Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*				R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	246.258	274.371	227.358	-	227.358	355.366	408.441	316.542	313.842	Continuing	Continuing
3186: *Air and Missile Defense Radar*	164.870	228.436	166.568	-	166.568	317.229	384.295	290.907	287.832	Continuing	Continuing
3187: *Periscope Detection*	6.942	3.374	14.509	-	14.509	1.733	-	-	-	0.000	26.558
3188: *Dual-Band Radar*	5.465	5.419	10.291	-	10.291	7.111	7.088	5.371	5.413	Continuing	Continuing
3232: *Multi-Mission Signal Processor*	52.649	32.607	32.361	-	32.361	25.778	14.989	19.324	19.638	Continuing	Continuing
3301: *Improved Capabilities SPY-1 Radar*	-	4.535	3.629	-	3.629	3.515	2.069	0.940	0.959	Continuing	Continuing
9999: *Congressional Adds*	16.332	-	-	-	-	-	-	-	-	0.000	16.332

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): The AMDR suite is being developed to fulfill Integrated Air and Missile Defense requirements for multiple ship classes. This suite consists of an S-Band radar (AMDR-S), an X-band radar (AMDR-X) and a Radar Suite Controller (RSC). AMDR will provide multi-mission capabilities, simultaneously supporting both long range, exoatmospheric detection, tracking and discrimination of ballistic missiles, as well as Area and Self Defense against air and surface threats. For the Ballistic Missile Defense capability, increased radar sensitivity and bandwidth over current radar systems are needed to detect, track and support engagements of advanced ballistic missile threats at the
required ranges, concurrent with Area and Self Defense against Air and Surface threats. For the Area Air Defense and Self Defense capability, increased sensitivity and clutter capability is needed to detect, react to, and engage stressing Very Low Observable/Very Low Flyer (VLO/VLF) threats in the presence of heavy land, sea, and rain clutter. This effort provides for the development of an active phased array radar with the required capabilities to address the evolving threat. The AMDR suite will obtain performance and technology enhancements throughout its service life based upon an approach that includes modularity of hardware and software, a scalable design and Open Architecture (OA) compliance.

Periscope Detection: The CVN Periscope Detection Radar program develops and delivers the capability which provides automatic detection and discrimination of submarine periscopes using advanced using advanced algorithms enabling discrimination of periscopes from surface contacts, buoys, small boats, floating mines, etc. This effort was initially based on an advanced development model, developed in the PE 0603553N, Surface Antisubmarine Warfare. System Engineering efforts under RDT&E funding will convert the Advanced Demonstration Model (ADM) variant previously developed and being installed to a production representative model that addresses manufacturability, supportability and reliability aspects as well as full system certification. In addition, funding will develop the Periscope Detection and Descrimination (PDD) Interface for AN/SPQ-9B Radar.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*

Dual-Band Radar (DBR) Upgrades: Funding is for Dual Band Radar (DBR) System upgrades to implement cost savings initiatives for Volume Search Radar (VSR) modifications, supportability analysis and associated logistics product updates; future upgrades/technology insertion efforts for Multi-Function Radar (MFR)/VSR as a part of the DBR suite on CVN 78 Class ships and the MFR on DDG 1000 Class ships. Funding is also required to resolve the hardware and software issues discovered during the various test events to include: DTB2-411, SDTS testing, Land Based Testing and pertinent At-Sea test events. The upgrades will include all aspects of the radar system/subsystems, including hardware and software. Specific subsystem areas include the Array, Transmit/Receive (T/R) module, Receiver/Exciter, Signal Data Processor, Radome, and power/cooling systems. Upgrades and technology insertions are required to maintain the level of force protection needed for ship defense against all threats envisioned in the littoral environment. The supportability analysis and logistic products associated with these upgrades will also be developed and updated.

DBR interface with Battle Force Tactical Trainer (BFTT): FY12-14 supports the design, development, and testing of an interface between the DBR and BFTT (AN/USQ-46) system that will provide training to enhance combat readiness for the CVN 78 crew. The DBR/BFTT interface development project initiates with the FY12 contract award and continues with validation testing in FY14.

Multi-Mission Signal Processor (MMSP): The development of Multi-Mission Signal Processor (MMSP) provides Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) Multi-mission capability for DDG 51-78 and CG 65 - 73 as part of Aegis Modernization Program. This capability will be utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1B(V)/D Transmitter to enable dual beam for reduced frame times and better reaction time, and provides stability for all D(V) waveforms and avoid operational degradation. The SPY-1 radar system detects, tracks and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter environments, and in electronic attack (EA), and chaff environments and provides greater commonality in computer programs and equipment.

Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements are intended to reduce cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions; while still providing AN/SPY-1 Radar Total Ownership Cost Reductions. Improvements will yield reductions in annual fleet maintenance costs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	251.251	274.371	171.766	-	171.766
Current President's Budget	246.258	274.371	227.358	-	227.358
Total Adjustments	-4.993	-	55.592	-	55.592
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	3.713	-			
• SBIR/STTR Transfer	-8.182	-			
• Program Adjustments	-	-	57.116	-	57.116
• Section 219 Reprogramming	-0.448	-	-	-	-
• Rate/Misc Adjustments	-	-	-1.524	-	-1.524
• Congressional General Reductions Adjustments	-0.076	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Project: 9999: *Congressional Adds*		
Congressional Add: *Common Digital Sensor Architecture*	2.390	-
Congressional Add: *Submarine Navigation Decision Aids*	3.983	-
Congressional Add: *Advanced Sensor Development*	9.959	-
Congressional Add Subtotals for Project: 9999	16.332	-
Congressional Add Totals for all Projects	16.332	-

Change Summary Explanation

Technical: Not Applicable

Schedule: PB11 budget supported a Technology Development (TD) phase beyond 24 months and resulted in a delay to the Engineering and Manufacturing Development (EMD) phase. The budget supports a 24 month TD phase, EMD start in FY13, and allows the program to meet an FY19 In-Yard Need date.

