Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy											Date: February 2015	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604501N *I Advanced Above Water Sensors*							
COST ($ in Millions)	**Prior Years**	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**	**FY 2017**	**FY 2018**	**FY 2019**	**FY 2020**	**Cost To Complete**	**Total Cost**
Total Program Element	1,078.859	144.589	19.809	43.914	-	43.914	92.562	89.722	49.314	21.045	Continuing	Continuing
3186: *Air and Missile Defense Radar*	879.721	112.658	-	-	-	-	-	-	-	-	-	992.379
3188: *Dual-Band Radar*	66.768	15.513	8.774	6.385	-	6.385	5.009	5.133	5.299	5.410	Continuing	Continuing
3232: *Multi-Mission Signal Processor*	121.000	14.376	9.669	13.432	-	13.432	13.749	14.073	14.479	14.782	Continuing	Continuing
3236: *Advanced Radar Technology*	0.000	-	0.600	23.301	-	23.301	73.000	69.700	28.700	-	-	195.301
3301: *Improved Capabilities SPY-1 Radar*	11.370	2.042	0.766	0.796	-	0.796	0.804	0.816	0.836	0.853	Continuing	Continuing

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): (Note: Beginning in FY15, this effort transfers to PE 0604522N) 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 and a Radar Suite Controller (RSC). Funding will develop AMDR-S and RSC, and integrate these components with an available X band radar. 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.

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, Self Defense Test Ship (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 Battle Force Tactical Trainer (BFTT)/Cooperative Engagement Capability (CEC)/Surface Electronic Warfare Improvement Program (SEWIP) Interface: FY14-15 requirement supports the design and development of the software interface between DBR and AN/USQ-46 BFTT, CEC and

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy	Date: February 2015
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SEWIP to enhance CVN 78 combat readiness. DBR CVN 78 Testing and Certification: FY14-FY17 requirement supports DBR At-Sea Test and Evaluation (T&E), Environmental Testing and DBR Systems Certification for CVN 78.

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 class ships as part of Aegis Modernization Program. This capability will be utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D Transmitters 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. This effort also provides for the development of a Solid State Switch Assembly (SSSA) through an ONR/MANTECH project, MMSP Commercial Off-The-Shelf (COTS) refresh, radar capability upgrades, reliability improvements, and ship-based Non-Cooperative Target Recognition (NCTR).

Advanced Radar Technology (ART): Funds the development and integration of existing and new radar technologies into the Navy's sensors to enhance performance and/or ensure sensor operations and sustainment throughout the lifecycle of the sensor and platforms on which installed.

Enterprise Air Surveillance Radar (EASR): EASR will modify an existing radar technology to meet the air surveillance requirements for multiple ship classes. EASR will be one sensor in a suite that is designed to meet the performance needs for ship self-defense, situational awareness and air traffic control. EASR will replace the Volume Search Radar (VSR) in the CVN 78 Class Dual Band Radar system and the AN/SPS-48/49 radar systems in numerous ship classes. The AN/SPS-48 Radars are long-range, three-dimensional (3-D) radars used to search, detect and provide space-stabilized, three-coordinate (range, bearing, height) data for air intercept control and designation to a weapon system. The AN/SPS-49A(V)1 radar system is a long range, two dimensional (2-D), L-Band air surveillance radar installed on USN major combatants. The AN/SPY-4 Volume Search Radar (VSR) is an S-Band active phased array radar deployed on CVN 78 providing volume surveillance and air traffic control. EASR funding will develop a modern 3-D air search radar that addresses the latest requirements for Aviation and Amphibious Warfare Ships and closely conforms to existing combat system interfaces, as well as aligns with existing shipboard space, weight, and power limits. The architecture and acquisition strategy for EASR is intended to drive a lower recurring cost by utilizing the same core technology for both fixed-face and rotating array variants.

Enterprise X-Band Illuminator (EXI): EXI funding will develop an X-band illuminator compatible with the EASR into a radar and Combat System suite, in order to mitigate the risk of changes to the CVN 78 class Island. Funding will also integrate a new planar array missile illuminator for future CVN applications as well as other ship classes.

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.

Advanced Radar Innovation Fund/Advanced Radar Research: Funds the development and integration of existing and new technologies into the Navy's sensors to enhance performance and ensure sensor operations and sustainment throughout the lifecycle of the sensor and platforms on which installed.

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Navy					Date: February 2015
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0604501N *I Advanced Above Water Sensors*		
B. Program Change Summary ($ in Millions)	**FY 2014**	**FY 2015**	**FY 2016 Base**	**FY 2016 OCO**	**FY 2016 Total**
Previous President's Budget	157.871	20.409	20.755	-	20.755
Current President's Budget	144.589	19.809	43.914	-	43.914
Total Adjustments	-13.282	-0.600	23.159	-	23.159
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.600			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-9.141	-			
• SBIR/STTR Transfer	-4.141	-			
• Program Adjustments	-	-	23.300	-	23.300
• Rate/Misc Adjustments	-	-	-0.141	-	-0.141

Change Summary Explanation

FY14: Decrease due to SBIR/STTR reduction and funding realignment to DDG1000 and SSDS RDTEN

FY16: Proj: 3236: Increase due to the development of the Enterprise Air Surveillance Radar (EASR).

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3186 / *Air and Missile Defense Radar*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3186: *Air and Missile Defense Radar*	879.721	112.658	-	-	-	-	-	-	-	-	-	992.379
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): (Note: Beginning in FY15, this effort transfers to PE 0604522N) 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 and a Radar Suite Controller (RSC). Funding will develop AMDR-S and RSC, and integrate these components with an available X band radar. 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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: SYSTEMS ENGINEERING	109.159	-	-	-	-
Articles:	-	-	-	-	-
FY 2014 Accomplishments: - Awarded AMDR-S/RSC Engineering and Manufacturing Development (E&MD) contract - Matured AMDR design and radar parameters necessary for ship integration - Supported E&MD Phase Integrated Baseline Review (IBR) - Conducted Hardware Delta Preliminary Design review (PDR) and System Delta PDR - Developed modeling and simulation tools - Conducted performance analysis in support of system design					
FY 2015 Plans: N/A					
FY 2016 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A ***FY 2016 OCO Plans:*** N/A					
Title: PROGRAM MANAGEMENT SUPPORT	3.499	-	-	-	-
Articles:	-	-	-	-	-
FY 2014 Accomplishments: - Provided support to IPTs and WGs required for program execution of the E&MD contract - Analyzed and assessed contractor deliverables - Conducted regular Program Management reviews - Assisted in cost, schedule, and performance management, contract administration and oversight, earned value assessment, and risk identification and mitigation - Provided support to Hardware Delta PDR and System Delta PDR - Provided support to technical interchange meetings (TIMs). ***FY 2015 Plans:*** N/A ***FY 2016 Base Plans:*** N/A ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	112.658	-	-	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• 0604522N: *Air and Missile Defense Radar*	-	129.706	241.754	-	241.754	151.870	32.662	28.877	29.868	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

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 included competitive prototyping; an E&MD phase which includes completion of a full Engineering Development Model (EDM) for land-based testing; and transition to production. The detailed scope of this acquisition is defined in the approved Milestone B AMDR Acquisition Strategy.

