Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy											Date: February 2016	
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 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	231.069	19.320	43.914	85.868	-	85.868	88.249	42.760	15.424	15.713	Continuing	Continuing
3188: *Dual-Band Radar*	82.281	8.597	6.385	4.808	-	4.808	5.133	0.000	0.000	0.000	0.000	107.204
3232: *Multi-Mission Signal Processor*	135.376	9.372	13.432	2.279	-	2.279	2.424	2.503	2.567	2.856	Continuing	Continuing
3236: *Advanced Radar Technology*	0.000	0.589	23.301	68.037	-	68.037	68.411	27.601	0.000	0.000	0.000	187.939
3301: *Improved Capabilities SPY-1 Radar*	13.412	0.762	0.796	10.744	-	10.744	12.281	12.656	12.857	12.857	Continuing	Continuing

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, 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: FY15 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: FY15-FY18 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 is 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). Initiate transition of Advanced Calibration Experiment (ACE) into Baseline (BL) 7.2 to continue MMSP development. FY17-FY21 funding realigned from Project 3232 to Project 3301 for Improved Capabilities SPY-1 Radar to support radar development. This line continues MMSP development and includes the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. This effort includes re-hosting the MMSP software and firmware on

a new computer platform. Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements.

Advanced Radar Technology (ART): The EASR and EXI Engineering and Manufacturing Development (E&MD) contracts are to be awarded in FY16. This requires a significant increase in funding between FY16 and FY17. 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. EASR will provide for engineering of component and system level technology improvements for equipment used by in service air search radars.

Enterprise X-Band Illuminator (EXI): EXI funding will develop an X-band illuminator compatible with the EASR radar and Combat System suite. Funding will also integrate a 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 and solid state technology inserters 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 and is a top fleet requirement as part of the AEGIS Wholeness initiative.

FY17-FY21 funding has been realigned from Project 3232 Multi-Mission Signal Processor to Project 3301. Efforts include development of Transmitter Noise Cancellation (TNC), Sidelobe Blanking (SLB), Ship-Based Non-Cooperative Target Recognition (SBNCTR), Electronic Attack (EA) and Rapid Radar Capability Program (R2CIP). Initiate transition of Advanced Calibration Experiment (ACE) into Baseline 9.

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 2017 Navy					Date: February 2016
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 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**
Previous President's Budget	19.809	43.914	92.562	-	92.562
Current President's Budget	19.320	43.914	85.868	-	85.868
Total Adjustments	-0.489	0.000	-6.694	-	-6.694
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.489	0.000			
• Program Adjustments	0.000	0.000	-4.088	-	-4.088
• Rate/Misc Adjustments	0.000	0.000	-2.606	-	-2.606

Change Summary Explanation

FY15: Decrease due to SBIR/STTR reduction.

FY16: FY15 to FY16 increase is due to the development of the Enterprise Air Surveillance Radar (EASR).

FY17: Decrease in Advanced Above Water Sensors by $3.688M as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015. FY17 funding request was reduced by $.400 million to account for the availability of prior year execution balances.

The EASR and EXI Engineering and Manufacturing Development (E&MD) contracts are to be awarded in FY16. This requires a significant increase in funding between FY16 and FY17.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3188: *Dual-Band Radar*	82.281	8.597	6.385	4.808	-	4.808	5.133	0.000	0.000	0.000	0.000	107.204
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: FY15 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: FY15-FY18 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: RADAR UPGRADES TECHNOLOGY INSERTION	4.840	5.635	3.702	0.000	3.702
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - Continued Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Completed software development of the DBR/BFTT and DBR/CEC interfaces. - Completed software development to implement live over simulation training capability in support of BFTT integration. - Completed integration of the DBR/BFTT, DBR/SEWIP and DBR/CEC interfaces.					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Continued to provide technical support for DBR element certification in support of overall combat system certification. - Continued validation testing and integration of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces.. - Continued planning for DBR Environmental Testing. - Continued DBR Shipboard Testing. ***FY 2016 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. - Complete validation testing and integration of the DBR/BFTT and DBR/CEC software interface. - Continue validation testing and integration of DBR/SEWIP software interfaces. - Continue planning for DBR Environmental Testing. - Continue DBR Shipboard Testing. ***FY 2017 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. - Complete validation testing and integration of DBR/SEWIP software interfaces. - Continue planning for DBR Environmental Testing. - Complete DBR Shipboard Testing. ***FY 2017 OCO Plans:*** N/A					
Title: RADAR UPGRADES GOVERNMENT ENGINEERING SERVICES	2.513	0.502	0.916	0.000	0.916
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - 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 DBR EMI testing efforts.					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Continued Government Engineering Services 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. - Continued validation testing and integration of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Continued planning for DBR Environmental Testing. - Continued DBR Shipboard Testing.					
FY 2016 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 and DBR/CEC software interface development integration. - Continue Government Engineering Services support of DBR/SEWIP software interface development integration. - Continue to provide Government Engineering Services required to complete DBR element certification to support overall combat system certification. - Complete Government Engineering Services to support validation testing and integration of the DBR/BFTT and DBR/CEC software interface. - Continue to provide Government Engineering Services to support validation testing and integration of the DBR/ SEWIP software interfaces. - Complete EMI Analysis Testing (Co-site & Off-ship). - Continue planning for DBR Environmental Testing. - Continue DBR Shipboard Testing.					
FY 2017 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. - Complete Government Engineering Services to support validation testing and integration of the DBR/SEWIP software interface.					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Continue planning for DBR Environmental Testing. - Complete DBR Shipboard Testing. ***FY 2017 OCO Plans:*** N/A					
Title: RADAR UPGRADES PROGRAM MANAGEMENT	1.244	0.248	0.190	0.000	0.190
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - Continued to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/VSR/DBR radars. - Completed Program Management support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development. - Continued to provide Program Management for validation testing and integration of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. ***FY 2016 Plans:*** - Continue to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/ VSR/DBR radars. - Complete Program Management for validation testing and integration of the DBR/BFTT and DBR/CEC software interfaces. - Continue to provide Program Management for validation testing and integration of the DBR/SEWIP software interfaces. ***FY 2017 Base Plans:*** - Continue to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/ VSR/DBR radars. - Complete Program Management for validation testing and integration of the DBR/SEWIP software interface. ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	8.597	6.385	4.808	0.000	4.808