Cost:$12.6M in FY10 was realigned from AMDR (3186) to MMSP (3232) for MMSP Development.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3186: *Air and Missile Defense Radar*	164.870	228.436	166.568	-	166.568	317.229	384.295	290.907	287.832	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): The AMDR suite is being developed to fulfill Integrated Air and Missile Defense requirements for multiple ship classes. This suite consists of an S-Band radar (AMDR-S), an X-band radar (AMDR-X) and a Radar Suite Controller (RSC). AMDR will provide multi-mission capabilities, simultaneously supporting both long range, exoatmospheric detection, tracking and discrimination of ballistic missiles, as well as Area and Self Defense against air and surface threats. For the Ballistic Missile Defense (BMD) capability, increased radar sensitivity and bandwidth over current radar systems are needed to detect, track and support engagements of advanced ballistic missile threats at the required ranges, concurrent with Area and Self Defense against Air and Surface threats. For the Area Air Defense and Self Defense capability, increased sensitivity and clutter capability is needed to detect, react to, and engage stressing Very Low Observable /Very Low Flyer (VLO/VLF) threats in the presence of heavy land, sea, and rain clutter. This effort provides for the development of an active phased array radar with the required capabilities to address the evolving threat. The AMDR suite will obtain performance and technology enhancements throughout its service life based upon an approach that includes modularity of hardware and software, a scalable design and Open Architecture (OA) compliance.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: R&D/RISK REDUCTION	17.726	12.280	4.209
Articles:	0	0	0
FY 2010 Accomplishments: - Technology Risk Reduction of Digital Array Radar (DAR) / digital beamforming, array architectures, Transmit/Receive (T/R) modules, thermal management, and Radio Frequency (RF) semiconductors - Critical component and subsystem demonstrations, integration and testing - Conducted related international cooperative research projects, including Advanced Radar Technology Integrated System Testbed (ARTIST) (U.K.), Australian U.S. Phased Array Radar (AUSPAR) (Australia), and Open Architecture Radar Interface Standard (OARIS) (Maritime Theater Missile Defense Forum)			
FY 2011 Plans: - Technology Risk Reduction of Digital Array Radar (DAR) / digital beamforming, array architectures, Transmit/Receive (T/R) modules, thermal management, and Radio Frequency (RF) semiconductors - Critical component and subsystem demonstrations, integration and testing			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
- Continue and complete related international cooperative research projects, including ARTIST (U.K.), AUSPAR (Australia), and OARIS (Maritime Theater Missile Defense Forum) ***FY 2012 Plans:*** - Gallium Nitride (GaN) High Power Amplifier (HPA) performance, reliability, and producibility improvement. - Technology Risk Reduction of Digital Array Radar (DAR) / digital beamforming, array architectures, Transmit/Receive (T/R) modules, thermal management, and Radio Frequency (RF) semiconductors - Critical component and subsystem demonstrations, integration and testing			
Title: SYSTEMS ENGINEERING	143.541	208.991	157.926
Articles:	0	0	0
FY 2010 Accomplishments: - Participate in the development of threat definitions, performance requirements and radar specifications; perform radar systems performance analysis - Complete system requirements; resolve combat system and ship interfaces - Initiate government/industry interaction through a series of In-Process Reviews to assess system concepts and develop a technology demonstration plan - Complete Systems Engineering Plan and Test and Evaluation Strategy for Milestone 'A' - Conduct AMDR competition and award Technology Development (TD) contracts - Initiate TD phase focused on demonstrating AMDR key technologies are scalable and sufficiently mature - Initiate documentation for AMDR-S/RSC and AMDR-X EMD contract awards ***FY 2011 Plans:*** - Continue TD phase focused on demonstrating AMDR key technologies are scalable and sufficiently mature - Complete the Technology Demonstration Plan - Review preliminary system concept and prototype design - Mature the AMDR suite system concept to a level sufficient to support a Preliminary Design Review (PDR) - Initiate development of Test and Evaluation Master Plan - Review system requirements and combat system/ship interfaces - Update Systems Engineering Plan - Continue documentation development for AMDR-S/RSC and AMDR-X EMD contract awards - Issue RFP and conduct competition for AMDR-X engineering studies contract ***FY 2012 Plans:*** - Conduct Preliminary Design Reviews with each TD contractor			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
- Conduct the technology development component and prototype testing - Analyze and review prototype test results - Conduct Technology Readiness Level assessments - Award AMDR-X Engineering Studies contract - Complete Technology Development Phase contracts			
Title: PROGRAM MANAGEMENT SUPPORT	3.603	7.165	4.433
Articles:	0	0	0
FY 2010 Accomplishments: - In-house, field activity, and contractor support of Integrated Product Teams (IPTs) and Cross Product Teams (CPTs) required for program execution milestones and achievement of Milestone 'A' - Cost, schedule and performance management, contract administration and oversight, risk identification and mitigation - Analyze and assess contractor studies - Review available/proposed technical alternatives			
FY 2011 Plans: - In-house, field activity, and contractor support of Integrated Product Teams (IPTs) and Cross Product Teams (CPTs) required for program execution and achievement of Milestone 'B' in FY13 - Cost, schedule and performance management, contract administration and oversight, risk identification and mitigation - Analyze and assess contractor studies - Review available/proposed technical alternatives			
FY 2012 Plans: - In-house, field activity, and contractor support of Integrated Product Teams (IPTs) and Cross Product Teams (CPTs) required for program execution and achievement of Milestone 'B' in FY13 - Cost, schedule and performance management, contract administration and oversight, risk identification and mitigation - Analyze and assess contractor studies - Review available/proposed technical alternatives			
Accomplishments/Planned Programs Subtotals	164.870	228.436	166.568