E. Performance Metrics

- Complete Technology Development (TD) phase System Requirements Review, Test Readiness Review, TD Prototype testing, TD System Functional Review, and TD Preliminary Design Review (PDR)
- Achieve Milestone B decision to proceed into E&MD phase
- Award E&MD contract
- Conduct E&MD Phase Integrated Baseline Review
- Conduct Hardware Delta PDR and System Delta PDR
- Conduct Hardware and System CDRs
- Complete Engineering Development Model (EDM) Testing
- Achieve Milestone C decision to proceed into production and exercise Low Rate Initial Production (LRIP) options

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Risk Reduction	WR	SCSC Wallops : Wallops Island, VA	10.530	-		-		-		-		-	-	10.530	-
Risk Reduction	MIPR	DMEA : McClellen AFB, CA	48.022	-		-		-		-		-	-	48.022	-
Risk Reduction	SS/CPFF	JHU/APL : Baltimore, MD	9.920	-		-		-		-		-	-	9.920	-
Risk Reduction	MIPR	MIT : Cambridge, MA	2.538	-		-		-		-		-	-	2.538	-
Risk Reduction	WR	NRL : Washington, DC	8.094	-		-		-		-		-	-	8.094	-
Risk Reduction	C/CPAF	BAE Systems : Rockville, MD	1.980	-		-		-		-		-	-	1.980	-
Risk Reduction	WR	NSWC/CR : Crane, IN	0.746	-		-		-		-		-	-	0.746	-
Risk Reduction	C/CPFF	SPA-PSS : Alexandria, VA	3.817	-		-		-		-		-	-	3.817	-
Risk Reduction	WR	NSWC/DD : Dahlgren, VA	6.439	-		-		-		-		-	-	6.439	-
Risk Reduction	MIPR	DARPA : Adelphi, MD	5.882	-		-		-		-		-	-	5.882	-
Engineering & Manufacturing Development	C/CPIF	Raytheon : Sudbury, MA	156.960	76.796	Apr 2014	-		-		-		-	-	233.756	-
Systems Engineering	SS/FFP	BAE Systems : Rockville, MD	9.536	-		-		-		-		-	-	9.536	-
Systems Engineering	Various	VARIOUS-SPECIAL : Special	3.078	-		-		-		-		-	-	3.078	-
Systems Engineering	C/FFP	CS-Northrop Grumman : Linthicum Heights, MD	10.000	-		-		-		-		-	-	10.000	-
Systems Engineering	C/FFP	CS-Lockheed Martin : Moorestown, NJ	10.000	-		-		-		-		-	-	10.000	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/FFP	CS-Raytheon : Sudbury, MA	9.909	-		-		-		-		-	-	9.909	-
Systems Engineering	WR	NAVFAC MID-ATLANTIC : Pearl Harbor, HI	4.026	-		-		-		-		-	-	4.026	-
Systems Engineering	WR	NSWC/PHD (VAB) : Virginia Beach, VA	0.730	-		-		-		-		-	-	0.730	-
Systems Engineering	C/FP	Program Office Ststem Engineering Staff : Washington, DC	1.855	-		-		-		-		-	-	1.855	-
Systems Engineering	SS/CPFF	INTEGRITS (via KRATOS) : San Diego, CA	0.149	-		-		-		-		-	-	0.149	-
Systems Engineering	C/FPIF	TD Contractor Raytheon : Sudbury, MA	116.839	-		-		-		-		-	-	116.839	-
Systems Engineering	C/FPIF	TD Contractor Northrop Grumman : Linthicum Heights, MD	120.000	-		-		-		-		-	-	120.000	-
Systems Engineering	C/FPIF	TD Contractor Lockheed Martin : Moorestown, NJ	119.157	-		-		-		-		-	-	119.157	-
		Subtotal	660.207	76.796		-		-		-		-	-	737.003	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	COMOPTEVFOR : Norfolk, VA	0.870	-		-		-		-		-	-	0.870	-
Systems Engineering	MIPR	GTRI : Atlanta, GA	6.273	0.415	Apr 2014	-		-		-		-	-	6.688	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPFF	JHU/APL : Baltimore, MD	55.296	5.771	Jan 2014	-		-		-		-	-	61.067	-
Systems Engineering	MIPR	MIT : Cambridge, MA	15.608	1.931	Dec 2013	-		-		-		-	-	17.539	-
Systems Engineering	WR	NRL : Washington, DC	5.722	1.606	Dec 2013	-		-		-		-	-	7.328	-
Systems Engineering	WR	NSWC/CR : Crane, IN	5.229	2.515	Dec 2013	-		-		-		-	-	7.744	-
Systems Engineering	WR	NSWC/DD : Dahlgren, VA	49.418	5.817	Dec 2013	-		-		-		-	-	55.235	-
Systems Engineering	WR	NSWC/PHD : Port Hueneme, CA	10.394	1.531	Jan 2014	-		-		-		-	-	11.925	-
Systems Engineering	WR	SPAWAR : San Diego, CA	0.000	0.009	Aug 2014	-		-		-		-	-	0.009	-
Systems Engineering	C/CPFF	SPA-PSS : Alexandria, VA	22.172	1.203	Jan 2014	-		-		-		-	-	23.375	-
Systems Engineering	MIPR	ARL : Adelphi, MD	0.454	0.460	Jun 2014	-		-		-		-	-	0.914	-
Systems Engineering	WR	NSWC/CD : Carderock, MD	0.256	0.291	Dec 2013	-		-		-		-	-	0.547	-
Systems Engineering	C/FFP	Alion Science : Washington, DC	0.543	-		-		-		-		-	-	0.543	-
Systems Engineering	WR	CDSA Dam Neck : Dam Neck, VA	0.723	0.521	Dec 2013	-		-		-		-	-	1.244	-
Systems Engineering	WR	ONI : Washington, DC	1.157	-		-		-		-		-	-	1.157	-
Systems Engineering	WR	NSWC Corona : Corona, CA	0.694	-		-		-		-		-	-	0.694	-
		Subtotal	174.809	22.070		-		-		-		-	-	196.879	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	0.066	0.270	Jan 2014	-		-		-		-	-	0.336	-
Test and Evaluation	MIPR	GTRI : Atlanta, GA	0.472	0.100	Apr 2014	-		-		-		-	-	0.572	-
Test and Evaluation	SS/CPFF	JHU/APL : Baltimore, MD	4.162	1.873	Jan 2014	-		-		-		-	-	6.035	-
Test and Evaluation	MIPR	MIT : Cambridge, MA	1.175	0.272	Dec 2013	-		-		-		-	-	1.447	-
Test and Evaluation	WR	NAWC WD : Pt. Mugu, CA	4.976	0.080	May 2014	-		-		-		-	-	5.056	-
Test and Evaluation	WR	NRL : Washington, DC	0.431	0.139	Dec 2013	-		-		-		-	-	0.570	-
Test and Evaluation	WR	NSWC/DD : Dahlgren, VA	3.720	0.398	Dec 2013	-		-		-		-	-	4.118	-
Test and Evaluation	WR	NSWC/PHD : Port Hueneme, CA	0.782	1.679	Jan 2014	-		-		-		-	-	2.461	-
Test and Evaluation	WR	PMRF : Kekaha, HI	1.927	0.407	Jun 2014	-		-		-		-	-	2.334	-
Test and Evaluation	C/CPFF	SPA-PSS : Alexandria, VA	1.669	1.365	Jan 2014	-		-		-		-	-	3.034	-
Test and Evaluation	C/BA	SCSC Wallops : Wallops Island, VA	0.078	0.012	Feb 2014	-		-		-		-	-	0.090	-
Test and Evaluation	C/BA	SPAWAR : San Diego, CA	0.142	-		-		-		-		-	-	0.142	-
Test and Evaluation	C/BA	NSWC PHD WS : Port Hueneme, CA	0.000	3.698	May 2014	-		-		-		-	-	3.698	-
		Subtotal	19.600	10.293		-		-		-		-	-	29.893	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Management Services	C/CPFF	SPA-PSS : Norfolk, VA	14.321	2.263	Jan 2014	-		-		-		-	-	16.584	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

Management Services ($ in Millions)