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• OPN/2980: *BLI 2980/ OPN Items Less Than $5M*	3.087	8.922	17.634	-	17.634	16.405	16.266	16.459	16.778	Continuing	Continuing
• OMN/0702228N: *0702228N/1C2C/O&M,N*	3.089	2.709	2.397	-	2.397	2.624	2.685	2.737	2.792	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 Hardware (H/W) and Software (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 planning for DBR 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
- Complete DBR Shipboard Testing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
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 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Support	WR	Other Government Activities : Various	1.143	0.000		0.000		0.000		-		0.000	0.000	1.143	-
Government Engineering Support	WR	NSWC/Dahlgren : Dahlgren, VA	13.648	1.225	Nov 2014	0.000		0.579	Dec 2016	-		0.579	0.000	15.452	-
Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	6.320	0.153	Feb 2015	0.000		0.076	Dec 2016	-		0.076	0.000	6.549	-
Government Engineering Support	WR	NSWC/Crane : Crane, IN	5.047	0.234	Feb 2015	0.000		0.105	Dec 2016	-		0.105	0.000	5.386	-
Government Engineering Support	WR	NRL : Washington, DC	3.725	0.000		0.000		0.000		-		0.000	0.000	3.725	-
Government Engineering Support	SS/CPFF	JHU/APL : Columbia, MD	1.159	0.246	Feb 2015	0.172	Mar 2016	0.093	Dec 2016	-		0.093	0.000	1.670	-
Government Engineering Support	MIPR	NSMA : Arlington, VA	0.903	0.000		0.000		0.000		-		0.000	0.000	0.903	-
Government Engineering Support	SS/CPFF	GTRI : Atlanta, GA	1.080	0.078	Feb 2015	0.051	Feb 2016	0.040	Dec 2016	-		0.040	0.000	1.249	-
Government Engineering Support	WR	NSWC/Carderock : Philadelphia, PA	0.143	0.059	Dec 2014	0.000		0.023	Dec 2016	-		0.023	0.000	0.225	-
Government Engineering Support	WR	NSWC/Dam Neck : Dam Neck, VA	0.808	0.466	Feb 2015	0.000		0.000		-		0.000	0.000	1.274	-
Government Engineering Support	SS/CPFF	AEGIS Tech Rep : Moorestown, NJ	0.014	0.000		0.000		0.000		-		0.000	0.000	0.014	-
Government Engineering Support	WR	TASC : Andover, MA	0.048	0.000		0.000		0.000		-		0.000	0.000	0.048	-
Government Engineering Support	WR	NSWC/Corona : Corona, CA	0.446	0.052	Nov 2014	0.279	Feb 2016	0.000		-		0.000	0.000	0.777	-
Government Engineering Support	WR	NAWC/PT MUGU : PT MUGU, CA	0.586	0.000		0.000		0.000		-		0.000	0.000	0.586	-
Systems Engineering	SS/CPFF	Raytheon : Raytheon, Sudbury, MA	40.270	4.840	Nov 2014	5.635	Dec 2015	3.702	Dec 2016	-		3.702	0.000	54.447	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy		Date: February 2016
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 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPAF	Raytheon IDS : San Diego, CA	1.500	0.000		0.000		0.000		-		0.000	0.000	1.500	-
Systems Engineering	SS/CPFF	General Dynamics AIS : Fairfax, VA	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
Systems Engineering	SS/CPFF	PMS 320 Syntek : Arlington, VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
		Subtotal	78.240	7.353		6.137		4.618		-		4.618	0.000	96.348	-

Management Services ($ in Millions)

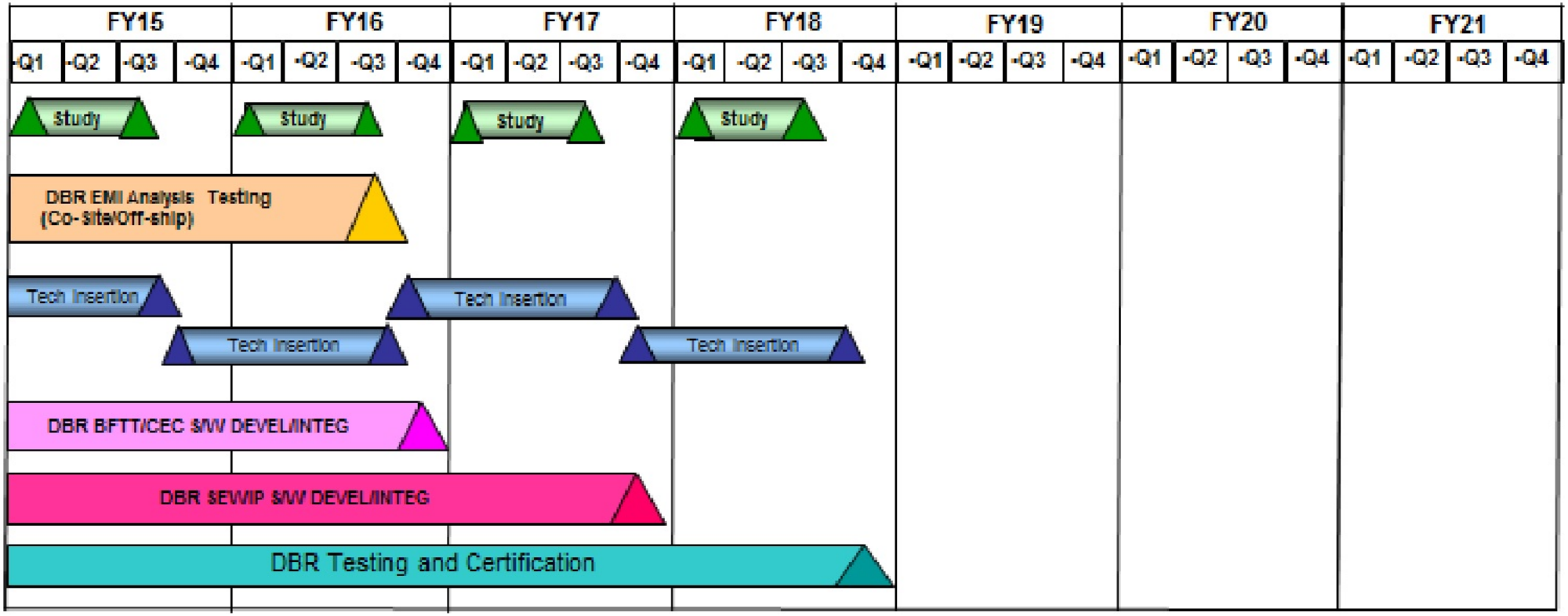
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPIF	SPA (SEAPORT) : Washington, DC	3.815	0.904	Feb 2015	0.000		0.000		-		0.000	0.000	4.719	-
DAWDF	Allot	N/A : N/A	0.027	0.000		0.000		0.000		-		0.000	0.000	0.027	-
Travel	Allot	PEOIWS2 : Washington, DC	0.133	0.017	Jan 2015	0.030	Dec 2015	0.008	Dec 2016	-		0.008	0.000	0.188	-
Program Management Support	C/CPIF	ALION : Washington, DC	0.026	0.000		0.000		0.000		-		0.000	0.000	0.026	-
Program Management Support	C/CPFF	CACI : Washington, DC	0.040	0.276	Apr 2015	0.000		0.000		-		0.000	0.000	0.316	-
Program Management Support	C/CPIF	TMB : Washington, DC	0.000	0.047	Apr 2015	0.000		0.000		-		0.000	0.000	0.047	-
Program Management Support	C/CPIF	TBD : TBD	0.000	0.000		0.000		0.182	Dec 2016	-		0.182	0.000	0.182	-
Program Management Support	SS/CPIF	SPA : Washington, DC	0.000	0.000		0.218	Jan 2016	0.000		-		0.000	0.000	0.218	-
		Subtotal	4.041	1.244		0.248		0.190		-		0.190	0.000	5.723	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3188 / *Dual-Band Radar*	

