Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Navy												Date: March 2014
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 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	932.493	235.176	157.871	20.409	-	20.409	20.755	19.720	20.168	20.736	Continuing	Continuing
3186: *Air and Missile Defense Radar*	685.773	193.947	125.132	-	-	-	-	-	-	-	-	1,004.852
3187: *Periscope Detection*	55.415	4.650	-	-	-	-	-	-	-	-	-	60.065
3188: *Dual-Band Radar*	55.159	11.609	15.893	8.774	-	8.774	6.432	5.058	5.179	5.337	Continuing	Continuing
3232: *Multi-Mission Signal Processor*	108.156	12.602	14.795	9.669	-	9.669	13.522	13.853	14.167	14.557	Continuing	Continuing
3236: *Advanced Radar Technology*	0.000	-	-	1.200	-	1.200	-	-	-	-	-	1.200
3301: *Improved Capabilities SPY-1 Radar*	7.990	3.380	2.051	0.766	-	0.766	0.801	0.809	0.822	0.842	Continuing	Continuing
9999: *Congressional Adds*	20.000	8.988	-	-	-	-	-	-	-	-	-	28.988
MDAP/MAIS Code: P384												

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): (Note: Beginning in FY15, this effort will transfer 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.

Periscope Detection: The CVN Periscope Detection Radar program, AN/SPS-74(V), develops and delivers the capability which provides automated detection and discrimination of submarine periscopes using advanced algorithms. This enables discrimination of periscopes from surface contacts, buoys, small boats, floating mines, etc. This effort was initially based on an Advanced Development Model (ADM), developed in PE 0603553N, Surface Antisubmarine Warfare. VCNO Memorandum

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Navy	Date: March 2014
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*

Ser N09/12U100544 dtd 17 Dec, 2012 directs cancellation of the AN/SPS-74 Program. FY12 and FY13 funding developed the Periscope Detection and Discrimination (PDD) interface for the AN/SPQ-9B Radar. FY13 funding also developed a Land Based Test Asset to demonstrate new solid state technology that lowers the required power and removes the highest failing components, improving system reliability and stability while greatly reducing the production life and life costs.

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: FY12-14 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: FY13-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.

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 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	255.516	275.871	236.157	-	236.157
Current President's Budget	235.176	157.871	20.409	-	20.409
Total Adjustments	-20.340	-118.000	-215.748	-	-215.748
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-118.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-7.024	-			
• SBIR/STTR Transfer	-6.830	-			
• Program Adjustments	-	-	-213.114	-	-213.114
• Rate/Misc Adjustments	-	-	-2.634	-	-2.634
• Congressional General Reductions Adjustments	-15.486	-	-	-	-
• Congressional Add Adjustments	9.000	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2013	FY 2014
Project: 9999: *Congressional Adds*		
Congressional Add: *Adv Radar Innovation Fund - Surf (Cong)*	8.988	-
Congressional Add Subtotals for Project: 9999	8.988	-
Congressional Add Totals for all Projects	8.988	-

Change Summary Explanation

Technical: N/A

Schedule: N/A

Cost: Reduced FY13 for Congressional Rescissions, sequestration reductions, and SBIR assessments. Reduction in FY14 due to Air and Missile Defense Radar (AMDR) Engineering and Manufacturing Development contract delay ($115M). Reduction in FY15 and out due to Department decision to reduce contracted services, rephasing of requirements to match expenditures, and movement of AMDR funding to PE 0604522N.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy												Date: March 2014
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 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
3186: *Air and Missile Defense Radar*	685.773	193.947	125.132	-	-	-	-	-	-	-	-	1,004.852
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