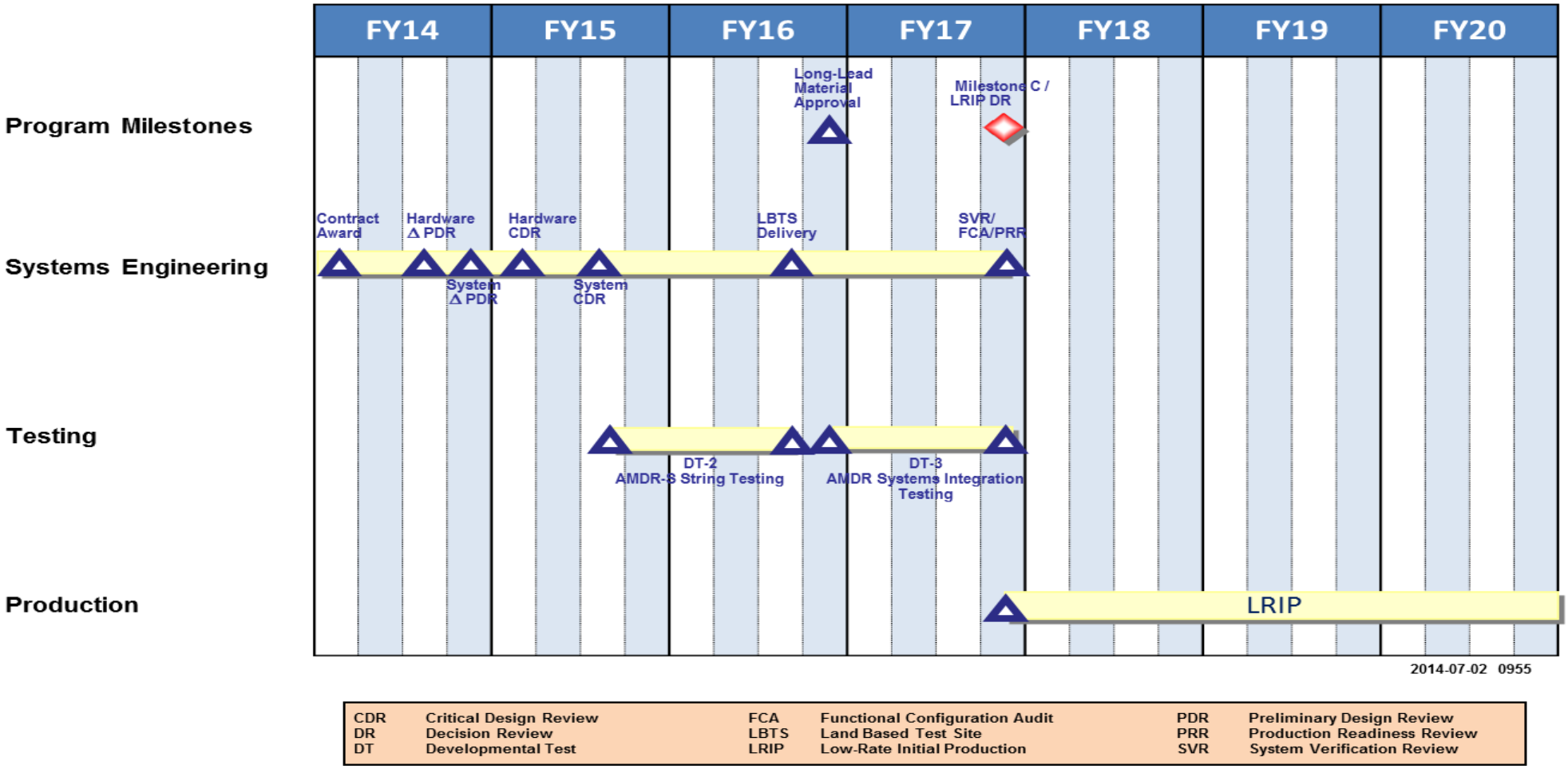
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2 : Washington, DC	0.624	0.115	Dec 2013	-		-		-		-	-	0.739	-
Support Management Services	WR	NSWC/DD : Dahlgren, VA	3.186	1.121	Dec 2013	-		-		-		-	-	4.307	-
Support Management Services	SS/FFP	BAE Systems : Rockville, MD	5.319	-		-		-		-		-	-	5.319	-
DAWDF	Various	N/A : N/A	0.513	-		-		-		-		-	-	0.513	-
Support Management Services	WR	NSWC/IHM : Indian Head, MD	1.142	-		-		-		-		-	-	1.142	-
		Subtotal	25.105	3.499		-		-		-		-	-	28.604	-

	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	879.721	112.658		-		-		-		-	-	992.379	-

Remarks

The R-3 cost categories have been expanded from PB15 to show more detail. Specifically, Support and Test and Evaluation categories have been broken out from Product Development.

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*



CDR	Critical Design Review	FCA	Functional Configuration Audit	PDR	Preliminary Design Review
DR	Decision Review	LBTS	Land Based Test Site	PRR	Production Readiness Review
DT	Developmental Test	LRIP	Low-Rate Initial Production	SVR	System Verification Review

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3186 / *Air and Missile Defense Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3186				
Engineering and Manufacturing Development (E&MD) Contract Award	1	2014	1	2014
E&MD Hardware (HW) Delta Preliminary Design Review (PDR)	3	2014	3	2014
E&MD System Delta PDR	4	2014	4	2014
E&MD HW Critical Design Review (CDR)	1	2015	1	2015
E&MD System CDR	3	2015	3	2015
E&MD AMDR-S String Testing (DT-2)	3	2015	3	2016
Engineering Development Model delivered to Land Based Test Site	3	2016	3	2016
LRIP Long Lead Material Approval	4	2016	4	2016
E&MD AMDR System Integration Testing (DT-3)	4	2016	4	2017
System Verification Review/Functional Configuration Audit/Production Readiness Review	4	2017	4	2017
Milestone C/Low Rate Initial Production (LRIP) Decision Review (DR)	4	2017	4	2017
LRIP Production	4	2017	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3188 / *Dual-Band Radar*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3188: *Dual-Band Radar*	66.768	15.513	8.774	6.385	-	6.385	5.009	5.133	5.299	5.410	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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 Battle Force Tactical Trainer (BFTT)/Cooperative Engagement Capability (CEC)/Surface Electronic Warfare Improvement Program (SEWIP) Interface: FY14-15 requirement supports the design and development of the software interface between DBR and AN/USQ-46 BFTT, CEC and SEWIP to enhance CVN 78 combat readiness.

DBR CVN 78 Testing and Certification: FY14-FY17 requirement supports DBR At-Sea Test and Evaluation (T&E), Environmental Testing and DBR Systems Certification for CVN 78.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: RADAR UPGRADES TECHNOLOGY INSERTION	10.986	5.098	4.719	-	4.719
Articles:	-	-	-	-	-
FY 2014 Accomplishments: - Completed software development of the DBR/SEWIP interface. - Continued Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Continued software development of the DBR/BFTT and DBR/CEC interfaces. - Continued software development to implement live over simulation training capability in support of BFTT integration. - Commenced integration of the DBR/BFTT, DBR/SEWIP and DBR/CEC interfaces.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continued to provide technical support for DBR element certification in support of overall combat system certification. - Commenced validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Commenced planning for DBR Environmental Testing. ***FY 2015 Plans:*** - Continue Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Complete software development to implement live over simulation training capability in support of BFTT integration. - Complete software development of the DBR/BFTT and DBR/CEC interfaces. - Complete integration of the DBR/BFTT, DBR/SEWIP and DBR/CEC interfaces. - Continue to provide technical support for DBR element certification in support of overall combat system certification. - Continue validation testing and integration of the DBR/BFFT, DBR/CEC and DBR/SEWIP software interfaces. - Continue DBR Environmental Testing. - Commence DBR Shipboard Testing. ***FY 2016 Base Plans:*** - Continue Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Continue to provide technical support for DBR element certification in support of overall combat system certification. - Continue to provide technical support for the validation testing and certification of DBR/BFFT, DBR/CEC and DBR/SEWIP software interfaces. - Continue DBR Environmental Testing. - Continue DBR Shipboard Testing. ***FY 2016 OCO Plans:*** N/A					
Title: RADAR UPGRADES GOVERNMENT ENGINEERING SERVICES	3.764	2.616	1.424	-	1.424
Articles:	-	-	-	-	-
FY 2014 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continued to provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Continued to perform oversight and assessment of efforts associated with this phase of the program. - Continued to provide DBR EMI testing efforts. - Continued to provide Government Engineering Services in support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development integration. - Continued to provide Government Engineering Services required for DBR element certification to support overall combat system certification. - Commenced validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Commenced planning for DBR Environmental Testing.					
FY 2015 Plans: - Continue to provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/VSR/DBR radars. Continue to perform oversight and assessment of efforts associated with this phase of the program. - Complete Government Engineering Services support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development integration. - Continue to provide Government Engineering Services required to complete DBR element certification to support overall combat system certification. - Continue to provide engineering services to support validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Continue to provide Government Engineering Services to support DBR EMI testing efforts. - Continue DBR Environmental Testing. - Commence DBR Shipboard Testing.					
FY 2016 Base Plans: - Continue to provide Government Engineering Services support for radar upgrades and technology insertion of the MFR/ VSR/DBR radars. Continue to perform oversight and assessment of efforts associated with this phase of the program. - Continue to provide Government Engineering Services required to complete DBR element certification to support overall combat system certification. - Continue to provide engineering services to support validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces.					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Complete EMI Analysis Testing (Co-site & Off-ship). - Continue DBR Environmental Testing. - Continue DBR Shipboard Testing. ***FY 2016 OCO Plans:*** N/A					
Title: RADAR UPGRADES PROGRAM MANAGEMENT	0.763	1.060	0.242	-	0.242
Articles:	-	-	-	-	-
FY 2014 Accomplishments: - Continued to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/VSR/DBR radars. - Continued to provide Program Management support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development. - Commenced Program Management Support for the validation testing and certification of the DBR/BFTT, DBR/ SEWIP and DBR/CEC software interfaces. ***FY 2015 Plans:*** - Continue to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/VSR/DBR radars. - Complete Program Management support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development. - Continue to provide Program Management for validation testing of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. ***FY 2016 Base Plans:*** - Continue to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/ VSR/DBR radars. - Continue to provide Program Management for validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	15.513	8.774	6.385	-	6.385