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	82.281	8.597		6.385		4.808		-		4.808	0.000	102.071	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
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, Planning for Environmental Testing and DBR System Certification are included in the DBR Testing and Certification support

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
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	2015	3	2018
DBR EMI Analysis Testing (Co-Site & Off-ship)	1	2015	3	2016
DBR System Upgrade Technology Insertion	1	2015	4	2018
DBR BFTT/CEC Software Development/Integration	1	2015	4	2016
DBR SEWIP Software Development/Integration	1	2015	4	2017
DBR Testing and Certification	1	2015	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3232: *Multi-Mission Signal Processor*	135.376	9.372	13.432	2.279	-	2.279	2.424	2.503	2.567	2.856	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 is 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 (SBNCTR). Initiate transition of Advanced Calibration Experiment (ACE) into Baseline (BL) 7.2 to continue MMSP development.

FY17-FY21 funding is realigned from Project 3232 to Project 3301 Improved Capabilities SPY-1 Radar to support radar development. This line continues MMSP development and includes the commencement of technology refresh to support Aegis Modernization due to Diminishing Manufacturing Sources and Material Shortages (DMSMS) and obsolescence issues. This effort includes re-hosting the MMSP software and firmware on a new computer platform. Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include system security requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: SYSTEMS ENGINEERING	9.372	13.432	2.279	0.000	2.279
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					
- Continued to support MMSP/ACB12 Radar Integration at-sea validation testing and computer program corrections.					
- Continued design and development of MANTECH SSSA, supported qualification testing and initiated transition to production.					
- Continued COTS Refresh and radar improvements.					
- Continued DDG BL 9 Radar Capabilities Upgrades, SBNCTR, and BL 9 Radar Synchronization.					
- Commenced ACB16 Radar upgrades for MMSP.					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Continued 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 Plans:*** - Continue to support MMSP/ACB12 Radar Integration at-sea validation testing and computer program corrections. - Support Final Certification of MMSP on Destroyers. - Complete ACE integration into BL 7.2. - Continue COTS Refresh and Radar Capability improvements. - Continue DDG BL 9 Radar Capabilities Upgrades, SBNCTR, and BL 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. - Support Production Readiness Review (PRR) of Solid State Switch Assembly (SSSA) and complete transition to production. ***FY 2017 Base Plans:*** - Initiate technology refresh to support AEGIS Modernization due to DMSMS and obsolescence issues. Engineering efforts will be required to assess alternate technologies and determine optimal MMSP architectural solutions, which will include System Security requirements. - Initiate analysis of alternatives and requirements definition for re-hosting MMSP software and firmware onto a new computer platform. - 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. - Continue to support ACB12 and ACB16 radar improvements. ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	9.372	13.432	2.279	0.000	2.279

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• SCN/2122: *BLI 2122/SCN DDG 51*	2,924.381	4,207.664	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPN/0900: *BLI 0900/ OPN DDG Modernization*	324.219	421.195	367.766	-	367.766	636.893	585.026	585.003	658.303	Continuing	Continuing

Remarks

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 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 ACB16 COTS Refresh
- Complete SSSA qualification testing

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 SSSA Production Readiness Review (PRR)
- Complete SSSA transition to production
- Complete SBNCTR integration review
- Complete ACE BL 7.2 Demo
- Complete ACE BL 7.2 Certification
- Complete MMSP Technology Refresh Requirements and Material Solution Analysis
- Complete MMSP Technology Refresh Technology Development
- Complete MMSP Technology Refresh Integration and Test

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy		Date: February 2016
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 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin : Moorestown, NJ	106.256	4.301	Feb 2015	5.737	Mar 2016	1.436	Dec 2016	-		1.436	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	C/CPFF	AEGIS Techrep : Moorestown, NJ	4.033	0.516	Feb 2015	0.855	Feb 2016	0.120	Dec 2016	-		0.120	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU : Laurel, MD	3.531	0.425	Feb 2015	0.840	Feb 2016	0.086	Feb 2017	-		0.086	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	CSCS : Dahlgren, VA	1.254	0.141	Apr 2015	0.285	Jan 2016	0.000		-		0.000	0.000	1.680	-
SYSTEM ENGINEERING	WR	NRL : Washington, DC	2.458	0.200	Feb 2015	0.382	Jan 2016	0.086	Dec 2016	-		0.086	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	MIT/LL : Lexington, MA	0.650	0.453	Feb 2015	0.350	Feb 2016	0.000		-		0.000	0.000	1.453	-
SYSTEM ENGINEERING	WR	NSWC/DD : Dahlgren, VA	4.390	1.822	Feb 2015	2.782	Jan 2016	0.321	Nov 2016	-		0.321	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	SCSC : Wallops Island, VA	0.000	0.019	May 2015	0.000		0.000		-		0.000	0.000	0.019	-
SYSTEM ENGINEERING	WR	NSWC/CR : Crane, IN	3.030	0.213	Oct 2014	0.784	Nov 2015	0.075	Nov 2016	-		0.075	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD : Port Hueneme, CA	3.463	0.259	Feb 2015	0.000		0.070	Dec 2016	-		0.070	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	Office of Naval Research : Arlington, VA	4.550	0.329	Apr 2015	0.900	Feb 2016	0.000		-		0.000	0.000	5.779	-
		Subtotal	133.615	8.678		12.915		2.194		-		2.194	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2 : Washington, DC	0.178	0.030	Jan 2015	0.020	Jan 2016	0.010	Jan 2017	-		0.010	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy		Date: February 2016
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*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Management Services	C/CPIF	TBD : TBD	0.000	0.000		0.000		0.075	Jan 2017	-		0.075	Continuing	Continuing	Continuing
Support Management Services	SS/CPIF	SPA : Washington, DC	0.000	0.000		0.413	Jan 2016	0.000		-		0.000	0.000	0.413	-
Support Management Services	C/CPIF	SPA (SEAPORT) : Washington, DC	1.583	0.664	Feb 2015	0.000		0.000		-		0.000	0.000	2.247	-
Support Management Services	C/CPFF	CACI : Washington, DC	0.000	0.000		0.084	Jan 2016	0.000		-		0.000	0.000	0.084	-
		Subtotal	1.761	0.694		0.517		0.085		-		0.085	-	-	-

