Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0205620N *I Surface ASW Cmbt Sys Integr*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	216.279	23.685	24.583	29.351	-	29.351	28.945	30.213	29.892	30.407	Continuing	Continuing
1916: *Surface ASW System Improvement*	216.279	23.685	24.583	29.351	-	29.351	28.945	30.213	29.892	30.407	Continuing	Continuing

A. Mission Description and Budget Item Justification

The objective of this Program Element (PE) is to significantly improve existing Surface Ship Undersea Warfare (USW) sonar system capabilities through quick and affordable development/integration of emergent, transformational technologies in support of Littoral Anti-Submarine Warfare (ASW), Theater ASW (TASW), and overall efforts required to pace the threat. Detection and classification play uniquely vital roles in the success of any ASW campaign. The Advanced Capability Build (ACB) spiral development process is the primary means by which these USW improvements are developed.

ASW remains a Navy core competency in a dynamic and uncertain maritime environment. U.S. adversaries continue to develop asymmetric capabilities and capacities to deter, disrupt, or delay the entry of U.S. and allied naval forces, and pose a constant challenge as we implement the Maritime Strategy. Evolving submarine technologies offer enhanced stealth, speed, endurance, weapons, and operational proficiency, trends foretelling that the adversary submarine of the future will have a significantly larger sphere of influence, while presenting less vulnerability to ASW forces. The effective offensive engagement range of the adversary submarine of the future will continue to match or outrange individual U.S. and multinational platform sensors and weapons in many tactical environments. Submarines are an increasing threat to all Naval and Allied ships, particularly modern diesel subs and faster torpedoes. Not only can the presence of potential hostile submarines delay naval combatant action until they are located and neutralized, submarines can also disrupt all seaborne logistics supply for any ground campaign as well as maritime commerce. ASW forces must be effective in all operating environments, ranging from the deep open ocean to the littorals, and are key to countering adversarial anti-access and area denial strategies.

This project takes advantage of the AN/SQQ-89(V) Open System Architecture (OSA) and Acoustic Rapid Commercial-Off-The-Shelf (COTS) Insertion (ARCI) initiatives to integrate Torpedo Detection, Classification, and Localization (TDCL) and ASW sonar combat system capability improvements. This COTS-based Surface Ship ASW combat system, the AN/SQQ-89A(V)15, is currently planned as a backfit program for both CG47 (select CG59-73 Baseline 3 and 4 ships) and DDG51 (All DDG and follow FLT I/II/IIA) class ships. The Open Architecture (OA) system enables the ACB process and provides budget flexibility to make COTS/OA technology solutions and ARCI-type initiatives affordable. Improvements are tested in the laboratory and at-sea.

This program will participate in, and take advantage of, the Tactical Advancements for the Next Generation (TANG) initiative that utilizes Commercial Industrial Design Thinking methodologies to engage the Fleet in generating innovative ASW improvement concepts.

ASW technology implementation will take advantage of improvements developed under the submarine Advanced Processing Build (APB) and Advanced Surveillance Build (ASB) programs and will in turn share unique improvements developed under this program with the submarine and surveillance ASW communities. All three programs (ACB, ASB, and APB) are managed under a common development organization and process titled AxB. While each platform retains its uniqueness and focus

in functional domains essential to mission success, a premium is placed on development of common capabilities and modular architecture technologies to maximize commonality and cost effectiveness.

This project will also contribute to the development of Littoral Combat Ship (LCS) ASW Mission Packages and the Frigate (FF) Program.

Project 1916 also includes funding for the Surface Ship Engineering Measurement Program (SSEMP), which will measure the performance of existing and new Surface Ship ASW combat systems and enables data-based assessment of the capabilities and shortfalls in the performance of these systems in realistic scenarios.

This project also includes funding to support cyber security initiatives to align future AN/SQQ-89A(V)15 baselines with future AEGIS Integrated Combat Systems

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	24.435	24.583	25.352	-	25.352
Current President's Budget	23.685	24.583	29.351	-	29.351
Total Adjustments	-0.750	0.000	3.999	-	3.999
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.750	0.000			
• Program Adjustments	0.000	0.000	4.097	-	4.097
• Rate/Misc Adjustments	0.000	0.000	-0.098	-	-0.098

Change Summary Explanation

Funding:
FY 2016: Decrease by $-0.750M for Small Business Innovative Research (SBIR) realignment.
FY 2018: Net increase of $+3.999M for AN/SQQ-89A(V)15 Cyber Security upgrades/alignment ($4.200M) and NWCF rate adjustments, offset by Program Sponsor realignments to higher priorities and Naval Innovative Science & Engineering (NISE)/Section 219 increase.