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• OPN/2980: *BLI 2980/ OPN Items Less Than $5M*	3.263	3.087	8.922	-	8.922	18.897	16.303	16.279	16.608	Continuing	Continuing
• OMN/0702228N: *0702228N/1C2C/O&M,N*	2.699	3.173	2.709	-	2.709	2.645	2.642	2.704	2.756	Continuing	Continuing

Remarks

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

- Complete upgrade studies and analyses each fiscal year to determine efficiencies for H/W and S/W upgrades and to determine appropriate logistics product updates
- Complete co-site and off-ship EMI analysis testing
- Complete VSR Radome development and determine opportunities to improve configuration and performance
- Complete upgrade technology insertion
- Complete development of logistics products
- Implement supportability analysis to improve supportability and reduce overall lifecycle cost
- Complete DBR At-Sea Test and Evaluation (T&E)
- Complete Environmental Testing
- Complete DBR/CEC interface development
- Complete DBR Systems Certification
- Complete Common Array Power System (CAPS) redesign
- Complete DBR/SEWIP interface development
- Complete DBR/BFTT interface development

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3188 / *Dual-Band Radar*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	Other Government Activities : Various	1.143	-		-		-		-		-	-	1.143	-
Government Engineering Support	WR	NSWC/Dahlgren : Dahlgren, VA	11.175	2.473	Dec 2013	1.352	Nov 2014	0.865	Dec 2015	-		0.865	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	5.856	0.464	Dec 2013	0.166	Feb 2015	0.148	Dec 2015	-		0.148	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/Crane : Crane, IN	4.641	0.406	Mar 2014	0.250	Feb 2015	0.197	Dec 2015	-		0.197	Continuing	Continuing	Continuing
Government Engineering Support	WR	NRL : Washington, DC	3.725	-		-		-		-		-	-	3.725	-
Government Engineering Support	SS/CPFF	JHU/APL : Columbia, MD	0.983	0.176	Apr 2014	0.133	Feb 2015	0.119	Dec 2015	-		0.119	Continuing	Continuing	Continuing
Government Engineering Support	MIPR	NSMA : Arlington, VA	0.903	-		-		-		-		-	-	0.903	-
Government Engineering Support	SS/CPFF	GTRI : Atlanta, GA	0.948	0.132	Apr 2014	0.083	Feb 2015	0.065	Dec 2015	-		0.065	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/Carderock : Philadelphia, PA	0.107	0.036	Mar 2014	0.063	Dec 2014	0.030	Dec 2015	-		0.030	Continuing	Continuing	Continuing
Government Engineering Support	WR	NSWC/Dam Neck : Dam Neck, VA	0.731	0.077	Mar 2014	0.514	Feb 2015	-		-		-	-	1.322	-
Government Engineering Support	SS/CPFF	AEGIS Tech Rep : Moorestown, NJ	0.014	-		-		-		-		-	-	0.014	-
Government Engineering Support	WR	TASC : Andover, MA	0.048	-		-		-		-		-	-	0.048	-
Government Engineering Support	WR	NSWC/Corona : Corona, CA	0.446	-		0.055	Nov 2014	-		-		-	-	0.501	-
Government Engineering Support	WR	NAWC/PT MUGU : PT MUGU, CA	0.586	-		-		-		-		-	-	0.586	-
Systems Engineering	SS/CPFF	Raytheon : Raytheon, Sudbury, MA	29.284	10.986	Dec 2013	5.098	Nov 2014	4.719	Dec 2015	-		4.719	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPAF	Raytheon IDS : San Diego, CA	1.500	-		-		-		-		-	-	1.500	-
Systems Engineering	SS/CPFF	General Dynamics AIS : Fairfax, VA	1.000	-		-		-		-		-	-	1.000	-
Systems Engineering	SS/CPFF	PMS 320 Syntek : Arlington, VA	0.400	-		-		-		-		-	-	0.400	-
		Subtotal	63.490	14.750		7.714		6.143		-		6.143	-	-	-

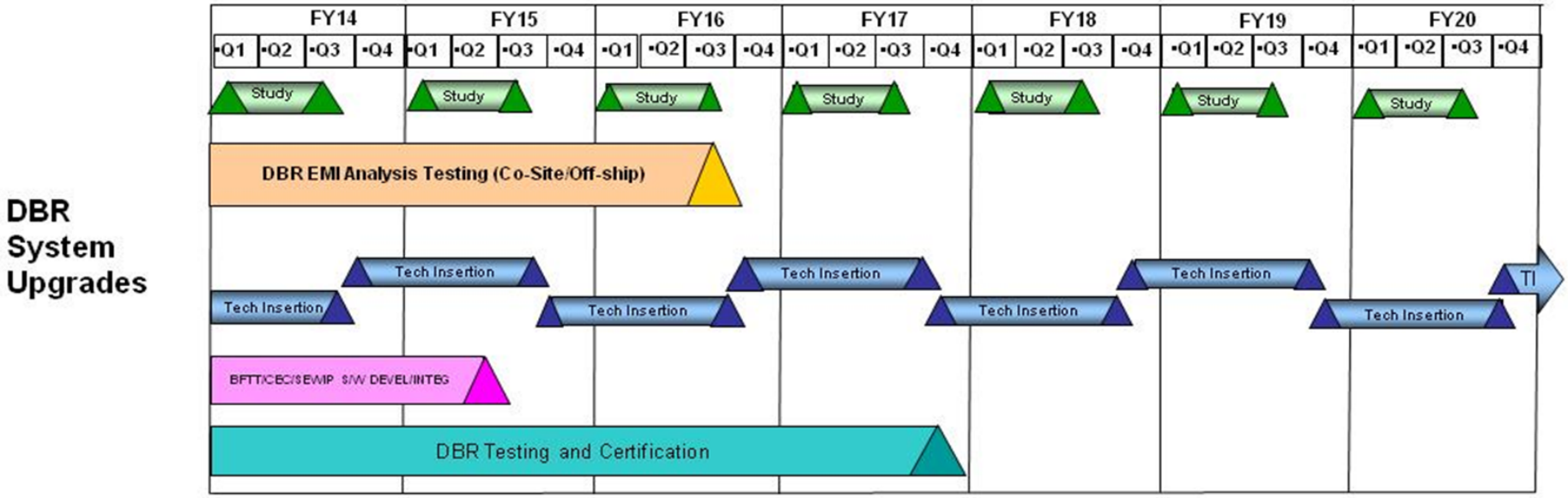
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	SPA : Washington, DC	3.065	0.750	Dec 2013	1.047	Feb 2015	0.232	Dec 2015	-		0.232	Continuing	Continuing	Continuing
DAWDF	Allot	N/A : N/A	0.027	-		-		-		-		-	-	0.027	-
Travel	Allot	PEOIWS2 : Washington, DC	0.120	0.013	Jun 2014	0.013	Jan 2015	0.010	Dec 2015	-		0.010	Continuing	Continuing	Continuing
Program Management Support	C/CPIF	ALION : Washington, DC	0.026	-		-		-		-		-	-	0.026	-
Program Management Support	C/CPFF	CACI : Washington, DC	0.040	-		-		-		-		-	-	0.040	-
		Subtotal	3.278	0.763		1.060		0.242		-		0.242	-	-	-

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	66.768	15.513		8.774		6.385		-		6.385	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3188 / *Dual-Band Radar*



Note: Supportability Analysis is conducted in conjunction with the Study.
DBR At-Sea T&E, Environmental Testing and DBR System Certification are included in the DBR Testing and Certification support