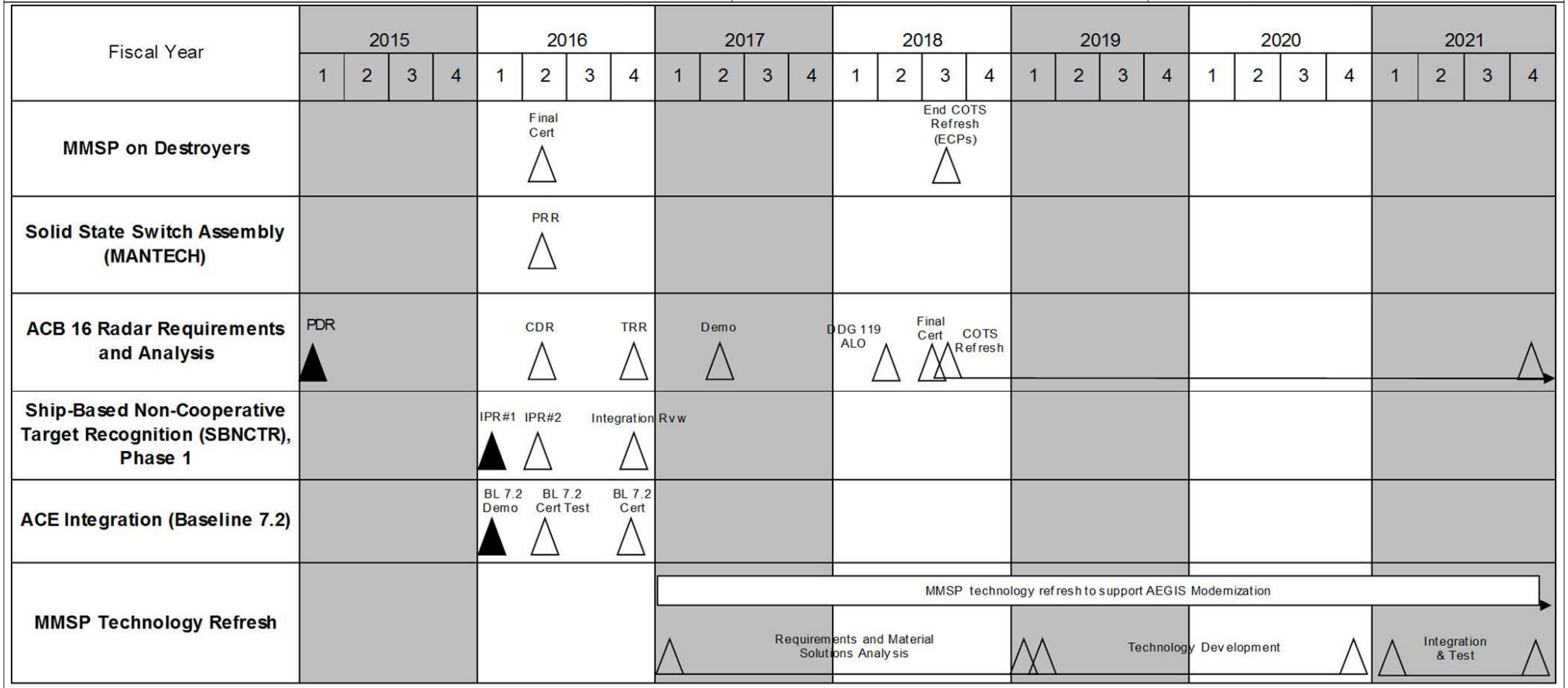
Remarks

FY16 funding redistributed to support SPY-1 slide rule enhancement speed to fleet (increased NSWC/DD, APL, AEGIS Techrep) and SSSA testing efforts (increased NSWC/CR and ONR).

	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	135.376	9.372		13.432		2.279		-		2.279	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
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.
MMSP Techonology Refresh continues beyond the FYDP.

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
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	2015	3	2018
ACB16 Preliminary Design Review (PDR)	1	2015	1	2015
SBNCTR IPR #1	1	2016	1	2016
ACE BL 7.2 Demo	1	2016	1	2016
DDG Final Certification	2	2016	2	2016
ACB16 CDR	2	2016	2	2016
SSSA Production Readiness Review (PRR)	2	2016	2	2016
SBNCTR IPR #2	2	2016	2	2016
ACE BL 7.2 Cert Test	2	2016	2	2016
ACB16 TRR	4	2016	4	2016
SBNCTR Integration Review	4	2016	4	2016
ACE BL 7.2 Cert	4	2016	4	2016
MMSP Tehcnology Refresh Requirements and Material Solutions Analysis	1	2017	1	2019
ACB16 Demo	2	2017	2	2017
DDG 119 ALO	2	2018	2	2018
ACB16 Final Certification	3	2018	3	2018
ACB16 COTS Refresh	3	2018	4	2021
MMSP Technology Refresh Technology Development	1	2019	4	2020
MMSP Technology Refresh Integration & Test	1	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3236: *Advanced Radar Technology*	0.000	0.589	23.301	68.037	-	68.037	68.411	27.601	0.000	0.000	0.000	187.939
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Advanced Radar Technology (ART): The EASR and EXI Engineering and Manufacturing Development (E&MD) contracts are to be awarded in FY16. This requires a significant increase in funding between FY16 and FY17. 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. EASR will provide for engineering of component and system level technology improvements for equipment used by in service air search radars.