YEAR-TO-YEAR OVERALL BUDGET CONTROL INCREASES/DECREASES:
- FY 2016 to FY 2017 increase ($+0.898M) representative of reasonable inflation escalation associated with the RDT&E,N appropriation coupled with the initiation of Common Sonar Tactical Decision Aid (STDA) development.
- FY 2017 to FY 2018 increase ($+4.768M) due initiation of cyber security capability development to align future AN/SQQ-89A(V)15 baselines with future AEGIS Integrated Combat Systems, the initiation of studies on STDA Next Generation hardware and software architectures with the goals of virtualization and cyber hardening in conjunction with the incorporation of Bipartisan Budget Act (BBA) reduction to FY 2017.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0205620N *I Surface ASW Cmbt Sys Integr*

Schedule:
ACB development is now reflected as a continuous pipeline/conveyor process, conducted in parallel to system integration and production. This makes Steps 1 and 2 independent of any particular Build (e.g ACB-15) and allows for development of longer lead technologies.

ACB-15 At-Sea Test has shifted from 1Q17 to 3Q17 due to test ship availability. This shift does not delay delivery to system integrator.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0205620N / *Surface ASW Cmbt Sys Integr*	Project (Number/Name) 1916 / *Surface ASW System Improvement*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
1916: *Surface ASW System Improvement*	216.279	23.685	24.583	29.351	-	29.351	28.945	30.213	29.892	30.407	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Surface ASW Systems Improvements Project will support essential performance enhancements to AN/SQQ-89(V) and Surface Ship Sonar Systems. This project will improve AN/SQQ-89(V) Measures of Performance (MOP) by enhancing operator interface methods and tools, active and passive detection, tracking, classification and localization, torpedo DCL, and sonobuoy data processing and display capabilities, and increasing acoustic sensor frequency bandwidth (Operational Requirements Document #667-76-05 titled 'AN/SQQ-89 Improvement Program'), Test & Evaluation Master Plan (TEMP) 802-2.

This project will take advantage of the TANG initiative, AN/SQQ-89(V) OSA, and ARCI initiatives to integrate a TDCL and ASW sonar and combat system capability improvements. This COTS-based Surface Ship ASW combat system, the AN/SQQ-89A(V)15, is currently planned as a backfit program for both CG47 (select CG59-73 Baseline 3 and 4 ships) and DDG51 (All DDG51 and follow FLT I/II/IIA) class ships. This project has delivered the AN/SQQ-89A(V)15 Pre-Production Prototype, performed installation on board CG73, and conducted subsequent Developmental Test & Evaluation (DT&E) and Initial Operational Test & Evaluation (IOT&E) where the system was found 'Operationally Effective' by Command Operational Test and Evaluation Force (COMOPTEVFOR).

The OSA and high performance COTS processing hardware on ships fielded with the AN/SQQ-89A(V)15 combat system provides an opportunity to integrate emergent, transformational ASW technological improvements that were previously unachievable. The USW suites on these ships will require periodic upgrades to remain effective well into the 21st century and to pace the threat. Software upgrades target capability increases in high interest areas as prescribed by the Fleet and captured in campaign analysis. To achieve this, this project will package and deliver incremental upgrades every two years to the AN/SQQ-89A(V)15 production program via an ACB spiral development process (ACB-13, ACB-15, etc.) by inserting maturing USW technologies.