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 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	2014	3	2020
DBR EMI Analysis Testing (Co-Site & Off-ship)	1	2014	3	2016
DBR System Upgrade Technology Insertion	1	2014	4	2020
DBR BFTT/CEC/SEWIP Integration	1	2014	2	2015
DBR Testing and Certification	1	2014	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3232 / *Multi-Mission Signal Processor*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3232: *Multi-Mission Signal Processor*	121.000	14.376	9.669	13.432	-	13.432	13.749	14.073	14.479	14.782	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Multi-Mission Signal Processor (MMSP): The development of Multi-Mission Signal Processor (MMSP) provides simultaneous Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) Multi-mission capability for DDG 51 class ships as part of Aegis Modernization Program. This capability will be utilized for DDG 113 and follow new construction and Aegis Ashore. Modifies SPY-1D Transmitters 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. This effort also provides for the development of a Solid State Switch Assembly (SSSA) through an ONR/MANTECH project, MMSP Commercial Off-The-Shelf (COTS) refresh, radar capability upgrades, reliability improvements, and ship-based Non-Cooperative Target Recognition (NCTR).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: SYSTEMS ENGINEERING	14.376	9.669	13.432	-	13.432
Articles:	-	-	-	-	-
FY 2014 Accomplishments: - Supported Combat System Ship Qualification Trials (CSSQT) testing - Continued MMSP/ACB12 Radar Integration at-sea validation testing and computer program correction - Continued design and development of MANTECH SSSA - Continued COTS Refresh and radar improvements - Continued DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Finalized ACB16 Radar requirements analysis - Continued to 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					
FY 2015 Plans: - Continue to support MMSP/ACB12 Radar Integration at-sea validation testing and computer program correction - Complete design and development of MANTECH SSSA and initiate transition to production					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue COTS Refresh and radar improvements - Continue DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Commence ACB16 Radar upgrades for MMSP - Continue to maintain alignment with the BMD Program and the associated Ballistic Missile Defense Signal Processor (BSP) adjunct to incorporate BMD capability within MMSP during AEGIS Modernization ***FY 2016 Base Plans:*** - Continue to support MMSP/ACB12 Radar Integration at-sea validation testing and Computer Program Correction - Support Final Certification of MMSP on Destroyers - Continue COTS Refresh and Radar Capability improvements - Continue DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Continue ACB16 Radar upgrades for MMSP - Continue to 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 - Commence ACB 20 Radar upgrades for MMSP - Support design verification testing of Solid State Switch Assembly (SSSA) and complete transition to production ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	14.376	9.669	13.432	-	13.432

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• SCN/2122: *BLI 2122/SCN DDG 51*	2,085.115	2,925.090	3,149.703	-	3,149.703	3,353.936	3,440.080	3,543.571	3,633.657	Continuing	Continuing
• OPN/0900: *BLI 0900/ OPN DDG Modernization*	285.994	324.219	364.157	-	364.157	403.782	570.886	507.745	521.562	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

D. Acquisition Strategy

Multi-Mission Signal Processor (MMSP) provides simultaneous 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/SCN procurement for shore sites and shipsets. This effort also provides for the development of a Solid State Switch Assembly (SSSA) through an ONR/MANTECH project, and will lead to OPN/SCN procurement for shore sites and shipsets. COTS refresh, radar capability upgrades, reliability improvements, and ship-based Non-Cooperative Target Recognition will be incorporated into Baseline 9 and follow.

E. Performance Metrics

- Complete DDG SPY-1D(V) Engineering Exercise (EE) #2
- Complete DDG Qualification Testing
- Complete DDG ACB12 Multi-Mission Exercise
- Complete DDG Delivery
- Complete DDG Aegis Light Off (ALO)
- Complete DDG Combat System Ship Qualification Trials (CSSQT)
- Complete MMSP on DDG on Final Certification
- Complete DDG Commercial Off The Shelf (COTS) Refresh - Engineering Change Proposal (ECP) for MMSP on Destroyers
- Complete Solid State Switch Assembly (SSSA) contract award
- Complete SSSA Critical Design Review (CDR)
- Complete SSSA Final Certification
- Complete Ship-Based Non-Cooperative Target Recognition (SBNCTR) Engineering Exercise (EE)
- Complete ACB16 Preliminary Design Review (PDR)
- Complete ACB16 CDR
- Complete ACB16 Test Readiness Review (TRR)
- Complete ACB16 Demo
- Complete ACB16 AEGIS Light Off (ALO)
- Complete ACB16 Final Certification
- Complete ACB 20 PDR
- Complete ACB 20 CDR
- Complete ACB 20 TRR
- Complete ACB16 COTS Refresh
- Complete SBNCTR TRR
- Complete SSSA qualification testing
- Complete SSSA Production Readiness Review (PRR)
- Complete ACB16 System Readiness review (SRR)
- Complete DDG 116 ALO

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

- Complete ACB 20 SRR
- Complete ACB 20 In Process Review (IPR)

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin : Moorestown, NJ	99.921	6.335	Jan 2014	6.471	Feb 2015	8.743	Dec 2015	-		8.743	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	C/CPFF	AEGIS Techrep : Moorestown, NJ	3.184	0.849	Jan 2014	0.259	Feb 2015	0.540	Dec 2015	-		0.540	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU : Laurel, MD	2.611	0.920	Feb 2014	0.250	Feb 2015	0.426	Feb 2016	-		0.426	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	CSCS : Dahlgren, VA	0.951	0.303	Mar 2014	0.122	Apr 2015	0.171	Dec 2015	-		0.171	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NRL : Washington, DC	1.959	0.499	Dec 2013	0.200	Feb 2015	0.409	Dec 2015	-		0.409	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	MIT/LL : Lexington, MA	0.300	0.350	Mar 2014	0.200	Mar 2015	0.395	Mar 2016	-		0.395	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/DD : Dahlgren, VA	3.305	1.085	Dec 2013	1.084	Feb 2015	1.218	Nov 2015	-		1.218	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/CR : Crane, IN	2.362	0.668	Dec 2013	0.191	Oct 2014	0.277	Nov 2015	-		0.277	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD : Port Hueneme, CA	2.849	0.614	Dec 2013	0.210	Feb 2015	0.220	Dec 2015	-		0.220	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	Office of Naval Research : Arlington, VA	2.150	2.400	Mar 2014	0.329	Apr 2015	0.600	Feb 2016	-		0.600	-	5.479	-
		Subtotal	119.592	14.023		9.316		12.999		-		12.999	-	-	-

Management Services ($ in Millions)