Enterprise X-Band Illuminator (EXI): EXI funding will develop an X-band illuminator compatible with the EASR radar and Combat System suite. Funding will also integrate a missile illuminator for future CVN applications as well as other ship classes.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: SYSTEMS ENGINEERING - SPEED TO FLEET (S2F)	0.589	0.600	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - Commenced development, integration, and testing of an advanced signal processing capability for X-Band radars (S2F). - Completed hardware and software (HW/SW) testing - Commenced S2F At Sea testing					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Commenced S2F land based testing ***FY 2016 Plans:*** - Complete development, integration, and testing of an advanced signal processing capability for X-Band radars (S2F). - Complete S2F land based testing - Complete At Sea testing - Complete transition of an advanced signal processing capability for X-Band radars (Speed To Fleet). ***FY 2017 Base Plans:*** - N/A ***FY 2017 OCO Plans:*** N/A					
Title: SYSTEMS ENGINEERING - EASR ***Articles:*** ***FY 2015 Accomplishments:*** - N/A ***FY 2016 Plans:*** - Conduct EASR Technical Interchange Meetings (TIMs) - Commence support to EASR Integrated Product Teams (IPTs) and Working Groups (WGs) to facilitate successful integration of the radar with the ship and combat system ***FY 2017 Base Plans:*** The EASR and EXI Engineering and Manufacturing Development (E&MD) contracts are to be awarded in FY16. This requires a significant increase in funding between FY16 and FY17. - Perform EASR Preliminary Design - Conduct EASR Preliminary Design Review (PDR) - Conduct EASR TIMs - Initiate EASR test planning in support of test site requirements - Continue supporting EASR IPTs and WGs to facilitate successful integration of the radar with the ship and combat system ***FY 2017 OCO Plans:***	0.000 -	6.189 -	55.623 -	0.000 -	55.623 -

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
Title: GOVERNMENT ENGINEERING SERVICES- EASR	0.000	8.319	4.325	0.000	4.325
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - N/A					
FY 2016 Plans: - Support EASR Source Selection - Provide support to EASR IPTs and WGs - Analyze and assess EASR E&MD contract deliverables - Support regular EASR Program Management Reviews - Support EASR cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Provide support to EASR TIMs'					
FY 2017 Base Plans: - Support EASR PDR - Continue to provide support to EASR IPTs and WGs - Continue to analyze and assess EASR E&MD contract deliverables - Continue to support regular EASR Program Management Reviews - Continue to support EASR cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Continue to provide support to EASR TIMs					
FY 2017 OCO Plans: N/A					
Title: SYSTEMS ENGINEERING - X BAND ILLUMINATOR (EXI)	0.000	4.000	5.000	0.000	5.000
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - N/A					
FY 2016 Plans: - Commence EXI Preliminary Design					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Commence support to EXI IPTs and WGs to facilitate successful integration with the ship and combat system - Conduct EXI TIMs ***FY 2017 Base Plans:*** - Continue EXI Preliminary Design - Continue support to EXI IPTs and WGs to facilitate successful integration with the ship and combat system - Conduct EXI TIMs - Initiate EXI test planning in support of test site requirements ***FY 2017 OCO Plans:*** N/A					
Title: GOVERNMENT ENGINEERING SERVICES - X BAND ILLUMINATOR ***Articles:*** ***FY 2015 Accomplishments:*** - N/A ***FY 2016 Plans:*** - Provide support to EXI IPTs and WGs - Analyze and assess EXI contract deliverables - Support regular EXI Program Management Reviews - Support EXI cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Provide support to EXI TIMs ***FY 2017 Base Plans:*** - Support EXI PDR - Continue to provide support to EXI IPTs and WGs - Continue to analyze and assess EXI contract deliverables - Continue to support regular EXI Program Management Reviews - Continue to support EXI cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Continue to provide support to EXI TIMs ***FY 2017 OCO Plans:***	0.000 -	2.600 -	2.000 -	0.000 -	2.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
Title: PROGRAM MANGEMENT SUPPORT - EASR/EXI	0.000	1.593	1.089	0.000	1.089
Articles:	-	-	-	-	-
FY 2015 Accomplishments: - N/A					
FY 2016 Plans: - Perform EASR Source Selection - Award EASR E&MD Contract - Provide support to EASR/EXI IPTs and WGs - Analyze and assess EASR/EXI contract deliverables - Conduct regular EASR/EXI Program Management Reviews - Execute EASR/EXI cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Provide support to EASR/EXI TIMs					
FY 2017 Base Plans: - Continue to provide support to EASR/EXI IPTs and WGs - Continue to analyze and assess EASR/EXI contract deliverables - Continue to conduct regular EASR/EXI Program Management Reviews - Continue to execute EASR/EXI cost, schedule, and performance management, contract administration, contract oversight, risk identification and risk mitigation - Continue to provide support to EASR/EXI TIMs					
FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	0.589	23.301	68.037	0.000	68.037

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• OPN/2026: *0204228N Radar Support*	26.735	19.841	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	92.586

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• O&MN: *0702228N Radar Support*	2.897	2.324	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.729

Remarks

D. Acquisition Strategy

Advanced Radar Technology (ART): ART efforts 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 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 Protection (EP) new firmware/software changes testing
- S2F EP Land Based Testing
- S2F EP At-Sea Testing
- S2F 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
- EASR and EXI Production Authorization
- EASR and EXI Production