Primary areas of USW improvement are as follows:
- Medium Frequency (MF) Pulsed Active Sonar
- Continuous Active Sonar (CAS)
- MF Acoustic Communications
- TDCL
- Torpedo Defense
- Passive Sonar
- Sonar Tactical Decision Aids (STDA)

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build (ACB) Development	19.785	20.683	21.251	0.000	21.251
Articles:	-	-	-	-	-
Description: Develop enhancements to the AN/SQQ-89A(V)15 Open System Architecture (OSA) via the integration of transformational technologies through the four step ACB spiral development process, enhanced by the TANG initiative. These items will be integrated and delivered to the CG47 and DDG51 class AN/SQQ-89A(V)15 backfit production programs via ACB updates. The ACB four step process: Step 1 - algorithm/technology assessment by peer review panels of Subject Matter Experts (SME) to down-select technologies and assist developers with technical guidance. Step 2 - algorithm/technology testing with open and closed data sets to further down-select and refine capabilities prior to integration and testing. Step 3 - land based system-level testing in a realistic tactical environment. Step 4 - at-sea testing on an operational surface combatant. Step 4 is conducted only if an appropriate platform is available. ACB requirements are generated through discussions with the Fleet, then vetted and provided as direction by CNO, N96. Beginning in FY 2017, Steps 1 and 2 will be conducted in a pipeline style parallel to system integration and production. This makes Steps 1 and 2 independent of any particular Build (e.g ACB-15) and allows for development of longer lead technologies. The content of a specific ACB build (every two years on the odd year) will then be determined through a series of discussions with the Fleet aimed at selecting the most relevant and mature technologies available in the ACB pipeline. Integration at the String and System level will then be performed followed by Steps 3 and 4, as applicable, and transitioned to production. Additionally, import advanced development capabilities from the submarine APB and ARCI projects. Export advanced capabilities to submarine and surveillance combat system programs. Resolve/troubleshoot issues/deficiencies that arise from the AN/SQQ-89(V) Surface Ship ASW Test & Evaluation program. Rapidly address and correct problems/deficiencies in processing, capability or operations within the following areas within the AN/SQQ-89(V) USW combat system architecture; sensor processing, acoustics, fire control, contact management, performance prediction, operator productivity and on-board training, Multi-Function Towed Array (MFTA), Digital Fire Control Interface (DFCI), MFA processing, TDCL, Torpedo Defense and adaptive beamforming.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
FY 2016 Accomplishments: Completed development and integration of enhancements to the AN/SQQ-89A(V)15 for ACB-15. Conducted Step 3 land-based testing of full tactical system which tested individual capability and system performance of ACB-15. Initiated development of concepts and capabilities for ACB-17 including improvements to Active Sonar, Torpedo Detection, Contact Followers/tracking, on-board training videos, cyber protection/Information Assurance (IA) and a new environmental status board. Conducted independent Step 2 testing of ACB-17 individual technologies. ***FY 2017 Plans:*** - Conduct Step-4 at-sea testing of ACB-15. Transition ACB-15 to production. - Continue development and integration of enhancements to the AN/SQQ-89A(V)15 for ACB-17. Conduct system integration and Step 3 land-based testing of ACB-17. Transition ACB-17 to production. - Initiate planning and development of capabilities for ACB-19. - Conduct Step 1 and Step 2 testing of capabilities under development. - Support conduct of TANG events. - Initiate Common STDA development. Currently, submarine, surface and surveillance programs each develop, field and maintain similar but unique STDA products. The Common STDA development is intended to reduce future year development costs, by containing development efforts within one common system architecture and sharing of capability increases. Life cycle STDA costs will also decrease as one baseline, rather than three, is documented, maintained and trained on. ***FY 2018 Base Plans:*** - Continue development and integration of enhancements to the AN/SQQ-89A(V)15 for ACB-19. Anticipate developing improvements to implement passive tracking improvements from submarine APB; implement Active Sonar Automation improvements from Office of Naval Research (ONR); implement Doppler Clutter Reduction; implement a modern classifier for CAS; implement Synthetic Aperture Sonar from Naval Research Laboratory (NRL); implement a CAS mode for Torpedo Defense; and implement improved sonobuoy processing. - Conduct system integration and commence Step 3 land-based testing of ACB-19. - Support conduct of TANG events. - Continue Common STDA development and initiate studies on Next Generation hardware and software architectures with the goals of virtualization and cyber hardening. Virtualization is intended to reduce software integration costs while increasing flexibility. ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: AN/SQQ-89(V) Surface Ship ASW Test & Evaluation Program	0.700	0.700	0.700	0.000	0.700
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Supported final ACB-11 Initial Operational Test & Evaluation (IOT&E) events. Finalized test ship and resources in support of ACB-13 Developmental Test & Evaluation (DT&E). Supported conduct of AEGIS Integration Events (AIE) for ACB-13 certification.					
FY 2017 Plans: - Finalize ACB-13 Test & Evaluation Master Plan (TEMP). - Begin conduct of ACB-13 Developmental Test (DT) events. - Finalize test ship and resources in support of ACB-13 Operational Test (OT). - Support conduct of AIE for ACB-15 certification. Work test ship and resources in support of ACB-15 DT&E and ACB-15 TEMP.					
FY 2018 Base Plans: - Begin conduct of ACB-13 OT events. - Continue AIE to support ACB-17 certification. - Finalize test ship and resources in support of ACB-15 OT. Finalize ACB-15 TEMP.					
FY 2018 OCO Plans: N/A					
Title: Surface Ship Enhanced Measurement Program (SSEMP)	3.200	3.200	3.200	0.000	3.200
Articles:	-	-	-	-	-
Description: Analyze the sonar employment in the operational setting and report results for improvement of training/employment guidance. Perform Fleet exercise data reconstruction and post-test analysis each year. Conduct selected at-sea data collection activities by providing planning support, ship riders, and analyst support. Evaluate prototype sonar employment tactics, sonar processing and automation algorithms, and communication protocols for the detection, classification, tracking, and intra-Fleet hand-off to Fleet ASW assets, and provide summary reports to document results.					
FY 2016 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Commenced planning for ACB-11/ACB-13 Level 4 Operator Test. Supported analysis of ACB-13/ACB-15 Return-On-Investment (ROI) test. Conducted analysis of three real-world SSEMP cases and additional exercise data. Supported COMOPTEVFOR as trusted agent to conduct ACB-11 OT analysis. Updated lab hardware to support ACB-13 install on TI-14 hardware. ***FY 2017 Plans:*** - Complete ACB-11/ACB-13 Level 4 Operator Test analysis. - Support ACB-13 IOT&E/OT data collection and analysis of operational performance. - Continue analysis of real-world SSEMP cases and exercise performance data. ***FY 2018 Base Plans:*** - Continue support of ACB-13 IOT&E/OT data collection and analysis of operational performance. - Support ACB-15 IOT&E/OT data collection and analysis of operational performance. - Continue analysis of real-world SSEMP cases and exercise performance data. ***FY 2018 OCO Plans:*** N/A					
Title: AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade	0.000	0.000	4.200	0.000	4.200
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** - Align with system design plans with the Program Executive Office (PEO) Integrated Warfare Systems (IWS) Cyber Security Instruction 5239.1, incorporate support architecture changes required to meet the current cyber security requirements defined in the Risk Management Framework (RMF), and incorporate capabilities to better align with the Defense-In-Depth Functional Implementation Architecture (DFIA) and Information Assurance (IA) Technical Authority Board Implementation Standards. - Initiate development of cyber security capabilities into AN/SQQ-89A(V)15 Technical Insertion (TI) baselines to support emergent cyber security requirements. These TI's will interface with various Aegis Weapon System (AWS) baselines.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Initiate development of cyber security capabilities into Advance Capability Builds (ACB) to support emergent cyber security requirements. - Initiate efforts to modernize existing software to reduce the cyber security risks to the weapons control component of the system. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	23.685	24.583	29.351	0.000	29.351