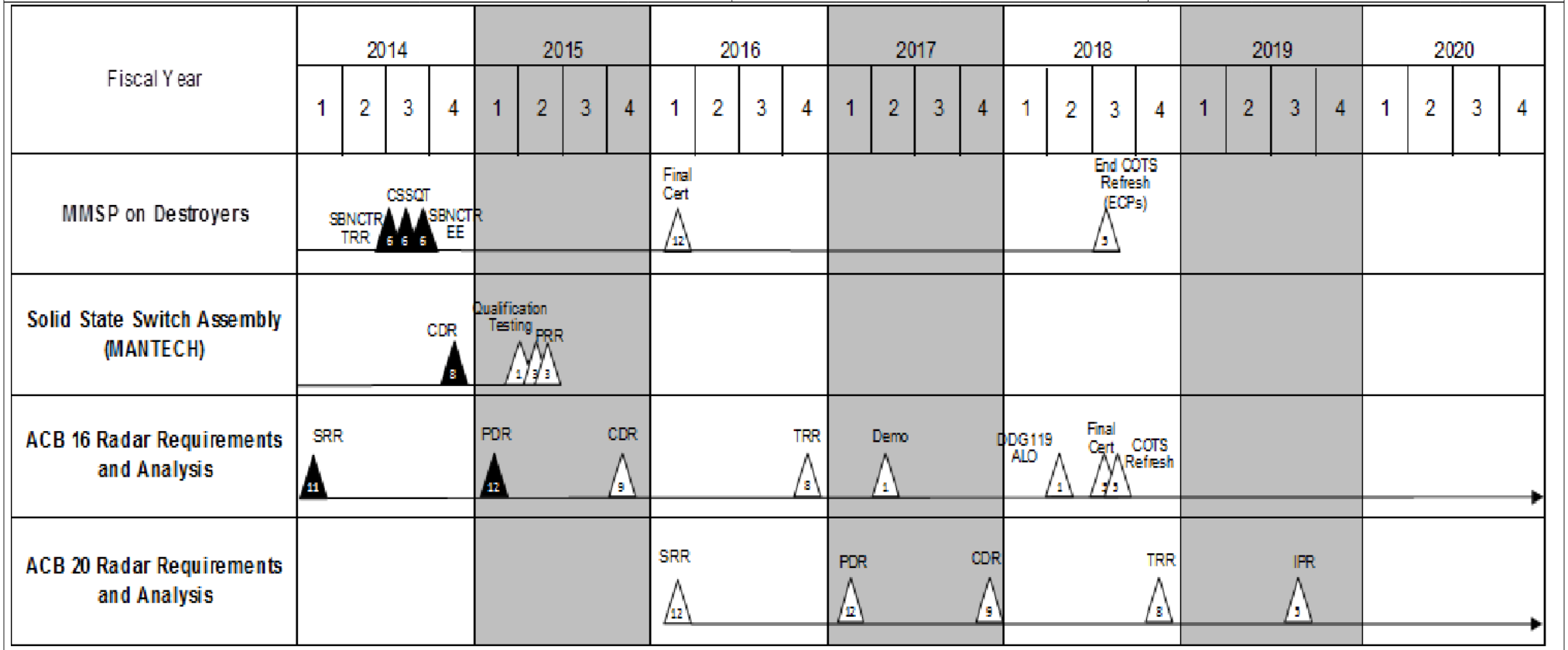
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2 : Washington, DC	0.158	0.020	Jun 2014	0.020	Feb 2015	0.020	Feb 2016	-		0.020	Continuing	Continuing	Continuing
PSS	C/CPFF	SPA-PSS : Washington, DC	1.250	0.333	Jan 2014	0.333	Jan 2015	0.413	Jan 2016	-		0.413	Continuing	Continuing	Continuing
		Subtotal	1.408	0.353		0.353		0.433		-		0.433	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3232 / *Multi-Mission Signal Processor*	

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	121.000	14.376		9.669		13.432		-		13.432	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*



MMSP on Destroyers and Solid State Switch Assembly are continued development from prior years.
ACB 16 COTS Refresh continues beyond the FYDP.
ACB 20 Radar efforts continue beyond the FYDP.

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3232				
DDG Commercial Off The Shelf (COTS) Refresh - Engineering Change Proposals (ECP)	1	2014	3	2018
ACB16 System Readiness Review (SRR)	1	2014	1	2014
Ship-Based Non-Cooperative Target Recognition (SBNCTR) Test Readiness Review (TRR)	3	2014	3	2014
DDG Combat System Ship Qualification Trials (CSSQT)	3	2014	3	2014
SBNCTR Engineering Exercise (EE)	3	2014	3	2014
SSSA Critical Design Review (CDR)	4	2014	4	2014
SSSA Qualification Testing	2	2015	2	2015
ACB16 Preliminary Design Review (PDR)	1	2015	1	2015
SSSA Production Readiness Review (PRR)	2	2015	2	2015
ACB16 CDR	4	2015	4	2015
DDG Final Certification	1	2016	1	2016
ACB 20 System SRR	1	2016	1	2016
ACB16 TRR	4	2016	4	2016
ACB 20 PDR	1	2017	1	2017
ACB16 Demo	2	2017	2	2017
ACB 20 CDR	4	2017	4	2017
DDG 119 ALO	2	2018	2	2018
ACB16 Final Certification	3	2018	3	2018
ACB16 COTS Refresh	3	2018	4	2020
ACB 20 TRR	4	2018	4	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3232 / *Multi-Mission Signal Processor*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ACB 20 In Process Review (IPR)	3	2019	3	2019

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3236 / *Advanced Radar Technology*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3236: *Advanced Radar Technology*	-	-	0.600	23.301	-	23.301	73.000	69.700	28.700	-	-	195.301
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Radar Technology (ART): Funds the development and integration of existing and new radar technologies into the Navy's sensors to enhance performance and/or ensure sensor operations and sustainment throughout the lifecycle of the sensor and platforms on which installed.

Enterprise Air Surveillance Radar (EASR): EASR will modify an existing radar technology to meet the air surveillance requirements for multiple ship classes. EASR will be one sensor in a suite that is designed to meet the performance needs for ship self-defense, situational awareness and air traffic control. EASR will replace the the Volume Search Radar (VSR) in the CVN 78 Class Dual Band Radar system and the AN/SPS-48/49 radar systems in numerous ship classes. The AN/SPS-48 Radars are long-range, three-dimensional (3-D) radars used to search, detect and provide space-stabilized, three-coordinate (range, bearing, height) data for air intercept control and designation to a weapon system. The AN/SPS-49A(V)1 radar system is a long range, two dimensional (2-D), L-Band air surveillance radar installed on USN major combatants. The AN/SPY-4 Volume Search Radar (VSR) is an S-Band active phased array radar deployed on CVN 78 providing volume surveillance and air traffic control. EASR funding will develop a modern 3-D air search radar that addresses the latest requirements for Aviation and Amphibious Warfare Ships and closely conforms to existing combat system interfaces, as well as aligns with existing shipboard space, weight, and power limits. The architecture and acquisition strategy for EASR is intended to drive a lower recurring cost by utilizing the same core technology for both fixed-face and rotating array variants.

Enterprise X-Band Illuminator (EXI): EXI funding will develop an X-band illuminator compatible with the EASR into a radar and Combat System suite, in order to mitigate the risk of changes to the CVN 78 class Island. Funding will also integrate a new planar array missile illuminator for future CVN applications as well as other ship classes.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: SYSTEMS ENGINEERING	-	0.600	21.500	-	21.500
Articles:	-	-	-	-	-
FY 2014 Accomplishments: N/A					
FY 2015 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Develop and perform limited testing on a pared advanced signal processing capability for X-Band radars (Speed To Fleet). ***FY 2016 Base Plans:*** - Award EASR Engineering and Manufacturing Development (E&MD) contract - Procure EASR Engineering Development Model (EDM) material - Support EASR working groups (WGs) to facilitate successful integration of the radar with the ship and combat system - Initiate EASR test planning in support of test site requirements ***FY 2016 OCO Plans:*** N/A					
Title: PROGRAM MANAGEMENT SUPPORT	-	-	1.801	-	1.801
Articles:	-	-	-	-	-
FY 2014 Accomplishments: N/A ***FY 2015 Plans:*** N/A ***FY 2016 Base Plans:*** - Provide support to EASR Integrated Product Teams (IPTs) and WGs required for program execution of the E&MD contract - Analyze and assess EASR contractor deliverables - Conduct regular EASR Program Management Reviews - Execute EASR cost, schedule, and performance management, contract administration, contract oversight, risk identification, and risk mitigation - Provide support to EASR technical interchange meetings (TIMs) ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	-	0.600	23.301	-	23.301

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• OPN/2026: *0204228N Radar Support*	27.934	26.735	20.551	-	20.551	28.603	30.452	29.269	29.911	Continuing	Continuing
• O&MN: *0702228N Radar Support*	2.508	2.897	2.324	-	2.324	2.700	2.854	2.777	2.941	Continuing	Continuing

Remarks

D. Acquisition Strategy

Advanced Radar Technology (ART) will develop and test an advanced signal processing capability for X-Band radars (Speed-to-Fleet).
EASR: The EASR Acquisition is a planned competitive procurement based on a radar specification that incorporates the latest requirements for aviation and amphibious warfare ships, closely conforms to existing combat system interfaces, and includes physical Space Weight and Power (SWAP) Not-to-Exceed (NTE) interface requirements from:
- CVN 79+, LHA(R), and LX(R) for Forward-Fit
- CVN, LHA, LPD for back-fit.

EXI: The EXI Acquisition is a planned competitive procurement based on an illuminator specification that incorporates the latest requirements for aviation and amphibious warfare ships, closely conforms to existing combat system interfaces, and includes physical SWAP NTE interface requirements applicable to CVN 79+, LHA(R), and LX(R).