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

AMDR: Plans for the Air and Missile Defense Radar are to leverage research and development investments, integrate sufficiently matured fundamental advanced technologies from technology risk reduction efforts, and incorporate Open Architecture approaches to develop a scalable radar design with major improvements in power, sensitivity, resistance to natural and man-made environments over current radar systems for simultaneous multi-mission (BMD), Area and Self Defense Anti-Air Warfare (AAW). System design will be accomplished by employing proven technologies and commercial standards to lower schedule risk and develop a product with the lowest life-cycle cost.

Program scope consists of the following phases: a Concept Studies phase; a Technology Development phase which includes competitive prototyping; an EMD phase which includes completion of a full Engineering Development Model (EDM) for land-based testing; and transition to production. This scope is defined in the approved acquisition strategy contained in the Technology Development Strategy (TDS) for the AMDR suite system concept.

E. Performance Metrics

- Successfully complete Defense Acquisition Board (DAB) Review
- Successfully complete AMDR Concept Studies
- Successfully achieve Milestone A
- Successfully complete Technology Development (TD) phase Test Readiness Review, TD Prototype testing, TD System Functional Review, and TD Preliminary Design Review

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Risk Reduction	WR	SCSC Wallops:Wallops Island, VA	9.638	1.067	Mar 2011	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	MIPR	DMEA:McClellen AFB, CA	48.022	-	Mar 2011	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	SS/CPFF	JHU/APL:Baltimore, MD	7.745	2.746	Dec 2010	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	MIPR	MIT:Cambridge, MA	1.771	0.746	Mar 2011	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	WR	NRL:Washington, DC	5.802	1.555	Mar 2011	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	C/CPAF	BAE Systems:Rockville, MD	1.980	-		-		-		-	0.000	1.980	
Systems Engineering	WR	NAVFAC MID-ATLANTIC:Pearl Harbor, HI	4.026	-		-		-		-	0.000	4.026	
Risk Reduction	C/CPFF	SPA-PSS:Alexandria, VA	1.237	2.317	Dec 2010	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	WR	NSWC/DD:Dahlgren, VA	3.993	3.274	Dec 2010	-		-		-	Continuing	Continuing	Continuing
Risk Reduction	MIPR	DARPA:Adelphi, MD	4.500	0.575	Mar 2011	4.209	Dec 2011	-		4.209	Continuing	Continuing	Continuing
Systems Engineering	SS/CPFF	GTRI:Atlanta, GA	3.198	2.166	Mar 2011	1.526	Dec 2011	-		1.526	Continuing	Continuing	Continuing
Systems Engineering	SS/FFP	BAE Systems:Rockville, MD	9.536	-		-		-		-	0.000	9.536	
Systems Engineering	Various	VARIOUS-SPECIAL:Special	3.078	-		-		-		-	0.000	3.078	
Systems Engineering	WR	NSWC/DD:Dahlgren, VA	31.497	22.045	Dec 2010	20.269	Dec 2011	-		20.269	Continuing	Continuing	Continuing
Systems Engineering	WR	PMRF:Kekaha, HI	0.774	0.676	Mar 2011	1.344	Dec 2011	-		1.344	Continuing	Continuing	Continuing
Systems Engineering	SS/CPFF	JHU/APL:Baltimore, MD	30.774	21.359	Dec 2010	17.022	Dec 2011	-		17.022	Continuing	Continuing	Continuing
Systems Engineering	MIPR	MIT:Cambridge, MA	8.378	5.641	Mar 2011	3.865	Dec 2011	-		3.865	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC/PHD:Port Hueneme, CA	3.683	3.053	Dec 2010	4.549	Dec 2011	-		4.549	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC/CR:Crane, IN	1.407	1.016	Dec 2010	1.246	Dec 2011	-		1.246	Continuing	Continuing	Continuing
Systems Engineering	WR	NRL:Washington, DC	2.679	1.166	Mar 2011	2.024	Dec 2011	-		2.024	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/FPIF	TBD-Tech. Development Phase:TBD	-	-		83.156	Dec 2011	-		83.156	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	SPA-PSS:Alexandria, VA	3.334	8.540	Dec 2010	7.661	Dec 2011	-		7.661	Continuing	Continuing	Continuing
Systems Engineering	WR	COMPTEVFOR:Norfolk, VA	0.001	0.433	Mar 2011	0.447	Dec 2011	-		0.447	Continuing	Continuing	Continuing
Systems Engineering	C/FFP	CS-Northrop Grumman:Linthicum Heights, MD	10.000	-		-		-		-	0.000	10.000	
Systems Engineering	C/FFP	CS-Lockheed Martin:Moorestown, NJ	10.000	-		-		-		-	0.000	10.000	
Systems Engineering	C/FFP	CS-Raytheon:Sudbury, MA	9.909	-		-		-		-	0.000	9.909	
Systems Engineering	WR	NSWC/PHD (VAB):Virginia Beach, VA	0.124	0.424	Dec 2010	0.363	Nov 2011	-		0.363	0.000	0.911	
Systems Engineering	C/FP	Program Office System Engineering Staff:Washington, DC	0.725	1.100	Mar 2011	0.941	Dec 2011	-		0.941	0.000	2.766	
Systems Engineering	C/FP	TBD-Engineering Studies:TBD	-	-		5.200	Feb 2012	-		5.200	0.000	5.200	
Systems Engineering	SS/CPFF	INTEGRITS (via KRATOS):San Diego, CA	0.055	-		0.122	Dec 2011	-		0.122	0.000	0.177	
Systems Engineering	WR	NAWC AD:Patuxent River, MD	0.005	0.483	Mar 2011	7.997	Dec 2011	-		7.997	0.000	8.485	
Systems Engineering	WR	SCSC Wallops:Wallops Island, VA	0.037	-	Mar 2011	0.125	Dec 2011	-		0.125	0.000	0.162	
Systems Engineering	WR	SPAWAR:San Diego, CA	0.028	-		0.069	Dec 2011	-		0.069	0.000	0.097	
Systems Engineering	C/FPIF	TD Contractor Raytheon:Sudbury, MA	38.431	46.963	Mar 2011	-		-		-	0.000	85.394	