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
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 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - S2F	C/CPFF	Northrop Grumman - ES : Baltimore, MD	0.000	0.308	Jul 2015	0.300	Mar 2016	0.000		-		0.000	0.000	0.608	-
Systems Engineering - EASR	C/FPIF	EASR E&MD Contractor - TBD : TBD	0.000	0.000		6.189	Jul 2016	55.623	Jan 2017	-		55.623	0.000	61.812	-
Systems Engineering - EXI	TBD	EXI E&MD Contractor - TBD : TBD	0.000	0.000		4.000	Jul 2016	5.000	Jan 2017	-		5.000	0.000	9.000	-
		Subtotal	0.000	0.308		10.489		60.623		-		60.623	0.000	71.420	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering - EASR	WR	NSWC/DD : Dahlgren, VA	0.000	0.000		4.236	Jan 2016	1.565	Nov 2016	-		1.565	0.000	5.801	-
Government Engineering - EASR	WR	NSWC/CR : Crane, IN	0.000	0.000		0.869	Jan 2016	0.775	Nov 2016	-		0.775	0.000	1.644	-
Government Engineering - EASR	WR	NSWC/PHD(VAB) : Virginia Beach, VA	0.000	0.000		0.596	Jan 2016	0.275	Nov 2016	-		0.275	0.000	0.871	-
Government Engineering - EASR	WR	NSWC/CD(PHI : Philadelphia, PA	0.000	0.000		0.197	Jan 2016	0.100	Nov 2016	-		0.100	0.000	0.297	-
Government Engineering - EASR	WR	NRL : Washington, DC	0.000	0.000		0.325	Jan 2016	0.250	Nov 2016	-		0.250	0.000	0.575	-
Government Engineering - EASR	SS/CPFF	JHU/APL : Baltimore, MD	0.000	0.000		0.696	Feb 2016	0.360	Nov 2016	-		0.360	0.000	1.056	-
Government Engineering - EASR	MIPR	ONR : Arlington, VA	0.000	0.000		1.400	Feb 2016	1.000	Nov 2016	-		1.000	0.000	2.400	-
Government Engineering - EXI	WR	NSWC/DD : Dahlgren, VA	0.000	0.000		1.050	Jan 2016	0.840	Nov 2016	-		0.840	0.000	1.890	-
Government Engineering - EXI	WR	NSWC/CR : Crane, IN	0.000	0.000		1.050	Jan 2016	0.840	Nov 2016	-		0.840	0.000	1.890	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3236 / *Advanced Radar Technology*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering - EXI	WR	NSWC/PHD(VAB) : Virginia Beach, VA	0.000	0.000		0.500	Jan 2016	0.320	Nov 2016	-		0.320	0.000	0.820	-
		Subtotal	0.000	0.000		10.919		6.325		-		6.325	0.000	17.244	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - S2F	WR	NRL : Washington, DC	0.000	0.281	Jan 2015	0.300	Jan 2016	0.000		-		0.000	0.000	0.581	-
		Subtotal	0.000	0.281		0.300		0.000		-		0.000	0.000	0.581	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Management Services	C/CPIF	TBD : TBD	0.000	0.000		0.000		0.569	Nov 2016	-		0.569	0.000	0.569	-
Travel	Allot	TRAVEL : Washington, DC	0.000	0.000		0.050	Jan 2016	0.020	Nov 2016	-		0.020	0.000	0.070	-
Support Management Services	C/CPIF	CACI : Washington, DC	0.000	0.000		0.349	Feb 2016	0.250	Nov 2016	-		0.250	0.000	0.599	-
Support Management Services	SS/CPIF	SPA : Washington, DC	0.000	0.000		0.974	Feb 2016	0.000		-		0.000	0.000	0.974	-
Support Management Services	C/CPIF	TMB : Washington, DC	0.000	0.000		0.220	Feb 2016	0.250	Nov 2016	-		0.250	0.000	0.470	-
		Subtotal	0.000	0.000		1.593		1.089		-		1.089	0.000	2.682	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.589		23.301		68.037		-		68.037	0.000	91.927	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy			Date: February 2016
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3236 / *Advanced Radar Technology*	

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

Notional Schedule Aligned with CVN ACAT Program (DON17)