Air and Missile Defense Radar (AMDR): (Note: Beginning in FY15, this effort will transfer 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 2013	FY 2014	FY 2015
Title: SYSTEMS ENGINEERING	190.367	121.474	-
Articles:	-	-	-
FY 2013 Accomplishments: - Achieved successful Milestone B decision - Supported efforts to mature AMDR design and radar parameters necessary for ship integration			
FY 2014 Plans: - Award AMDR-S/RSC Engineering & Manufacturing Development (E&MD) contract - Mature AMDR design and radar parameters necessary for ship integration - Support E&MD Phase Integrated Baseline Review - Conduct Hardware Delta Preliminary Design Review (PDR) and Software/System Delta PDR - Develop modeling and simulation tools - Conduct performance analysis in support of system design			
FY 2015 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015
N/A			
Title: PROGRAM MANAGEMENT SUPPORT	3.580	3.658	-
Articles:	-	-	-
FY 2013 Accomplishments: - Achieved successful Milestone B decision - Provided support to Integrated Product Teams (IPTs) and Working Groups (WGs) required for program execution - Assisted in cost, schedule and performance management, contract administration and oversight, risk identification and mitigation			
FY 2014 Plans: - Conduct E&MD Phase Integrated Baseline Review - Provide support to IPTs and WGs required for program execution of the E&MD contracts - Analyze and assess contractor deliverables - Conduct regular Program Management Reviews - Assist in cost, schedule and performance management, contract administration and oversight, earned value assessment, risk identification and mitigation - Provide support to Hardware Delta PDR and Software/System Delta PDR - Provide support to technical interchange meetings			
FY 2015 Plans: N/A			
Accomplishments/Planned Programs Subtotals	193.947	125.132	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• 0604522N: *Air and Missile Defense Radar*	-	-	144.706	-	144.706	247.339	100.414	43.057	41.329	Continuing	Continuing

Remarks

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

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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*

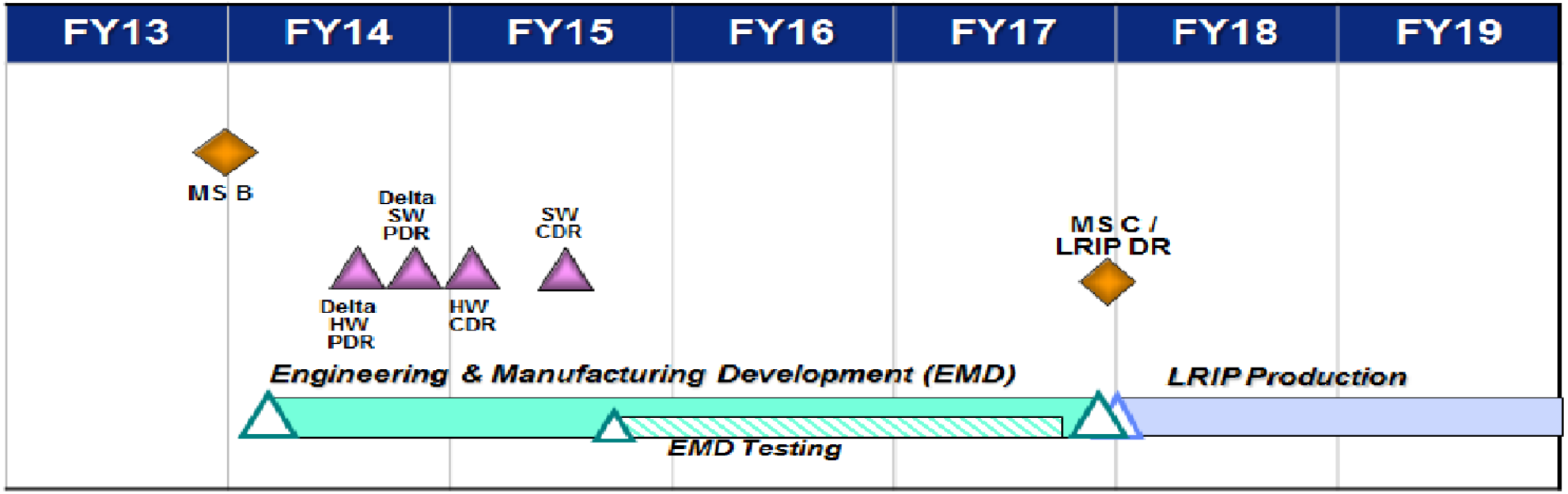
Warfare (AAW). System design will be accomplished by employing proven technologies and commercial standards to lower schedule risk and develop a product with the lowest life-cycle cost.

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 Software/System Delta PDR
- Conduct Hardware and Software/System CDRs
- Complete Engineering Development Model (EDM) Testing
- Achieve Milestone C decision to proceed into production and exercise LRIP options

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
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*



Note: FY14 and prior captured under PE0604501N. Starting in FY15, effort moved to PE 0604522N.