E. Performance Metrics

- Speed-to-Fleet (S2F) Electronic Pulse (EP) new firmware/software changes testing
- S2F EP Land Based Testing
- S2F EP At-Sea Testing
- Approval for Transition
- EASR - Engineering and Manufacturing Development (E&MD) Contract RFP
- EXI - E&MD Contract RFP
- EASR - E&MD Contract Award
- EXI - E&MD Contract Award
- EASR - E&MD System PDR
- EXI - E&MD System PDR
- EASR - E&MD System CDR
- EXI - E&MD System CDR
- EASR Engineering Development Model delivered to Land Based Test Site
- EXI - Engineering Development Model delivered to Land Based Test Site
- EASR and EXI - E&MD EASR Land Based System Integration Testing

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

- EASR and EXI Low Rate Initial Production (LRIP) Authorization
- EASR and EXI LRIP Production

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3236 / *Advanced Radar Technology*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	Northrop Grumman - ES : Baltimore, MD	0.000	-		0.300	Jan 2015	-		-		-	-	0.300	-
Systems Engineering	TBD	EASR E&MD Contractor - TBD : TBD	0.000	-		-		18.550	Jul 2016	-		18.550	-	18.550	-
		Subtotal	0.000	-		0.300		18.550		-		18.550	-	18.850	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NSWC/CR : Crane, IN	0.000	-		-		0.500	Nov 2015	-		0.500	-	0.500	-
Systems Engineering	WR	NSWC/DD : Dahlgren, VA	0.000	-		-		0.650	Nov 2015	-		0.650	-	0.650	-
Systems Engineering	WR	NSWC/PHD(VAB) : Virginia Beach, VA	0.000	-		-		0.350	Nov 2015	-		0.350	-	0.350	-
Systems Engineering	SS/CPFF	JHU/APL : Baltimore, MD	0.000	-		-		0.400	Nov 2015	-		0.400	-	0.400	-
Systems Engineering	C/CPIF	IWS2:PSS - TBD : TBD	0.000	-		-		0.280	Nov 2015	-		0.280	-	0.280	-
Systems Engineering	MIPR	MIT/LL : Bedford, MA	0.000	-		-		0.430	Nov 2015	-		0.430	-	0.430	-
		Subtotal	0.000	-		-		2.610		-		2.610	-	2.610	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NRL : Washington, DC	0.000	-		0.300	Jan 2015	0.340	Nov 2015	-		0.340	-	0.640	-
		Subtotal	0.000	-		0.300		0.340		-		0.340	-	0.640	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3236 / *Advanced Radar Technology*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Management	C/CPIF	IWS2 - PSS - TBD : TBD	0.000	-		-		0.751	Nov 2015	-		0.751	-	0.751	-
Travel	Allot	PEO IWS2 : Washington, DC	0.000	-		-		0.050	Nov 2015	-		0.050	-	0.050	-
Support Management	WR	NSWC/DD : Dahlgren, VA	0.000	-		-		1.000	Nov 2015	-		1.000	-	1.000	-
		Subtotal	0.000	-		-		1.801		-		1.801	-	1.801	-

	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		0.600		23.301		-		23.301	-	23.901	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

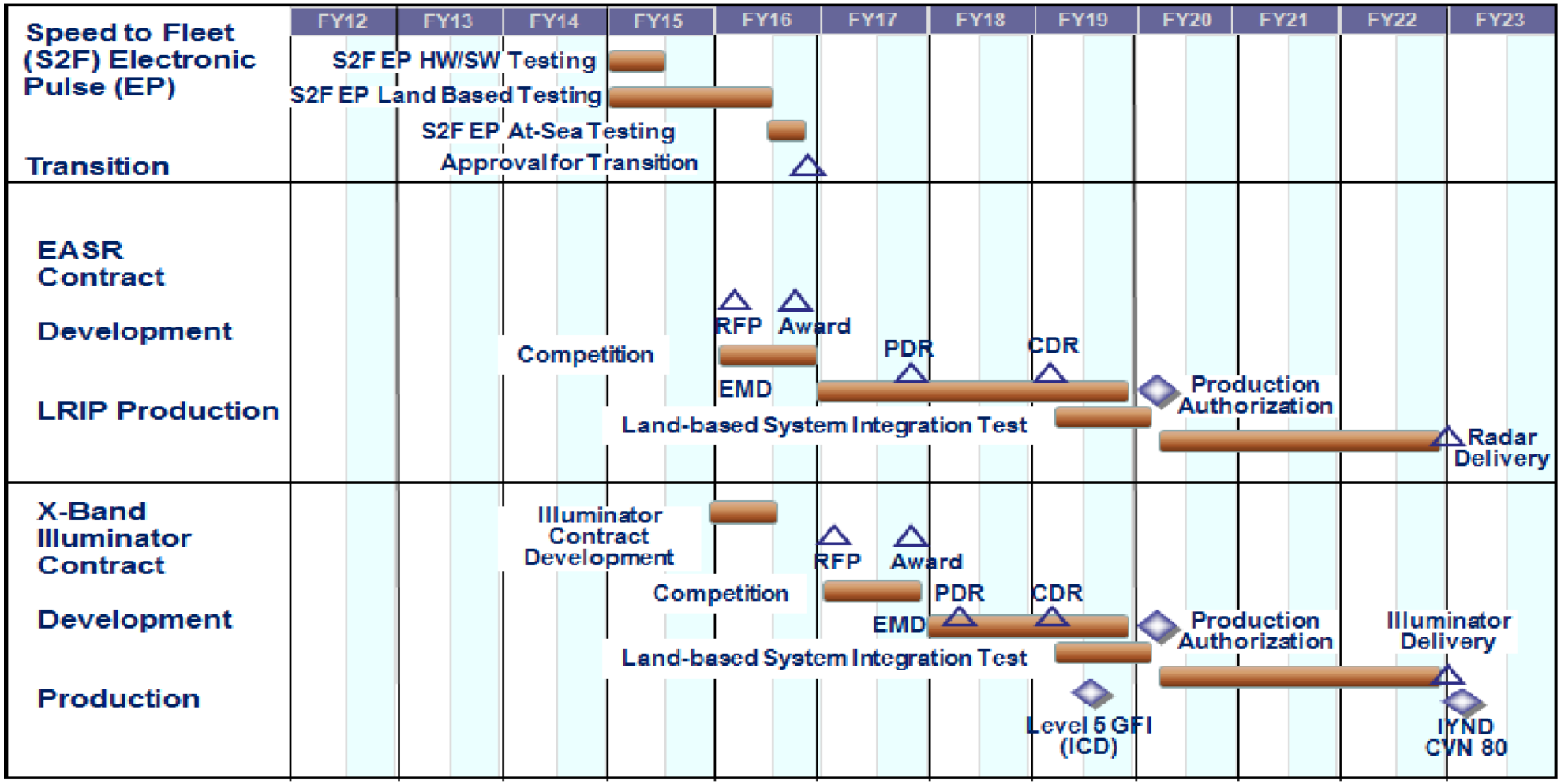


Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3236				
Speed-to-Fleet (S2F) Electronic Pulse (EP) new firmware/software changes testing	1	2015	2	2015
S2F EP Land Based Testing	1	2015	2	2016
S2F EP At-Sea Testing	3	2016	4	2016
Approval for Transition	4	2016	4	2016
EASR - Engineering and Manufacturing Development (E&MD) Contract RFP	1	2016	1	2016
EASR - Engineering and Manufacturing Development (E&MD) Contract Award	4	2016	4	2016
EXI - Engineering and Manufacturing Development (E&MD) Contract RFP	1	2017	1	2017
EXI - Engineering and Manufacturing Development (E&MD) Contract Award	4	2017	4	2017
EASR - E&MD System PDR	4	2017	4	2017
EXI - E&MD System PDR	2	2018	2	2018
EASR - E&MD System CDR	1	2019	1	2019
EXI - E&MD System CDR	1	2019	1	2019
EASR - Engineering Development Model delivered to Land Based Test Site	2	2019	2	2019
EXI - Engineering Development Model delivered to Land Based Test Site	2	2019	2	2019
EASR and EXI - E&MD EASR Land Based System Integration Testing	2	2019	1	2020
EASR and EXI Low Rate Initial Production (LRIP) Authorization	2	2020	2	2020
EASR and EXI LRIP Production	2	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy			Date: February 2015
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3301 / *Improved Capabilities SPY-1 Radar*	