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPN/2136: *AN/SQQ-89 Surface ASW Combat System*	103.241	90.029	102.050	-	102.050	123.284	124.400	127.426	135.030	Continuing	Continuing
• RDTEN/0603553N/1704: *Undersea Warfare*	1.056	1.081	1.136	-	1.136	1.159	1.183	1.206	1.231	Continuing	Continuing

Remarks

D. Acquisition Strategy

- Via an ACB spiral development process, incorporate evolutionary and transformational technologies into AN/SQQ-89A(V)15 production systems.
- Utilize the Small Business Innovative Research (SBIR) program and full and open competition for new and improved innovative capability development.

E. Performance Metrics

- Deliver incremental capability increases in high interest areas, as prescribed by the Fleet and captured in campaign analysis, every two years to the AN/SQQ-89A(V)15 production program via an ACB spiral development process (ACB-09, ACB-11, ACB-13, etc.) by inserting maturing USW technologies.
- Conduct system qualification testing (SQT) and AEGIS Integration Events (AIE) for all fielded variants of ACB.
- Utilize the SSEMP to evaluate performance of fielded systems.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SQQ-89 S/W Development/Integration	C/CPFF	AAC : NY	6.238	0.267	Feb 2016	0.000		0.000		-		0.000	0.000	6.505	-
SQQ-89 S/W Development/Integration	C/CPFF	Alion : IL	5.663	1.250	Nov 2015	0.915	Nov 2016	1.250	Dec 2017	-		1.250	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	Adaptive Methods : VA	14.675	0.150	Dec 2015	0.575	Dec 2016	0.605	Dec 2017	-		0.605	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	GD-AIS : VA	11.322	0.000		0.000		0.000		-		0.000	0.000	11.322	-
SQQ-89 S/W Development/Integration	C/CPFF	In-Depth Engineering : VA	2.975	0.000		0.000		0.000		-		0.000	0.000	2.975	-
SQQ-89 S/W Development/Integration	C/CPFF	JHU/APL : MD	27.560	4.317	Dec 2015	6.059	Nov 2016	6.100	Dec 2017	-		6.100	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	Metron : VA	3.850	1.100	Dec 2015	0.500	Nov 2016	0.600	Dec 2017	-		0.600	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	Lockheed Martin : NY	10.205	0.000		0.000		0.000		-		0.000	0.000	10.205	-
SQQ-89 S/W Development/Integration	C/CPFF	Lockheed Martin : VA	12.903	3.152	Feb 2016	3.658	Dec 2016	3.650	Dec 2017	-		3.650	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	WR	NSWC/Carderock : MD	7.527	0.000		0.250	Jan 2017	0.250	Nov 2017	-		0.250	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	WR	NSWC/Dahlgren : VA	1.440	0.000		0.000		0.000		-		0.000	0.000	1.440	-
SQQ-89 S/W TDA Support	WR	NUWC/Newport : RI	11.370	2.300	Nov 2015	2.822	Jan 2017	2.970	Nov 2017	-		2.970	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	Sedna Digital : VA	4.300	0.000		0.105	Feb 2017	0.100	Dec 2017	-		0.100	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	UT/ARL : TX	14.052	2.641	Dec 2015	1.975	Nov 2016	1.950	Dec 2017	-		1.950	Continuing	Continuing	Continuing
SQQ-89 S/W Development/Integration	C/CPFF	VAR : VAR*	20.995	2.800	Dec 2015	3.516	Dec 2016	3.468	Dec 2017	-		3.468	Continuing	Continuing	Continuing
SAST Development/ Integration	C/CPFF	JHU/APL : MD	8.302	0.000		0.000		0.000		-		0.000	0.000	8.302	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SAST Development/ Integration	WR	NSWC/Carderock : MD	12.379	1.114	Nov 2015	0.000		0.000		-		0.000	0.000	13.493	-
SAST Development/ Integration	WR	NUWC/Newport : RI	3.015	0.065	Nov 2015	0.000		0.000		-		0.000	0.000	3.080	-
SAST Development/ Integration	C/CPFF	Sedna Digital : VA	4.897	0.105	Feb 2016	0.000		0.000		-		0.000	0.000	5.002	-
SAST Development/ Integration	C/CPFF	UT/ARL : TX	1.652	0.000		0.000		0.000		-		0.000	0.000	1.652	-
SAST Development/ Integration	C/CPFF	VAR : VAR*	0.596	0.216	Feb 2016	0.000		0.000		-		0.000	0.000	0.812	-
SQQ-89 CyberSecurity Development/Integration	C/CPFF	Lockheed Martin : VA	0.000	0.000		0.000		3.360	Dec 2017	-		3.360	0.000	3.360	-
SQQ-89 CyberSecurity Development/Integration	WR	NSWC/Dahlgren : VA	0.000	0.000		0.000		0.630	Nov 2017	-		0.630	0.000	0.630	-
SQQ-89 CyberSecurity Development/Integration	WR	NUWC/Newport : RI	0.000	0.000		0.000		0.210	Nov 2017	-		0.210	0.000	0.210	-
		Subtotal	185.916	19.477		20.375		25.143		-		25.143	-	-	-

Remarks

*Consists of multiple performing activities with funding for each not greater than $1M per year.