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CDR	Critical Design Review
DR	Decision Review
HW	Hardware
LRIP	Low Rate Initial Production
MS	Milestone
PDR	Preliminary Design Review
SFR	System Functional Review
TRR	Test Readiness Review
SW	Software

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy			Date: March 2014
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3187 / *Periscope Detection*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
3187: *Periscope Detection*	55.415	4.650	-	-	-	-	-	-	-	-	-	60.065
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

Periscope Detection: The CVN Periscope Detection Radar program, AN/SPS-74(V), develops and delivers the capability which provides automated detection and discrimination of submarine periscopes using advanced algorithms. This enables discrimination of periscopes from surface contacts, buoys, small boats, floating mines, etc. This effort was initially based on an Advanced Development Model (ADM), developed in PE 0603553N, Surface Antisubmarine Warfare. VCNO Memorandum Ser N09/12U100544 dtd 17 Dec, 2012 directs cancellation of the AN/SPS-74 Program. FY12 and FY13 funding developed the Periscope Detection and Discrimination (PDD) interface for the AN/SPQ-9B Radar. FY13 funding also developed a Land Based Test Asset to demonstrate new solid state technology that lowers the required power and removes the highest failing components, improving system reliability and stability while greatly reducing the production life and life costs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Title: Periscope Detection	4.650	-	-
Articles:	-	-	-
FY 2013 Accomplishments: - Completed AN/SPQ-9B Radar PDD interface development and testing.			
FY 2014 Plans: N/A			
FY 2015 Plans: N/A			
Accomplishments/Planned Programs Subtotals	4.650	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPN/2980: *0204228N/2980 Radar Support (OPN)*	0.258	0.700	0.696	-	0.696	0.696	0.696	0.697	0.696	Continuing	Continuing
• O&MN/1C2C/12C31: *0702228N/Radars*	1.500	1.500	1.500	-	1.500	1.500	1.500	1.500	1.500	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3187 / *Periscope Detection*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

Current Program supports four (4) Advanced Demonstration Models (ADMs).

E. Performance Metrics

- Complete AN/SPQ-9B PDD Interface Development and Testing

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3187 / *Periscope Detection*

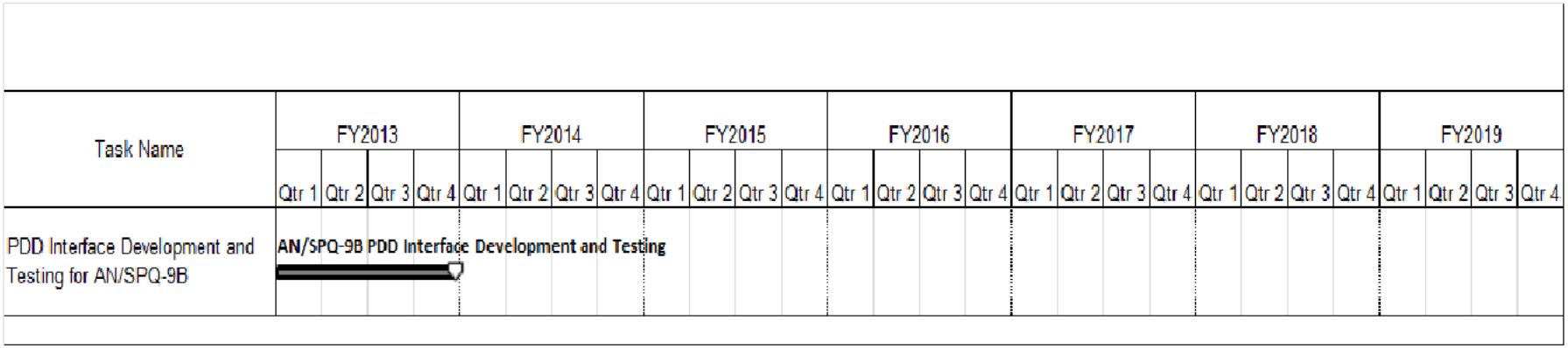


Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy			Date: March 2014
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3188 / *Dual-Band Radar*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
3188: *Dual-Band Radar*	55.159	11.609	15.893	8.774	-	8.774	6.432	5.058	5.179	5.337	Continuing	Continuing
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