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3186: *Air and Missile Defense Radar*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/FPIF	TD Contractor Northrop Grumman:Linthicum Heights, MD	38.431	46.963	Mar 2011	-		-		-	0.000	85.394	
Systems Engineering	C/FPIF	TD Contractor Lockheed Martin:Moorestown, NJ	38.431	46.963	Mar 2011	-		-		-	0.000	85.394	
		Subtotal	333.229	221.271		162.135		-		162.135			

Remarks

Engineering Studies and Engineering & Manufacturing Development Phase procurements are in a competitive status and contracts have not yet been awarded.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Management Services	SS/FFP	BAE Systems:Rockville, MD	5.319	-		-		-		-	0.000	5.319	
Support Management Services	C/CPFF	SPA-PSS:Alexandria, VA	3.232	5.974	Dec 2010	3.414	Dec 2011	-		3.414	Continuing	Continuing	Continuing
Travel	Allot	PEOIWS2:Washington, DC	0.311	0.333	Mar 2011	0.285	Nov 2011	-		0.285	Continuing	Continuing	Continuing
DAWDF	Various	N/A:N/A	0.513	-		-		-		-	0.000	0.513	
Support Management Services	WR	NSWC/PHD:Port Hueneme, CA	0.260	0.858	Dec 2010	0.734	Nov 2011	-		0.734	0.000	1.852	
		Subtotal	9.635	7.165		4.433		-		4.433			

	Total Prior Years Cost	FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	342.864	228.436		166.568		-		166.568			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3186: *Air and Missile Defense Radar*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3186: *Air and Missile Defense Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3186				
Concept Studies (CS)	1	2010	1	2010
Milestone A (MS A)	4	2010	4	2010
Technology Development (TD)	4	2010	4	2012
System Readiness Review (SRR)	3	2011	3	2011
TD Test Readiness Review (TRR)	4	2011	4	2011
TD Prototype Testing	4	2011	3	2012
TD System Functional Review (SFR)	1	2012	1	2012
TD Preliminary Design Review (PDR)	3	2012	3	2012
Engineering Studies	2	2012	2	2013
Milestone B (MS B)	1	2013	1	2013
Engineering & Manufacturing Development (EMD)	1	2013	4	2016
EMD HW Delta PDR	2	2013	2	2013
EMD SW / System Delta PDR	3	2013	3	2013
EMD HW Critical Design Review (CDR)	2	2014	2	2014
EMD SW / System Critical Design Review (CDR)	3	2014	3	2014
EMD Testing	2	2014	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3187: *Periscope Detection*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3187: *Periscope Detection*	6.942	3.374	14.509	-	14.509	1.733	-	-	-	0.000	26.558
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Periscope Detection: The CVN Periscope Detection Radar program develops and delivers the capability which provides automatic detection and discrimination of submarine periscopes using advanced using advanced algorithms enabling discrimination of periscopes from surface contacts, buoys, small boats, floating mines, etc. This effort was initially based on an advanced development model, developed in PE 0603553N, Surface Antisubmarine Warfare. System Engineering efforts under RDT&E funding will convert the Advanced Demonstration Model (ADM) variant previously developed and being installed to a production representative model that addresses manufacturability, supportability and reliability aspects as well as full system certification. In addition, funding will develop the Periscope Detection and Discrimination (PDD) Interface for AN/SPQ-9B Radar.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: Periscope Detection	6.942	3.374	14.509
Articles:	0	0	0
FY 2010 Accomplishments: FY 2010 Accomplishments: Installed ADM on platforms. Developed system requirements for SPS-74(V)2.			
FY 2011 Plans: FY 2011 Plans: Continue design and development of AN/SPS-74(V)2 and conduct Critical Design Review (CDR). Perform AN/SPS-74(V)2 Environmental Qualification Testing and below deck shock testing.			
FY 2012 Plans: FY 2012 Base Plans: Conduct First Article Test; Install Land Based Test Site (LBTS) System; Perform Software Verification; Conduct Factory Acceptance Test on First Article System; Conduct planning and preparation for Developmental Testing/Operational Testing (DT/OT); and Develop AN/SPQ-9B Radar PDD Interface.			
Accomplishments/Planned Programs Subtotals	6.942	3.374	14.509