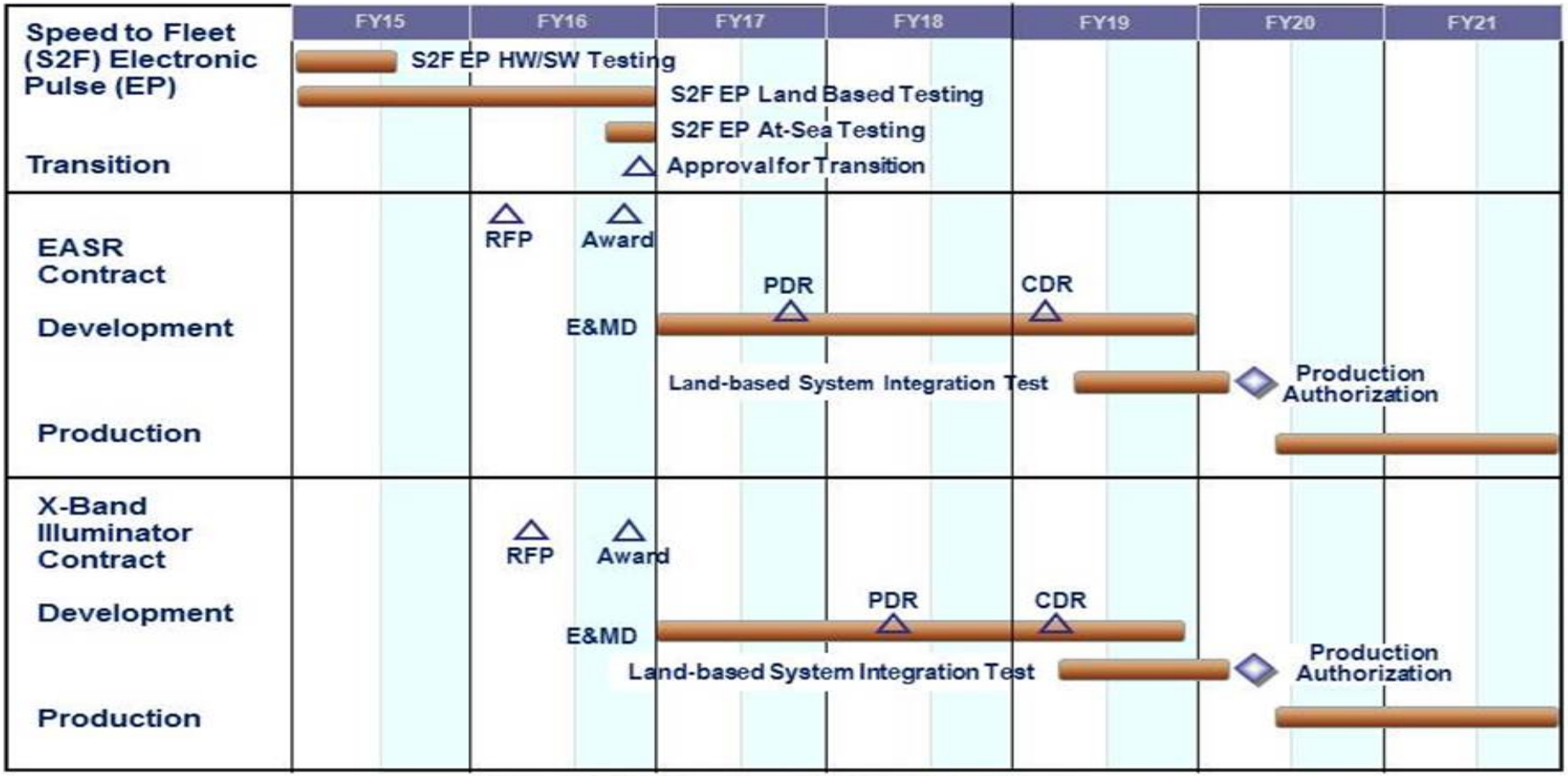


Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

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	3	2015
S2F EP Land Based Testing	1	2015	4	2016
S2F EP At-Sea Testing	3	2016	4	2016
S2F 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	2	2016	2	2016
EXI - Engineering and Manufacturing Development (E&MD) Contract Award	4	2016	4	2016
EASR & EXI E&MD	1	2017	4	2019
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 and EXI - E&MD EASR Land Based System Integration Testing	2	2019	1	2020
EASR and EXI Authorization	2	2020	2	2020
EASR and EXI Production	2	2020	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3301: *Improved Capabilities SPY-1 Radar*	13.412	0.762	0.796	10.744	-	10.744	12.281	12.656	12.857	12.857	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 and solid state technology inserters 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 and is a top fleet requirement as part of the AEGIS Wholeness initiative.

FY17-FY21 funding has been realigned from Project 3232 Multi-Mission Signal Processor to Project 3301. Efforts include development of Transmitter Noise Cancellation (TNC), Sidelobe Blanking (SLB), Ship-Based Non-Cooperative Target Recognition (SBNCTR), Electronic Attack (EA) and Rapid Radar Capability Program (R2CIP). Initiate transition of Advanced Calibration Experiment (ACE) into Baseline 9.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Improved Capabilities SPY-1 Radar	0.762	0.796	10.744	0.000	10.744
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					
- Initiated technology development of 40W/400W Gallium Nitride (GaN) based solid state amplifier					
- Continued development of additional cost reduction initiatives					
- Continued Microwave Tube (MWT) improvement design/development					
FY 2016 Plans:					
- Complete MWT improvement design/development					
- Continue technology development for GaN Based 40W/400W Solid State Amplifier					
- Initiate technology development for 10KW GaN Based Amplifier for Pre-Drivers					
- Continue development of additional cost reduction initiatives					
FY 2017 Base Plans:					
- Continue Technology Development for GaN Based 40W/400W Solid State Amplifier					
- Continue Technology Development for 10KW GaN Based Amplifier for Pre-Drivers					
- Continue development of additional cost reduction initiatives					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Initiate Transmitter Noise Cancellation (TNC) requirements analysis and conduct SDR - Initiate concept development for Electronic Attack Improvements - Initiate requirements development and design reviews Ship-Based Non-Cooperative Target Recognition (SBNCTR) - Continue Radar Integrated Product Team (IPT) support for all baselines - Initiate adaptation of Baseline 7.2 Advanced Calibration Experiment (ACE) for Baseline 9 ***FY 2017 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	0.762	0.796	10.744	0.000	10.744

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• OPN/2980: *Items Less Than $5M*	14.527	17.509	19.010	-	19.010	36.648	26.377	26.278	29.647	Continuing	Continuing
• O&MN/0702228N: *O&M,N AEGIS Wholeness SPY Transmitter Reliability*	4.222	3.726	4.040	-	4.040	4.205	4.294	4.373	4.460	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. Radar capability upgrades will be incorporated into Baselines 7 and 9.

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

Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
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 Water Cooled Vane (WCV) to Double Duty (DD) engineering development
- Complete Simplified Driver (SDR) reliability design improvements
- 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
- Complete GaN based Driver/Pre-Driver studies/investigations
- Complete Advanced Calibration Experiment (ACE) Baseline (BL) 9 Demo
- Complete Transmitter Noise Cancellation (TNC) SDR
- Complete Electronic Attack (EA) Studies and Rapid Radar Capability Program (R2CIP) concept development
- Complete ACE BL 9 certification
- Complete TNC Preliminary Design Review (PDR)
- Complete EA studies and R2CIP requirement analysis and spec updates
- Complete SBNCTR integration and test
- Complete TNC Critical Design Review (CDR)
- Complete Sidelobe Blanking (SLB) requirement analysis
- Complete SBNCTR EA
- Complete SLB PDR
- Complete EA and R2CIP Technology Development
- Complete TNC integration and test
- Complete SLB CDR

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy		Date: February 2016
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 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SYSTEM ENGINEERING	MIPR	Office of Naval Research : Arlington, VA	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	-
SYSTEM ENGINEERING	C/CPFF	Raytheon : Sudbury, MA	1.941	0.000		0.000		0.000		-		0.000	0.000	1.941	-
SYSTEM ENGINEERING	WR	NSWC/Crane, IN : Crane, IN	10.471	0.762	Oct 2014	0.796	Jan 2016	0.789	Dec 2016	-		0.789	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.000		0.000		6.035	Dec 2016	-		6.035	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/CPFF	AEGIS Techrep : Moorestown, NJ	0.000	0.000		0.000		0.451	Dec 2016	-		0.451	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	SS/FP	APL/JHU : Laurel, MD	0.000	0.000		0.000		0.384	Feb 2017	-		0.384	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	CSCS : Dahlgren, VA	0.000	0.000		0.000		0.222	Dec 2016	-		0.222	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NRL : Washington, DC	0.000	0.000		0.000		0.440	Dec 2016	-		0.440	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	MIPR	MIT/LL : Lexington, MA	0.000	0.000		0.000		0.405	Mar 2017	-		0.405	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		1.303	Nov 2016	-		1.303	Continuing	Continuing	Continuing
SYSTEM ENGINEERING	WR	NSWC/PHD : Port Hueneme, CA	0.000	0.000		0.000		0.206	Dec 2016	-		0.206	Continuing	Continuing	Continuing
		Subtotal	13.412	0.762		0.796		10.235		-		10.235	-	-	-