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: FY12-14 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: FY13-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 2013	FY 2014	FY 2015
Title: RADAR UPGRADES TECHNOLOGY INSERTION	6.194	11.920	6.272
Articles:	-	-	-
FY 2013 Accomplishments: - Continued Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Commenced software development to implement live over simulation training capability in support of BFTT integration. - Commenced software development to implement DBR/SEWIP interface. - Continued software development to implement DBR/CEC interface.			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015
- Continued to provide technical support for the DBR element certification in support of the overall combat system certification. ***FY 2014 Plans:*** - Continue Technology Insertion for the MFR/VSR/DBR hardware and software and development/updates to associated logistics products. - Continue software development and commence integration of the DBR/BFTT, DBR/SEWIP and DBR/CEC interfaces. - Continue to provide technical support for the DBR element certification in support of the overall combat system certification. - Commence validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Commence 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 and integration of the DBR/BFTT, DBR/SEWIP and DBR/CEC interfaces. - Continue to provide technical support for the DBR element certification in support of the overall combat system certification. - Complete validation testing and integration of the DBR/BFFT, DBR/CEC and DBR/SEWIP software interfaces. - Continue DBR Environmental Testing. - Commence DBR Shipboard Testing.			
Title: RADAR UPGRADES GOVERNMENT ENGINEERING SERVICES	4.548	3.414	2.139
Articles:	-	-	-
FY 2013 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. - Commenced Government Engineering Services in support of DBR/BFTT and DBR/SEWIP software interface development. - Continued to provide DBR EMI testing efforts. - Continued to provide Government Engineering Services for the DBR/CEC software interface development. ***FY 2014 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 DBR EMI testing efforts. - Continue to provide Government Engineering Services in support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development integration. - Continue to provide Government Engineering Services required for DBR element certification to support overall combat system certification.			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015
- Commenced validation testing and certification of the DBR/BFTT, DBR/CEC and DBR/SEWIP software interfaces. - Commenced 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. - Continue to provide Government Engineering Services in 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 DBR Environmental Testing. - Commence DBR Shipboard Testing.			
Title: RADAR UPGRADES PROGRAM MANAGEMENT	0.867	0.559	0.363
Articles:	-	-	-
FY 2013 Accomplishments: - Continued to provide Program Management and logistics support for radar upgrades and technology insertion for the MFR/VSR/ DBR radars. - Commenced Program Management for the DBR/BFTT and DBR/SEWIP software interface development. - Continued to provide Program Management for DBR/CEC software interface development. ***FY 2014 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 support of DBR/BFTT, DBR/CEC and DBR/SEWIP software interface development. ***FY 2015 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 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.			
Accomplishments/Planned Programs Subtotals	11.609	15.893	8.774

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPN/2980: *BLI 2980/ OPN Items Less Than $5M*	-	3.263	4.187	-	4.187	11.616	16.381	16.398	16.397	Continuing	Continuing
• OMN/0702228N: *0702228N/1C2C/O&M,N*	0.939	2.699	3.173	-	3.173	2.763	2.671	2.698	2.760	Continuing	Continuing