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3187: *Periscope Detection*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• PE/LI: *0204228N/2040 Radar Support (OPN)*	9.927	12.027	18.818	0.000	18.818	13.255	15.873	6.122	4.457	Continuing	Continuing

D. Acquisition Strategy

Current Program supports 11 total units - 10 for installation onboard CVNs (includes upgrade of 4 Advanced Demonstration Models (ADMs) from (V)1 to (V)2 configuration) and 1 LBTS.

E. Performance Metrics

- Successfully complete TECHEVAL/OPEVAL
- Successfully complete AN/SPQ-9B PDD Interface Development

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3187: *Periscope Detection*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering	SS/CPFF	NGC:Melville, NY	14.950	2.744	Mar 2011	13.924	Dec 2011	-		13.924	0.000	31.618	
System Installation	SS/CPFF	3 Phoenix:Fairfax, VA	13.352	-		-		-		-	0.000	13.352	
		Subtotal	28.302	2.744		13.924		-		13.924	0.000	44.970	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	WR	NSWC/ Dahlgren:Dahlgren, VA	-	0.250	Mar 2011	-		-		-	0.000	0.250	
Test and Evaluation	WR	NSWC PHD:Port Hueneme, CA	0.690	0.380	Mar 2011	0.310	Dec 2011	-		0.310	0.000	1.380	
Test and Evaluation	WR	OPTEVFOR:Norfolk, VA	0.200	-	Mar 2011	0.275	Dec 2011	-		0.275	0.000	0.475	
		Subtotal	0.890	0.630		0.585		-		0.585	0.000	2.105	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DAWDF	Allot	N/A:N/A	0.036	-		-		-		-	0.000	0.036	
		Subtotal	0.036	-		-		-		-	0.000	0.036	

	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	29.228	3.374		14.509		-		14.509	0.000	47.111	

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3187: *Periscope Detection*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3187: *Periscope Detection*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3187				
Advanced Demonstration Model (ADM)	1	2010	4	2010
Production	1	2010	3	2016
Software Support	1	2010	4	2016
AN/SPS-74(V)2 CDR	2	2011	2	2011
AN/SPS-74(V)2 LBTS Installation	1	2013	1	2013
TECHEVAL/OPEVAL on CVN 73	2	2013	4	2013
PDD Interface Development for SPQ-9B	4	2011	4	2012

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3188: *Dual-Band Radar*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3188: *Dual-Band Radar*	5.465	5.419	10.291	-	10.291	7.111	7.088	5.371	5.413	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Dual-Band Radar (DBR) Upgrades: Funding is for Dual Band Radar (DBR) System upgrades to implement cost savings initiatives for Volume Search Radar (VSR) modifications, supportability analysis and associated logistics product updates; future upgrades/technology insertion efforts for Multi-Function Radar (MFR)/VSR as a part of the DBR suite on CVN 78 Class ships and the MFR on DDG 1000 Class ships. Funding is also required to resolve the hardware and software issues discovered during the various test events to include: DTB2-411, SDTS testing, Land Based Testing and pertinent At-Sea test events. The upgrades will include all aspects of the radar system/subsystems, including hardware and software. Specific subsystem areas include the Array, Transmit/Receive (T/R) module, Receiver/Exciter, Signal Data Processor, Radome, and power/cooling systems. Upgrades and technology insertions are required to maintain the level of force protection needed for ship defense against all threats envisioned in the littoral environment. The supportability analysis and logistic products associated with these upgrades will also be developed and updated.

DBR interface with Battle Force Tactical Trainer (BFTT): FY12-14 supports the design, development, and testing of an interface between the DBR and BFTT (AN/USQ-46) system that will provide training to enhance combat readiness for the CVN 78 crew. The DBR/BFTT interface development project initiates with the FY12 contract award and continues with validation testing in FY14.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: RADAR UPGRADES TECHNOLOGY INSERTION	-	1.500	5.870
Articles:		0	0
FY 2011 Plans: - Continue technology insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products			
FY 2012 Plans: - Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products - Commence software development to implement live over simulation training capability in support of BFTT integration			
Title: RADAR UPGRADES GOVERNMENT ENGINEERING SERVICES	5.265	3.719	3.771
Articles:	0	0	0
FY 2010 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3188: *Dual-Band Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
- Provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Perform oversight and assessment of efforts associated with this phase of the program. ***FY 2011 Plans:*** - Provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Perform oversight and assessment of efforts associated with this phase of the program. ***FY 2012 Plans:*** - Provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Perform oversight and assessment of efforts associated with this phase of the program. - Provide Government Engineering Services to support DBR BFTT integration for CVN 78.			
Title: RADAR UPGRADES PROGRAM MANAGEMENT	0.200	0.200	0.650
Articles:	0	0	0
FY 2010 Accomplishments: - Provide Program Management and logistics support for radar upgrades and technology insertion ***FY 2011 Plans:*** - Provide Program Management and logistics support for radar upgrades and technology insertion ***FY 2012 Plans:*** - Provide Program Management and logistics support for radar upgrades and technology insertion - Provide Program Management and logistics Support for DBR BFTT integration for CVN 78			
Accomplishments/Planned Programs Subtotals	5.465	5.419	10.291

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Radar Upgrades and logistic products will be developed to address lessons learned and technology refresh for DBR systems on multiple ship classes.

