid Drive	0.000	5.465	0.000
RDT&E Articles Quantity	0	0	0

Funds for the DDG 51 Homopolar Hybrid Drive will be used to develop, build, and test proof of concept equipment for a hybrid electric drive system. Development of this technology could significantly reduce fuel consumption and increase DDG 51 Class mission effectiveness through longer time on station.

	FY 2007	FY 2008	FY 2009
XXXXN Power Conversion equipment for High Density Power Generation	0.000	0.795	0.000
RDT&E Articles Quantity	0	0	0

Funds for the Power Conversion Equipment for High Density Power will be used to develop proof of concept power conversion equipment for an advanced high density power generation system.

	FY 2007	FY 2008	FY 2009
XXXXN Circuit Breaker for Navy Shipboard Power Distribution Center	0.000	0.596	0.000
RDT&E Articles Quantity	0	0	0

Funding for Circuit Breakers for Navy Shipboard Power Distribution Center, a Congressional add will be used for the development of a militarized version of a commercial off the shelf direct current (DC) circuit breaker rated at 800 amp/650 VDC in shock isolation mounted electrical assemblies for Naval ship low voltage power system applications.

	FY 2007	FY 2008	FY 2009
XXXXN High Temperature Superconductor (HTS) Navy propulsion Motor/DDG1000	0.000	1.987	0.000
RDT&E Articles Quantity	0	0	0

Funding for the High Temperature Superconductor (HTS) Navy propulsion Motor for DDG-1000, a congressional add, will be used for the continued testing of the high temperature superconducting motor up to full power.

	FY 2007	FY 2008	FY 2009

CLASSIFICATION:	UNCLASSIFIED		
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)			DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **9999/CONGRESSIONAL ADDS**	

XXXXN Internet Protocol over Power Line Carrier Tech Integration w/ ICAS	0.000	1.590	0.000
RDT&E Articles Quantity	0	0	0
This add will fund an Internet Protocol over Power Line Carrier Technology Integration with control and monitoring systems would be used to develop a high bandwidth PLC (Power Line Communication) FIPS 140-2 certified IP over power line product, which will serve to enable and support further development and enhancement of the current PLC technology for Navy applications.			
	FY 2007	FY 2008	FY 2009
XXXXN Advanced Navy Boat Lift Research and Development	0.000	0.994	0.000
RDT&E Articles Quantity	0	0	0
This Congressional Add funds Advanced Navy Boat Lift Research and Development efforts.			
	FY 2007	FY 2008	FY 2009
2858C MTTC/IPI and National Surface Treatment Center	3.793	3.180	0.000
RDT&E Articles Quantity	0	0	0
This Congressional add funds the continuous operation of the McConnell Technology and Training Center (MTTC/IPI) and the National Surface Treatment Center. This effort funds projects targeted at resolving fleet maintenance problems/issues through the rapid insertion of new technologies.			
	FY 2007	FY 2008	FY 2009
9518C Carbon Foam Program	2.728	0.000	0.000
RDT&E Articles Quantity	0	0	0
This effort for the Carbon Foam program, a Congressional add, focused on the development of uses for lightweight, strong, fire resistant and thermally insulating carbon foam material aboard Navy ships. The application of this material may provide improved characteristics that will enable a requirement objective or threshold to be exceeded improving performance of a ship and ship class.			
	FY 2007	FY 2008	FY 2009
9521C Intelligent Systems Consortium NAVSEA-Carderock	0.978	0.000	0.000
RDT&E Articles Quantity	0	0	0
This Congressional add continued to fund the Intelligent Systems Consortium NAVSEA Carderock with the U.S. offshore energy industrywhich focused on the development of intelligent shipboard electro-mechanical devices in support of the Navy's all-electric ship concept, reduced manning requirements and future seabasing needs.			
	FY 2007	FY 2008	FY 2009
9524C Shipboard Wireless Maintenance Assistant (SWMA)	0.976	1.192	0.000
RDT&E Articles Quantity	0	0	0
Funding for Shipboard Wireless Maintenance Assistant (SWMA), a Congressional add, develops a wireless maintenance collaboration tool for sailor use while maintaining shipboard systems and equipment.			
	FY 2007	FY 2008	FY 2009

CLASSIFICATION:	UNCLASSIFIED		
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)			DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **9999/CONGRESSIONAL ADDS**	