Remarks

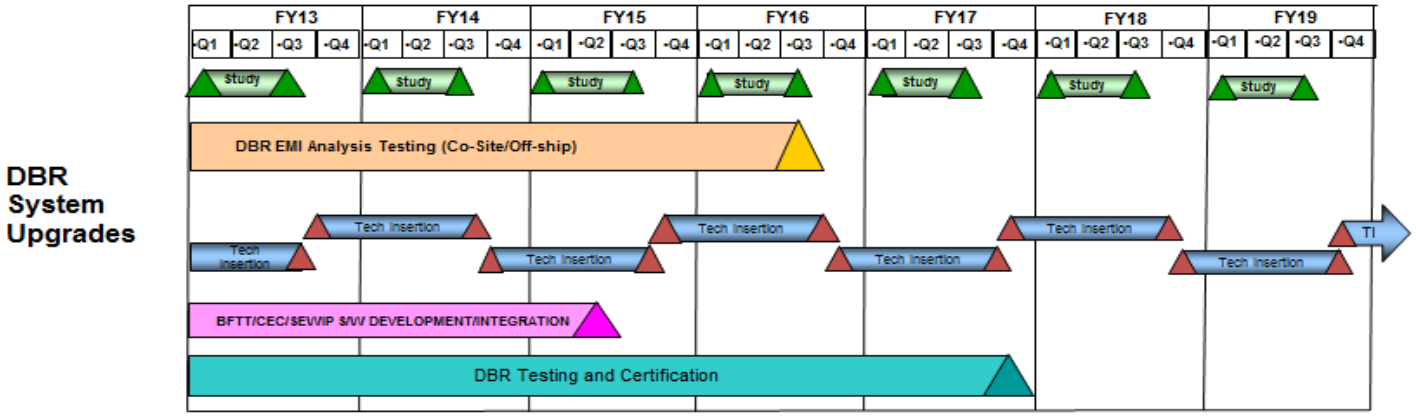
D. Acquisition Strategy

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-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
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-2A, RDT&E Project Justification: PB 2015 Navy			Date: March 2014
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 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
3232: *Multi-Mission Signal Processor*	108.156	12.602	14.795	9.669	-	9.669	13.522	13.853	14.167	14.557	Continuing	Continuing
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

Multi-Mission Signal Processor (MMSP): The development of Multi-Mission Signal Processor (MMSP) provides Anti-Air Warfare (AAW)/Ballistic Missile Defense (BMD) Multi-mission capability for DDG 51 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 2013	FY 2014	FY 2015
Title: SYSTEMS ENGINEERING	12.602	14.795	9.669
Articles:	-	-	-
FY 2013 Accomplishments: - Supported Aegis Light Off (ALO) - Continued to support MMSP integration testing with Advanced Capability Build (ACB12) to address all MMSP related issues - Initiated validation and verification testing and computer program corrections - 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 - Initiated design and development of MANTECH Solid State Switch Assembly (SSSA) - Initiated COTS Refresh and radar improvements - Initiated DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Supported MMSP/ACB12 Radar Integration at-sea validation testing and computer program correction. - Conducted ACB16 Radar requirements analysis			
FY 2014 Plans: - Support of Combat System Ship Qualification Trials (CSSQT) testing - Continue MMSP/ACB12 Radar Integration at-sea validation testing and computer program correction			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015
- Continue design and development of MANTECH SSSA - Continue COTS Refresh and radar improvements - Continue DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Finalize ACB16 Radar requirements analysis - 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			
FY 2015 Plans: - Support DDG MMSP final certification - Continue to support MMSP/ACB12 Radar Integration at-sea validation testing and computer program correction - Complete design and development of MANTECH SSSA and transition to production - Continue COTS Refresh and radar improvements - Continue DDG Baseline 9 Radar Capabilities Upgrades, Ship-Based NCTR, and Baseline 9 Radar Synchronization - Incorporate 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			
Accomplishments/Planned Programs Subtotals	12.602	14.795	9.669

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• SCN/2122: *BLI 2122/SCN DDG 51*	4,497.012	2,085.115	2,934.598	-	2,934.598	3,276.756	3,312.269	3,354.739	3,337.383	Continuing	Continuing
• OPN/0900: *BLI 0900/ OPN DDG Modernization*	407.707	285.994	338.569	-	338.569	427.258	491.224	719.671	669.440	Continuing	Continuing