Remarks

FY17-FY21 funding realigned from Project 3232 to 3301.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy		Date: February 2016
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*

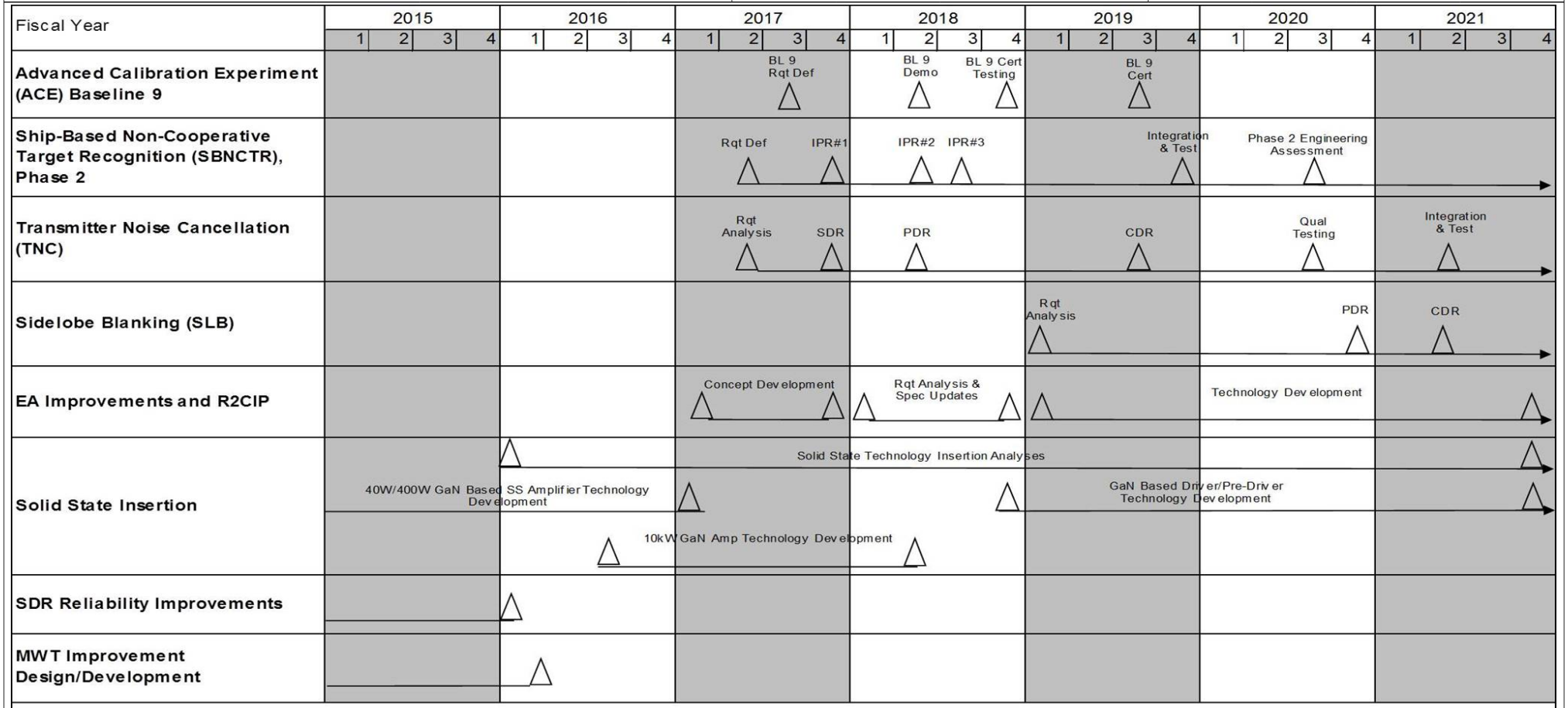
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	Allot	PEOIWS2 : Washington, DC	0.000	0.000		0.000		0.020	Feb 2017	-		0.020	Continuing	Continuing	Continuing
Support Management Services	C/CPIF	TBD : TBD	0.000	0.000		0.000		0.405	Jan 2017	-		0.405	Continuing	Continuing	Continuing
Support Management Services	C/CPIF	CACI : Washington, DC	0.000	0.000		0.000		0.084	Jan 2017	-		0.084	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		0.509		-		0.509	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.412	0.762		0.796		10.744		-		10.744	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy		Date: February 2016
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*



SDR Reliability Improvements and MWT Imporvement Design/Development are continued development from prior years.
TNC, SLB, EA Improvements and R2CIP, and Solid State Insertion continue beyond the FYDP.

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
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				
MWT Improvement Design/Development	1	2015	2	2016
Simplified Driver (SDR) Reliability Improvements	1	2015	1	2016
40W/400W GaN Based Solid State Amplifier Technology Development	1	2015	1	2017
Solid State Technology Insertion Analyses	1	2016	4	2021
EA Improvements and R2CIP Concept Development	1	2017	4	2017
Ship-Based Non-Cooperative Target Recognition (SBNCTR) Rqt Definition	2	2017	2	2017
Transmitter Noise Cancelation (TNC) Rqt Analysis	2	2017	2	2017
Advanced Calibration Experiment (ACE) Baseline 9 Requirement Definition	3	2017	3	2017
SBNCTR IPR #1	4	2017	4	2017
TNC SDR	4	2017	4	2017
EA Improvements and R2CIP Rqt Analysis & Spec Updates	1	2018	4	2018
TNC PDR	2	2018	2	2018
ACE Baseline 9 Demo	2	2018	2	2018
SBNCTR IPR #2	2	2018	2	2018
SBNCTR IPR #3	3	2018	3	2018
ACE Baseline 9 Cert Testing	4	2018	4	2018
GaN based Driver/Pre-Driver Technology Development	4	2018	4	2021
SLB Requirements Analysis	1	2019	4	2020
EA Improvements and R2CIP Technology Development	1	2019	4	2021
ACE Baseline 9 Cert	3	2019	3	2019
TNC CDR	3	2019	3	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
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*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SBNCTR Integration & Test	4	2019	4	2019
SBNCTR Engineering Assessment	3	2020	3	2020
TNC Qual Testing	3	2020	3	2020
SLB PDR	4	2020	4	2020
TNC Integration & Test	2	2021	2	2021
SLB CDR	2	2021	2	2021