Note: SAST Development/Integration cost category is not used effective FY17. SAST was developed stand-alone, but has been integrated into the AN/SQQ-89 ACB baseline.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SSEMP ConductTest/Data Evaluation	C/CPFF	JHU/APL : MD	14.065	2.100	Dec 2015	2.100	Nov 2016	2.100	Dec 2017	-		2.100	Continuing	Continuing	Continuing
SSEMP Conduct/Test/ Data Evaluation	WR	NUWC/Newport : RI	3.412	0.500	Nov 2015	0.500	Jan 2017	0.500	Nov 2017	-		0.500	Continuing	Continuing	Continuing
SSEMP Conduct/Test/ Data Evaluation	C/CPFF	UT/ARL : TX	4.278	0.600	Dec 2015	0.600	Nov 2016	0.600	Dec 2017	-		0.600	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SQQ-89 IV&V/SAT/TEMP Assess./Update	WR	NUWC/Newport : RI	2.426	0.400	Nov 2015	0.400	Jan 2017	0.400	Nov 2017	-		0.400	Continuing	Continuing	Continuing
SQQ-89 DT/OT/ Miscellaneous T&E	WR	VAR : VAR*	2.385	0.300	Feb 2016	0.300	Dec 2016	0.300	Dec 2017	-		0.300	Continuing	Continuing	Continuing
		Subtotal	26.566	3.900		3.900		3.900		-		3.900	-	-	-

Remarks

*Consists of multiple performing activities with funding for each not greater than $1M per year.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	BAE Systems : MD	2.999	0.000		0.000		0.000		-		0.000	0.000	2.999	-
Program Management Support	C/CPIF	CGI Federal : VA	0.000	0.250	Dec 2015	0.250	Nov 2016	0.250	Dec 2017	-		0.250	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	0.798	0.058	Jan 2016	0.058	Nov 2016	0.058	Oct 2017	-		0.058	Continuing	Continuing	Continuing
		Subtotal	3.797	0.308		0.308		0.308		-		0.308	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	216.279	23.685		24.583		29.351		-		29.351	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