Remarks

D. Acquisition Strategy

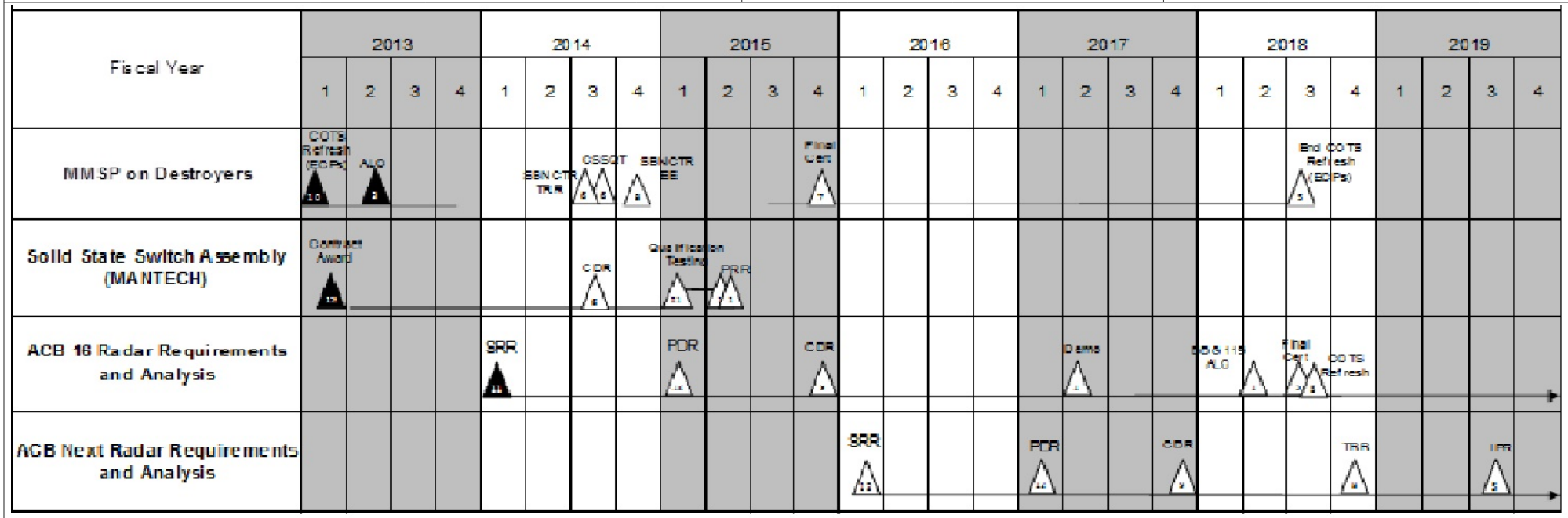
Multi-Mission Signal Processor (MMSP) provides AAW/BMD Multi-mission capability for AEGIS Modernization Program and leverages BMD 4.0.1 and SPY-1D(V) designs. This MMSP development efforts support integration of BMD 5.0 signal processing, and will lead to the OPN/SCN procurement for shore sites and shipsets.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

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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*

E. Performance Metrics

- Complete DDG SPY-1D(V) Engineering Exercise (EE) #2
- Complete DDG Qualification Testing
- Complete DDG ACB 12 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 Demo
- Complete ACB16 AEGIS Light Off (ALO)
- Complete ACB16 Final Certification
- Complete ACB Next PDR
- Complete ACB Next CDR
- Complete ACB Next Test Readiness Review (TRR)
- Complete ACB 16 COTS Refresh
- Complete SBNCTR TRR
- Complete SSSA qualification testing
- Complete SSSA Production Readiness Review (PRR)
- Complete ACB 16 System Readiness review (SRR)
- Complete DDG 116 ALO
- Complete ACB Next SRR
- Complete ACB Next In Process Review (IPR)

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
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*



Note:
ACB16 and ACB Next Radar efforts continue beyond the FYDP.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy												Date: March 2014
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 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
3236: *Advanced Radar Technology*	-	-	-	1.200	-	1.200	-	-	-	-	-	1.200
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

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.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Title: SYSTEMS ENGINEERING	-	-	1.200
Articles:	-	-	-
FY 2013 Accomplishments: N/A			
FY 2014 Plans: N/A			
FY 2015 Plans: - Develop, integrate, and test an advanced signal processing capability for X-Band radars (Speed To Fleet).			
Accomplishments/Planned Programs Subtotals	-	-	1.200

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPN/2026: *02042228N Radar Support*	18.076	27.934	28.007	-	28.007	24.801	30.678	31.295	31.996	798.236	991.023

Remarks

D. Acquisition Strategy

Advanced Radar Technology (ART) will develop, integrate, and test an advanced signal processing capability for X-Band radars (Speed-to-Fleet).