E. Performance Metrics

- Successfully complete upgrade studies and analyses
- Successfully complete upgrade technology insertion
- Successfully complete development of logistic products
- Implement supportability analysis to improve supportability and reduce overall lifecycle cost.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3188: *Dual-Band Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	Other Government Activities:Not Specified	1.143	-		-		-		-	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/ Dahlgren:Dahlgren, VA	1.780	1.000	Jan 2011	1.248	Dec 2011	-		1.248	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/PHD:Port Hueneme, CA	1.645	0.703	Dec 2010	1.050	Dec 2011	-		1.050	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/Crane:Crane, IN	3.725	0.435	Mar 2011	0.300	Dec 2011	-		0.300	Continuing	Continuing	Continuing
Government Engineering Support	WR	NRL:Washington, DC	3.725	0.050	Mar 2011	0.050	Dec 2011	-		0.050	Continuing	Continuing	Continuing
Government Engineering Support	SS/CPFF	JHU/APL:Baltimore, MD	0.240	0.132	Mar 2011	0.175	Dec 2011	-		0.175	Continuing	Continuing	Continuing
Government Engineering Support	MIPR	NSMA:Arlington, VA	0.900	0.100	Mar 2011	0.100	Feb 2012	-		0.100	Continuing	Continuing	Continuing
Government Engineering Support	SS/CPFF	GTRI:Atlanta, GA	0.150	0.160	Mar 2011	0.100	Feb 2012	-		0.100	Continuing	Continuing	Continuing
Government Engineering Support	SS/CPFF	TSC:Silver Spring, MD	-	0.100	Mar 2011	-		-		-	0.000	0.100	
Government Engineering Support	WR	ONR:Washington, DC	-	0.989	Mar 2011	0.698	Dec 2011	-		0.698	0.000	1.687	
Systems Engineering	SS/CPFF	Raytheon:Raytheon, Sudbury, MA	9.140	1.500	Dec 2010	5.870	Dec 2011	-		5.870	Continuing	Continuing	Continuing
		Subtotal	22.448	5.169		9.591		-		9.591			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various:Various	0.400	0.200	Dec 2010	0.650	Dec 2011	-		0.650	Continuing	Continuing	Continuing
DAWDF	Allot	N/A:N/A	0.027	-		-		-		-	0.000	0.027	

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3188: *Dual-Band Radar*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2:Washington, DC	-	0.050	Mar 2011	0.050	Dec 2011	-		0.050	0.000	0.100	
		Subtotal	0.427	0.250		0.700		-		0.700			

	Total Prior Years Cost	FY 2011		FY 2012 Base		FY 2012 OCO		FY 2012 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	22.875	5.419		10.291		-		10.291			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3188: *Dual-Band Radar*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3188: *Dual-Band Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3188				
DBR System Upgrade Studies and Analysis	1	2010	3	2016
DBR System Upgrade Technology Insertion	3	2010	4	2016
DBR BFTT Integration for CVN 78	1	2012	4	2014

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3232: *Multi-Mission Signal Processor*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3232: *Multi-Mission Signal Processor*	52.649	32.607	32.361	-	32.361	25.778	14.989	19.324	19.638	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Multi-Mission Signal Processor (MMSP): The development of Multi-Mission Signal Processor (MMSP) provides Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) Multi-mission capability for DDG 51-78 and CG 65 - 73 as part of AEGIS Modernization Program. This capability will be utilized for DDG 113 and follow new construction and AEGIS Ashore. Modifies SPY-1B(V)/D Transmitter to enable dual beam for reduced frame times and better reaction time, and provides stability for all D(V) waveforms and avoid operational degradation. The SPY-1 radar system detects, tracks and supports engagements of a broader range of threats. MMSP improves performance in littoral, ducted clutter environments, and in electronic attack (EA), and chaff environments and provides greater commonality in computer programs and equipment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: SYSTEMS ENGINEERING	52.649	32.607	32.361
Articles:	0	0	0
FY 2010 Accomplishments: - Completed Production Readiness Review in 3rd Quarter of FY10 - Completed first live BMD Narrow Band Track event May 2010 - Finalized requirements definition and alignment with the Ballistic Missile Defense Program for incorporation of the BMD capability - Supported Initial Capability Demonstration at Combat System Engineering Development Site (CSEDS) - MMSP installed and online in Oct 2009 with first live AAW Track in Dec 2009 - Maintained alignment with the Ballistic Missile Defense program and the associated Ballistic Missile Defense Signal Processor (BSP) Adjunct to incorporate BMD capability within MMSP during AEGIS Modernization.			
FY 2011 Plans: - Major focus of FY 11 will be preparation for and completion of an AAW Performance Demo Event - Continue MMSP Design and development - Support MMSP integration testing with ACB-12 to address all MMSP related issues - Complete transmitter modification development - Maintain alignment with the Ballistic Missile Defense Program and the associated Ballistic Missile Defense Signal Processor (BSP) Adjunct to incorporate BMD capability within MMSP during AEGIS Modernization			

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3232: *Multi-Mission Signal Processor*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
- Initiate cruiser variant engineering and design ***FY 2012 Plans:*** - Major focus of FY 2012 will be preparation for the Multi-Mission Exercise and Qualification Testing - MMSP Design and development for cruiser variant			
Accomplishments/Planned Programs Subtotals	52.649	32.607	32.361

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• PE/LI: *BLI 2980/OPN Items Less Than $5M*	29.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.600

D. Acquisition Strategy

Multi-Mission Signal Processor (MMSP) provides AAW/BMD Multi-mission capability for AEGIS Modernization Program and leverages BMD 4.0.1 and SPY-1D(V) designs. This MMSP development efforts support integration of BMD 5.0 signal processing, and will lead to the OPN procurement for shore sites and shipsets.