9807C Smart Machinery Spaces System	2.680	0.000	0.000
RDT&E Articles Quantity	0	0	0
The Smart Machinery Spaces System, a Congressional add focused on the development of a comprehensive, automated □Condition-Based Maintenance (CBM)+□ solution that incorporated Configuration Management (CM), CBM, and Automated Logistics functions.			
	FY 2007	FY 2008	FY 2009
9808C Water Mist Fire Protection Systems	0.984	0.000	0.000
RDT&E Articles Quantity	0	0	0
The Water mist fire protection systems, a Congressional add,tested Navy standard water mist fire protection system to commercial standards, so that the system can be marketed commercially.			
	FY 2007	FY 2008	FY 2009
9972N Advanced Fluid Controls for Shipboard Applications	0.977	2.385	0.000
RDT&E Articles Quantity	0	0	0
The Advanced Fluid Controls for Shipboard Applications, a Congressional add,develops materials, including composites and ceramics, for a variety of fluid control solutions that focuses on providing intelligent control and interface directly with the ship's main computer.			
	FY 2007	FY 2008	FY 2009
9973N Advanced Repair Technology for Expeditionary Navy	0.976	0.795	0.000
RDT&E Articles Quantity	0	0	0
The Advanced Repair Technology for Expeditionary Navy, a Congressional add, focuses on providing innovations in repair technology to the Expeditionary Navy aboard ships at sea and at forward repair sites.			
	FY 2007	FY 2008	FY 2009
9974N Advanced Steam Turbine	0.974	3.974	0.000
RDT&E Articles Quantity	0	0	0
The Advanced Steam Turbine, a Congressional add,develops advanced technologies resulted in a quieter, smaller turbine generator for the US Navy.			
	FY 2007	FY 2008	FY 2009
9975N Air Gun Shock Testing of Naval Vessels	0.976	1.590	0.000
RDT&E Articles Quantity	0	0	0
The Air Gun Shock Testing of Naval Vessels, a Congressional add,develops a low cost, environmentally safe underwater shock testing method employing non-explosive energy sources suitable for shock testing the ship or shock qualifying major shipboard systems.			
	FY 2007	FY 2008	FY 2009
9976N Braided Ropes for US Navy Ship Salvage	0.971	0.000	0.000
RDT&E Articles Quantity	0	0	0

CLASSIFICATION:	UNCLASSIFIED		
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)			DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603513N/SHIPBOARD SYSTEM COMPONENT DEVELOPMEN**	PROJECT NUMBER AND NAME **9999/CONGRESSIONAL ADDS**	

	FY 2007	FY 2008	FY 2009
The Braided Ropes for US Navy Ship Salvage, a Congressional add,developed and tested a stronger, more reliable and more efficient means for lifting, mooring and rigging of ships, barges, and aircraft during salvage search, recovery and towing operations.			
9977N Carrier Strike Group Forward Sensor Network	3.801	0.000	0.000
RDT&E Articles Quantity	0	0	0
The Carrier Strike Group Forward Sensor Network, a Congressional add,developed an integrated, limited area communication and force protection capability for ports and strike group ships within near line of sight utilizing a wireless mesh network comprised of ships and buoys with sensor systems.			
	FY 2007	FY 2008	FY 2009
9979N Fuel Contaminate Detection System	2.438	0.000	0.000
RDT&E Articles Quantity	0	0	0
The Fuel Contaminate Detection system, a Congressional add,developed sensors and detection system thatidentified combustion air and fuel contaminates that can cause premature gas turbine engine failures.			
	FY 2007	FY 2008	FY 2009
9980N High Efficiency Quiet Electric Drive	1.462	1.590	0.000
RDT&E Articles Quantity	0	0	0
High Efficiency Quiet Electric Drive, a Congressional add,develops and demonstrates an advanced propulsion motor drive by utilizing a hybrid power electronics approach.			
	FY 2007	FY 2008	FY 2009
9981N Integrated Power System Converter	0.974	0.795	0.000
RDT&E Articles Quantity	0	0	0
Integrated Power System Converter, a Congressional add, develops integrated power system propulsion motor drive power electronics technologies for future surface combatants that allow for rapid response to electrical system load demands.			
	FY 2007	FY 2008	FY 2009
9982N Propulsor Manufacturing Technology Development	4.138	2.385	0.000
RDT&E Articles Quantity	0	0	0
Propulsor Manufacturing Technology Development, a Congressional add,develops coatings for propellers to improve erosion resistance, fouling resistance and efficiency characteristics.			
	FY 2007	FY 2008	FY 2009
9983N Smart Valve	1.123	2.385	0.000
RDT&E Articles Quantity	0	0	0
Smart Valve, a Congressional add,develops linear electromechanical actuator technology to help eliminate high pressure hydraulic and pneumatic systems in a shipboard environment.			