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

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

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604501N / *Advanced Above Water Sensors*	**Project (Number/Name)** 3236 / *Advanced Radar Technology*

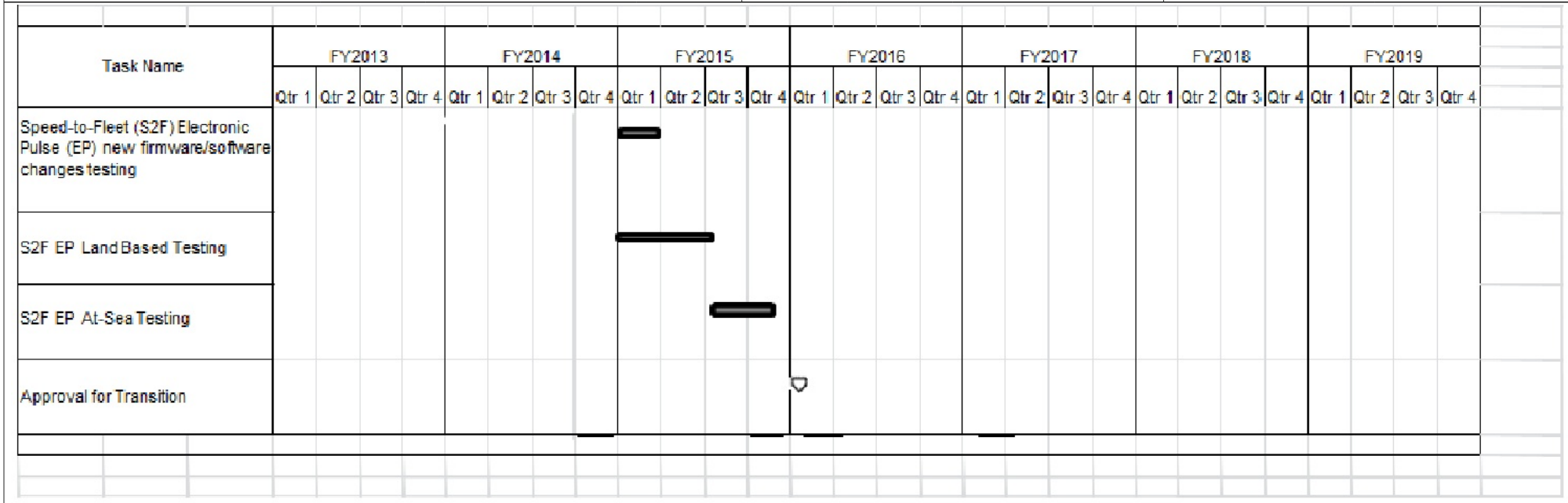


Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy			Date: March 2014
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 3301 / *Improved Capabilities SPY-1 Radar*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
3301: *Improved Capabilities SPY-1 Radar*	7.990	3.380	2.051	0.766	-	0.766	0.801	0.809	0.822	0.842	Continuing	Continuing
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

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

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Title: Improved Capabilities SPY-1 Radar	3.380	2.051	0.766
Articles:	-	-	-

FY 2013 Accomplishments:
- Finalized design and development of Sidewall Capacitor monitoring circuit for High Voltage Power Supply (HVPS)
- Finalized design and development of 10KW Traveling Wave Tube (TWT)
- Finalized design improvements to filament for Switch Tube
- Continued design and development of Crossed Field Amplifier (CFA) Microwave Tube (MWT)
- Continued design and development of reliability improvements for the Simplified Driver (SDR)
- Conducted Water Cooled Vane (WCV) to Double Duty (DD) engineering development
- Continued development of additional cost reduction initiatives
- Continued Microwave Tube (MWT) improvement design/development

FY 2014 Plans:
- Complete design and development of reliability improvements for the Simplified Driver (SDR)
- Conduct feasibility study for solid state Helix Regulator
- Conduct feasibility study for 40W/400W Gallium Nitride (GaN) based solid state amplifier
- Complete design and development of Crossed Field Amplifier (CFA) Microwave Tube
- Continue Microwave Tube (MWT) improvement design/development
- Continue development of additional cost reduction initiatives

FY 2015 Plans:
- Initiate design and development of solid state Helix Regulator

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
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 2013	FY 2014	FY 2015
- Initiate design and development of 40W/400W GaN based solid state amplifier - Continue development of additional cost reduction initiatives - Continue Microwave Tube (MWT) improvement design/development			
Accomplishments/Planned Programs Subtotals	3.380	2.051	0.766