E. Performance Metrics

- Complete MMSP CSEDS AEGIS Light Off (ALO)
- Complete MMSP Production Readiness Review (PRR)
- Complete DDG In-Process Review (IPR) #4
- Complete DDG In-Process Review (IPR) #5
- Complete SPY-1D(V) Performance Demo
- Complete CG System Readiness Review (SRR)
- Complete CG ACB 12 IPR #1
- Complete Multi-Mission Exercise
- Complete Qualification Testing
- Complete CG IPR #2
- Complete CG IPR #3
- Complete DDG Combat System Ship Qualification Trials (CSSQT)
- Complete CG Demo
- Complete CG ALO
- Complete CG CSSQT
- Complete CG Final Certification

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3232: *Multi-Mission Signal Processor*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin:Moorestown, NJ	46.798	27.858	Feb 2011	27.982	Dec 2011	-		27.982	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	AEGIS Techrep:Moorestown, NJ	0.919	0.989	Mar 2011	0.853	Dec 2011	-		0.853	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU:Laurel, MD	0.849	0.756	Mar 2011	0.626	Dec 2011	-		0.626	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	CSCS:Dahlgren, VA	0.391	0.166	Mar 2011	0.159	Dec 2011	-		0.159	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NRL:Washingotn, DC	0.648	0.520	Mar 2011	0.446	Dec 2011	-		0.446	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/DD:Dahlgren, VA	0.944	0.888	Mar 2011	0.830	Dec 2011	-		0.830	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/CR:Crane, IN	0.696	0.457	Mar 2011	0.452	Dec 2011	-		0.452	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD:Port Hueneme, CA	0.794	0.635	Mar 2011	0.586	Dec 2011	-		0.586	Continuing	Continuing	Continuing
		Subtotal	52.039	32.269		31.934		-		31.934			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2:Washington, DC	0.060	0.040	Mar 2011	0.060	Dec 2011	-		0.060	Continuing	Continuing	Continuing
PSS	C/CPFF	SPA-PSS:Washington, DC	0.550	0.298	Mar 2011	0.367	Dec 2011	-		0.367	Continuing	Continuing	Continuing
		Subtotal	0.610	0.338		0.427		-		0.427			

	Total Prior Years Cost	FY 2011 Cost	FY 2011	FY 2012 Base Cost	FY 2012 Base	FY 2012 OCO Cost	FY 2012 OCO	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.649	32.607		32.361		-		32.361			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3232: *Multi-Mission Signal Processor*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3232: *Multi-Mission Signal Processor*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3232				
MMSP CSEDS AEGIS Light Off (ALO)	1	2010	1	2010
MMSP Production Readiness Review (PRR)	2	2010	2	2010
DDG ACB12 Interim Progress Review (IPR) #4	3	2010	3	2010
DDG ACB12 IPR #5	1	2011	1	2011
CG ACB 12 IPR #1	1	2012	2	2012
SPY-1D(V) Performance Demo	2	2011	2	2011
CG System Readines Review (SRR)	2	2011	2	2011
CG System Functional Review (SFR)	3	2011	3	2011
Multi-Mission (MM) Exercise	1	2012	1	2012
Qualification Testing	2	2012	2	2012
DDG Delivery	2	2012	2	2012
CG ACB 12 IPR #2	1	2013	1	2013
CG ACB 12 IPR #3	3	2013	3	2013
DDG CSSQT	4	2013	4	2013
CG ACB 12 Demo	2	2014	2	2014
CG Delivery	2	2014	2	2014
CG 65 ALO	3	2014	3	2014
DDG COTS Refresh (ECPs)	1	2014	4	2016
CG Combat System Ship Qualification Trials (CSSQT)	1	2016	1	2016
CG Final Certification	2	2016	2	2016
CG COTS Refresh (ECPs)	3	2016	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3301: *Improved Capabilities SPY-1 Radar*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3301: *Improved Capabilities SPY-1 Radar*	-	4.535	3.629	-	3.629	3.515	2.069	0.940	0.959	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Improved Capabilities for SPY-1 Radar: These Reliability, Maintainability, and Availability (RM&A) improvements are intended to reduce cascading failures, mitigate obsolescence issues, and improve reliability in support of Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) missions; while still providing AN/SPY-1 Radar Total Ownership Cost Reductions. Improvements will yield reductions in annual fleet maintenance costs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: Improved Capabilities SPY-1 Radar	-	4.535	3.629
Articles:		0	0
FY 2011 Plans: - Initial Requirements development and design of 10KW Traveling Wave Tube (TWT) and Continuous Wave Illuminator (CWI) Microwave Tubes - Initial Design and development of sidewall capacitor monitoring circuit for Transmitter High Voltage Power Supply - Initial Design and development and environmental testing for 10kW TWT - Improvements to design of Cathode for MK 99 CWI TWT			
FY 2012 Plans: - Continue Design and Development of Sidewall Capacitor monitoring circuit for HVPS - Continue Design, Development, Environmental Testing for 10kW TWT - Initiate design improvements to filament for Switch Tube			
Accomplishments/Planned Programs Subtotals	-	4.535	3.629