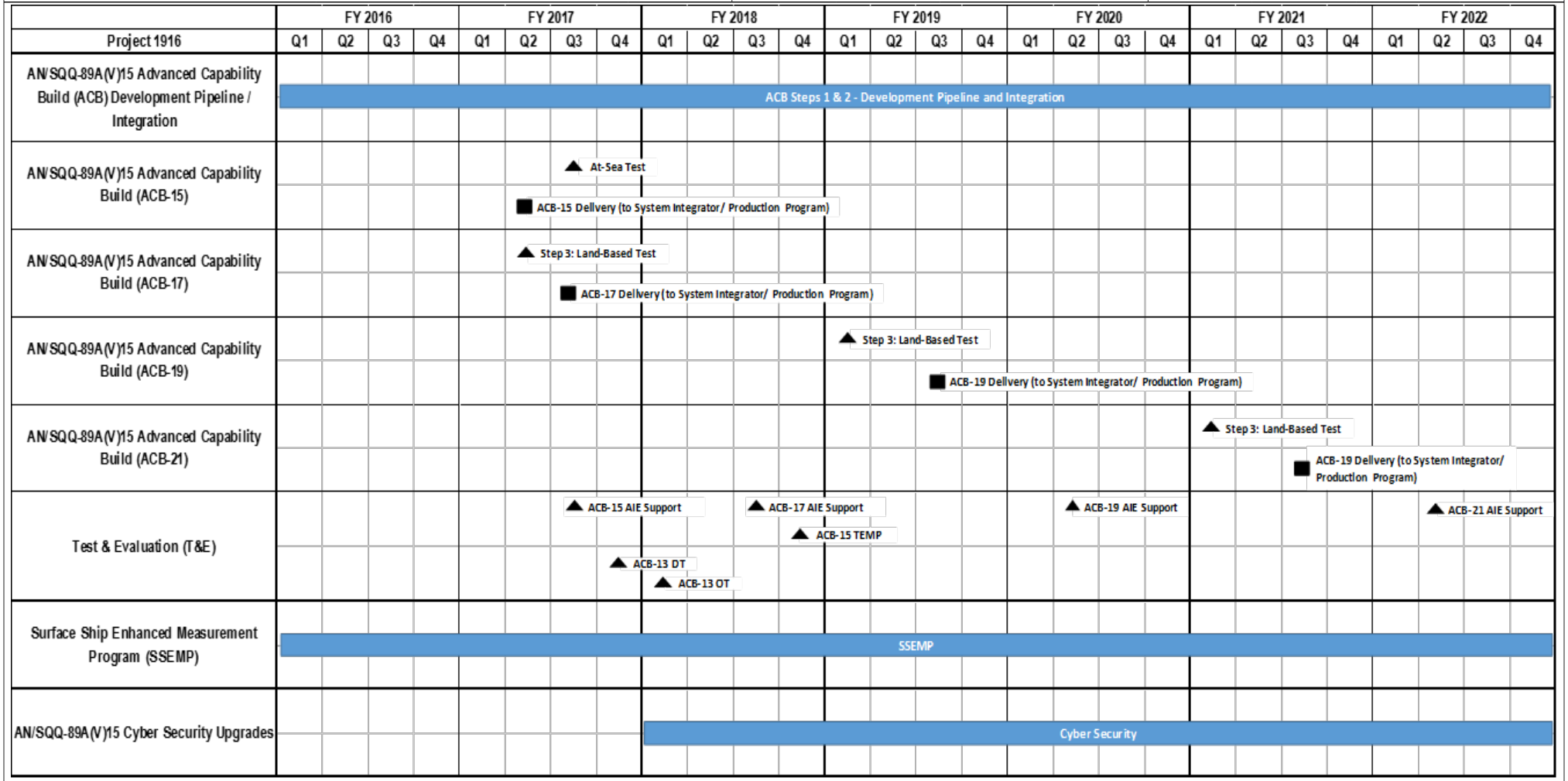

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1916				
AN/SQQ-89A(V)15 Advanced Capability Build: AN/SQQ-89A(V)15 Advanced Capability Build Development Pipleline	1	2016	4	2022
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-15): AN/SQQ-89A(V)15 ACB-15 Step 4 At-Sea Test	3	2017	3	2017
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-15): AN/SQQ-89A(V)15 ACB-15 S/W Delivery to Integrator	2	2017	2	2017
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-17): AN/SQQ-89A(V)15 ACB-17 Step 3 Land-Based Test (LBT)	2	2017	2	2017
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-17): AN/SQQ-89A(V)15 ACB-17 S/W Delivery to Integrator	3	2017	3	2017
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-19): AN/SQQ-89A(V)15 ACB-19 Step 3 Land-Based Test (LBT)	1	2019	1	2019
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-19): AN/SQQ-89A(V)15 ACB-19 S/W Delivery to Integrator	3	2019	3	2019
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 Step 3 Land-Based Test (LBT)	1	2021	1	2021
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 S/W Delivery to Integrator	3	2021	3	2021
Test & Evaluation: AN/SQQ-89A(V)15 ACB-13 Developmental Test (DT)	4	2017	4	2017
Test & Evaluation: AN/SQQ-89A(V)15 ACB-13 Operational Test (OT)	1	2018	1	2018
Test & Evaluation: AN/SQQ-89A(V)15 ACB-15 Aegis Integration Event (AIE)	3	2017	3	2017
Test & Evaluation: AN/SQQ-89A(V)15 ACB-15 T&E Master Plan (TEMP)	4	2018	4	2018
Test & Evaluation: AN/SQQ-89A(V)15 ACB-17 Aegis Integration Event (AIE)	3	2018	3	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0205620N / *Surface ASW Cmbt Sys Integr*	**Project (Number/Name)** 1916 / *Surface ASW System Improvement*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Test & Evaluation: AN/SQQ-89A(V)15 ACB-19 Aegis Integration Event (AIE)	2	2020	2	2020
Test & Evaluation: AN/SQQ-89A(V)15 ACB-21 Aegis Integration Event (AIE)	2	2022	2	2022
Surface Ship Enhanced Measurement Program (SSEMP): Surface Ship Enhanced Measurement Program (SSEMP)	1	2016	4	2022
AN/SQQ-89A(V)15 Cyber Security Upgrades: AN/SQQ-89A(V)15 Cyber Security Upgrades	1	2018	4	2022