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• OPN/2980: *Items Less Than $5M*	2.400	9.592	14.527	-	14.527	15.115	27.023	52.414	31.681	Continuing	Continuing
• O&MN/0702228N: *O&M,N AEGIS Wholeness SPY Transmitter Reliability*	2.254	3.723	4.222	-	4.222	3.888	4.387	4.435	4.522	Continuing	Continuing

Remarks

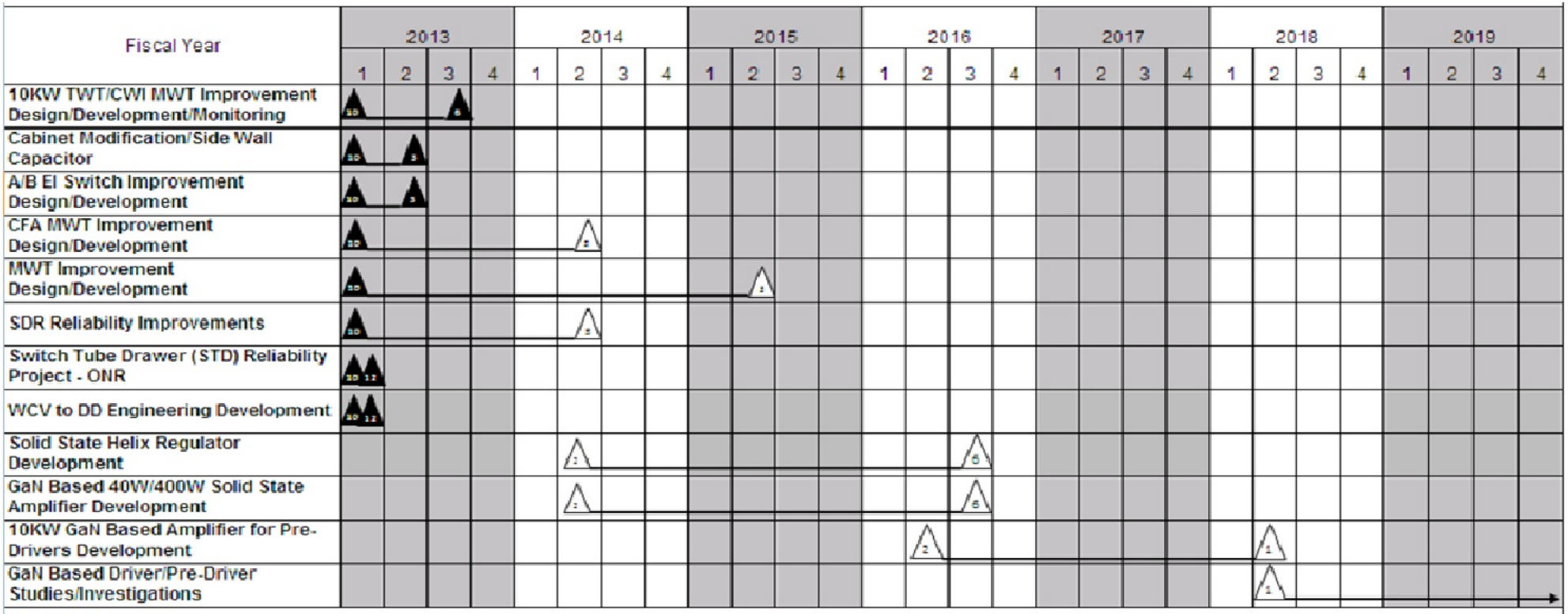
D. Acquisition Strategy

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

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Navy		Date: March 2014
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:
GaN Based Driver/Pre-Driver Studies/Investigations continue beyond the FYDP.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy			Date: March 2014
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604501N / *Advanced Above Water Sensors*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
9999: *Congressional Adds*	20.000	8.988	-	-	-	-	-	-	-	-	-	28.988
Quantity of RDT&E Articles	0.000	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

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.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014
Congressional Add: Adv Radar Innovation Fund - Surf (Cong)	8.988	-
FY 2013 Accomplishments: N/A		
FY 2014 Plans: N/A		
Congressional Adds Subtotals	8.988	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Add