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3301: *Improved Capabilities SPY-1 Radar*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• PE/LI: *BLI 2980/OPN Surface Warfare*	0.000	0.000	0.000	0.000	0.000	0.200	0.700	1.500	1.500	6.100	10.000

D. Acquisition Strategy

Improved Capabilities SPY-1 Reliability, Maintainability, and Availability (RM&A) will design and development of an ORDALT Package for fixes and modifications to known transmitter, microwave tube (MWT), and logistic shortcomings (also includes the MK-99 CWI MWT).

E. Performance Metrics

- Complete 10kW Traveling Wave Tube/Continuous Wave Illumination Microwave Tube (TWT/CWI MWT) Improvement Design/Development
- Complete A/B El Switch Improvement Design/Development
- Complete Sidewall Capacitor Monitoring Circuit
- Complete 10kW Monitoring Circuit development
- Complete Cross-Field Amplifier/Switch Tube (CFA/SWT) MWT Improvement Design Development
- Complete MWT Improvement Design/Development

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 3301: *Improved Capabilities SPY-1 Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	C/CPFF	Raytheon:Sudbury, MA	-	0.531	Mar 2011	1.000	Dec 2011	-		1.000	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/Crane, IN:Crane, IN	-	4.004	Mar 2011	2.629	Dec 2011	-		2.629	Continuing	Continuing	Continuing
		Subtotal	-	4.535		3.629		-		3.629			

	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.535		3.629		-		3.629			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3301: *Improved Capabilities SPY-1 Radar*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604501N: *Advanced Above Water Sensors*	**PROJECT** 3301: *Improved Capabilities SPY-1 Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3301				
10 kW TWT/CWI MWT Improvement Design/Development	1	2011	2	2013
Cabinet Modification/Side Wall Capacitor	1	2011	2	2013
A/B EI Switch Improvement Design/Development	4	2012	3	2014
TWT Monitoring	4	2012	1	2014
CFA/SWT MWT Improvement Design Development	1	2013	1	2015
MWT Improvement Design/Development	1	2015	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 9999: *Congressional Adds*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
9999: *Congressional Adds*	16.332	-	-	-	-	-	-	-	-	0.000	16.332
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Common Digital Sensor Architecture - Congressional Add to execute the AN/SPS-49A(V)1 common digital sensor architecture transmitter modification from system functional requirements to design review. This shall include - developing prototypes to reduce integration and manufacturing risks; ensure operational supportability; reduce the logistics footprint; and implement human systems integration.

Submarine Navigation Decision Aids - Congressional Add to continue the SBIR effort in support of the fielded AN/BPS Radar Voyage Management System (VMS) Subsystem. With the implementation of Electronic Chart Display & Information Systems-Navy (ECDIS-N) on submarines, there is a need to improve related navigation functions which are not currently supported in navigation architectures afloat, referred by the fleet as Navigation Decision Aids.

Advanced Sensor Development - Congressional Add to develop and demonstrate the technology required to sustain supportability solution for deployed above water sensors. Efforts to be performed will be in the technology development phase to include interpreting user needs and operational capabilities, developing system performance and limitation specification, developing functional definitions for technologies, demonstrate system functionality, demonstrate integrated system, and demonstrate and validate systems concepts and technology maturity.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
Congressional Add: Common Digital Sensor Architecture	2.390	-
FY 2010 Accomplishments: - Participate in the development of sensor sustainment definitions, performance requirements and radar specifications; perform radar systems reliability, maintainability, availability, and cost performance analysis. - Complete system requirements; develop combat system and support domain ship interfaces. - Initiate government/industry interaction through a series of Technical Interchange Meetings to assess system architecture concepts and develop system sustainment strategies - Complete / Update Acquisition Strategy, Systems Engineering Plan, Program Management Plan, Supportability Strategy. - Develop system support architectures		

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 9999: *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011
- Refine system performance specifications - Develop system functional specifications and system verification plan - Evolve functional performance specifications into design to specifications and product build to documentation		
Congressional Add: Submarine Navigation Decision Aids ***FY 2010 Accomplishments:*** - SBIR development of Submarine Navigation Decision Aids (NDA) software in support of ECDIS-N	3.983	-
Congressional Add: Advanced Sensor Development ***FY 2010 Accomplishments:*** - Participate in the development of sensor sustainment definitions, performance requirements and radar specifications; perform radar systems reliability, maintainability, availability, and cost performance analysis. - Complete system requirements; develop combat system and support domain ship interfaces. - Initiate government/industry interaction through a series of Technical Interchange Meetings to assess system architecture concepts and develop system sustainment strategies - Complete / Update Acquisition Strategy, Systems Engineering Plan, Program Management Plan, Supportability Strategy. - Develop system support architectures - Refine system performance specifications - Develop system functional specifications and system verification plan - Evolve functional performance specifications into design to specifications and product build to documentation	9.959	-
Congressional Adds Subtotals	16.332	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 5: *Development & Demonstration (SDD)*	R-1 ITEM NOMENCLATURE PE 0604501N: *Advanced Above Water Sensors*	PROJECT 9999: *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Add.