COST ($ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
3301: *Improved Capabilities SPY-1 Radar*	11.370	2.042	0.766	0.796	-	0.796	0.804	0.816	0.836	0.853	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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. Improvements are a top fleet requirement as part of the AEGIS Wholeness initiative.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Improved Capabilities SPY-1 Radar	2.042	0.766	0.796	-	0.796
Articles:	-	-	-	-	-
FY 2014 Accomplishments:					
- Completed design and development of reliability improvements for the Simplified Driver (SDR)					
- Conducted feasibility study for solid state Helix Regulator					
- Conducted feasibility study for 40W/400W Gallium Nitride (GaN) based solid state amplifier					
- Completed design and development of Crossed Field Amplifier (CFA) Microwave Tube					
- Continued Microwave Tube (MWT) improvement design/development					
- Continued development of additional cost reduction initiatives					
FY 2015 Plans:					
- Initiate technology development of solid state Helix Regulator					
- Initiate technology development of 40W/400W GaN based solid state amplifier					
- Continue development of additional cost reduction initiatives					
- Continue Microwave Tube (MWT) improvement design/development					
FY 2016 Base Plans:					
- Complete MWT improvement design/development					
- Continue technology development for Solid State Helix Regulator					
- Continue technology development for GaN Based 40W/400W Solid State Amplifier					
- Initiate technology development for 10KW GaN Based Amplifier for Pre-Drivers					

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3301 / *Improved Capabilities SPY-1 Radar*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Continue development of additional cost reduction initiatives ***FY 2016 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	2.042	0.766	0.796	-	0.796

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• OPN/2980: *Items Less Than $5M*	9.592	14.527	17.501	-	17.501	21.973	47.510	29.053	29.673	Continuing	Continuing
• O&MN/0702228N: *O&M,N AEGIS Wholeness SPY Transmitter Reliability*	3.716	4.222	3.807	-	3.807	4.203	4.205	4.294	4.373	Continuing	Continuing

Remarks

D. Acquisition Strategy

Improved Capabilities SPY-1 Reliability, Maintainability, and Availability (RM&A) will design and develop an Ordnance Alterations (ORDALT) Package for fixes and modifications to known transmitter, microwave tube (MWT), and logistic shortcomings (also includes the MK-99 CWI MWT). Investment in development of SPY-1 RM&A improvements to address failure mechanisms and improve reliability is planned to continue beyond the FYDP.

E. Performance Metrics

- Complete 10KW Traveling Wave Tube/Continuous Wave Illumination Microwave Tube (TWT/CWI MWT) Improvement Design/Development/Monitoring
- Complete A/B EI Switch Improvement Design/Development
- Complete Sidewall Capacitor Monitoring Circuit
- Complete 10KW Monitoring Circuit development
- Complete Crossed Field Amplifier/Switch Tube (CFA/SWT) MWT Improvement Design Development
- Complete MWT Improvement Design/Development
- Complete Water Cooled Vane (WCV) to Double Duty (DD) engineering development
- Complete Simplified Driver (SDR) reliability design improvements
- Complete Solid State Helix Regulator technology development
- Complete Gallium Nitride (GaN) based 40W/400W solid state amplifier development
- Complete 10KW GaN based amplifier for Pre-Drivers development
- Complete Switch Tube Drawer (STD) Reliability Project

Exhibit R-2A, RDT&E Project Justification: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3301 / *Improved Capabilities SPY-1 Radar*

- Complete GaN based Driver/Pre-Driver studies/investigations

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3301 / *Improved Capabilities SPY-1 Radar*

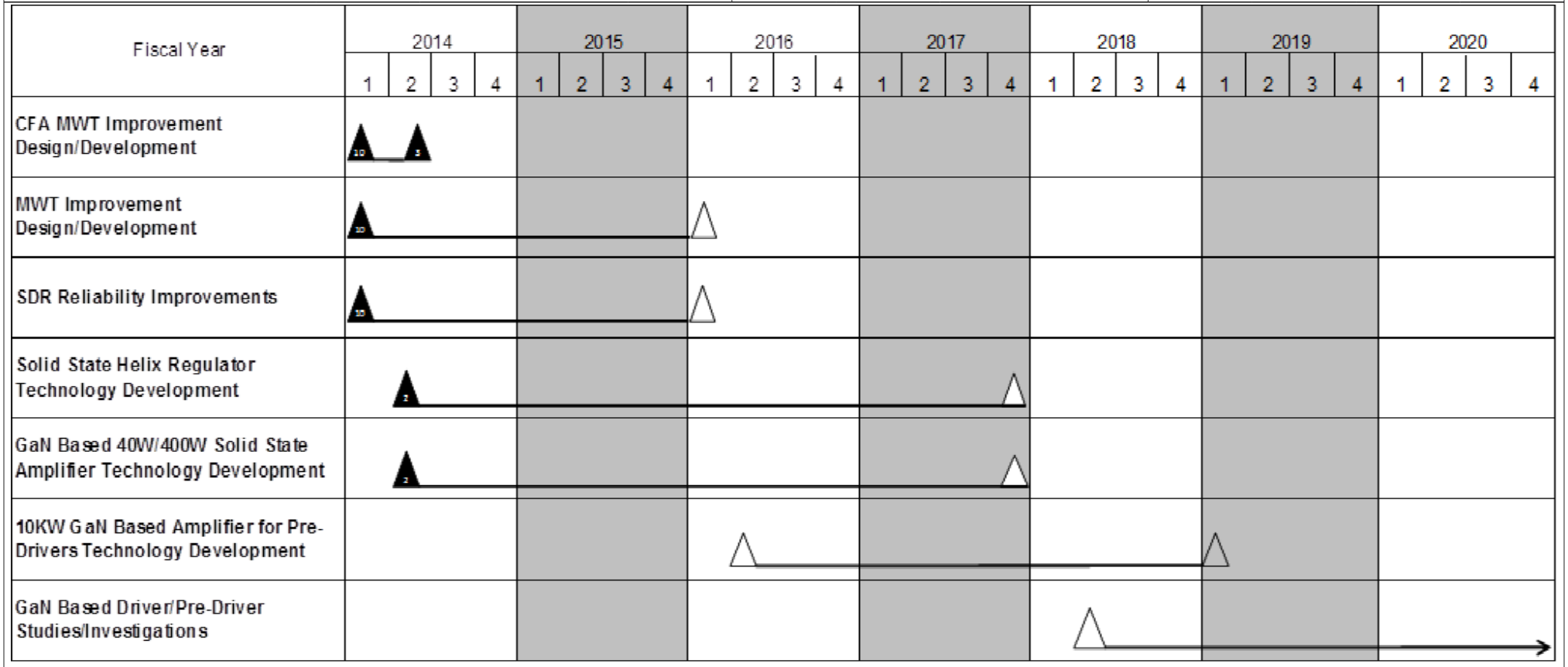
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2014 Cost	FY 2014 Award Date	FY 2015 Cost	FY 2015 Award Date	FY 2016 Base Cost	FY 2016 Base Award Date	FY 2016 OCO Cost	FY 2016 OCO Award Date	FY 2016 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	MIPR	Office of Naval Research : Arlington, VA	1.000	-		-		-		-		-	-	1.000	-
SYSTEM ENGINEERING	C/CPFF	Raytheon : Sudbury, MA	1.741	0.200	Dec 2013	0.100	Feb 2015	0.200	Jan 2016	-		0.200	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/Crane, IN : Crane, IN	8.629	1.842	Dec 2013	0.666	Oct 2014	0.596	Dec 2015	-		0.596	Continuing	Continuing	Continuing
		Subtotal	11.370	2.042		0.766		0.796		-		0.796	-	-	-

	Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.370	2.042		0.766		0.796		-		0.796	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3301 / *Improved Capabilities SPY-1 Radar*



Note:

10KW GaN Based Amplifier for Pre-Drivers Technology Development and GaN Based Driver/Pre-Driver Studies/Investigations continue beyond the FYDP.

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Navy		Date: February 2015
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3301 / *Improved Capabilities SPY-1 Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3301				
Crossed Field Amplifier (CFA)/Switch Tube (SWT) Microwave Tube (MWT) Improvement Design/Development	1	2014	2	2014
MWT Improvement Design/Development	1	2014	1	2016
Simplified Driver (SDR) Reliability Improvements	1	2014	1	2016
Solid State Helix Regulator Technology Development	2	2014	4	2017
GaN Based 40W/400W Solid State Amplifier Technology Development	2	2014	4	2017
10KW GaN based Amplifier for Pre-Drivers Technology Development	2	2016	1	2019
GaN based Driver/Pre-Driver Studies/investigations	2	2018	4	2020