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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>					<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>							
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	375.946	27.781	28.999	29.973	-	29.973	30.077	30.542	30.822	31.311	Continuing	Continuing
1916: <i>Surface ASW System Improvement</i>	375.946	27.781	28.999	29.973	-	29.973	30.077	30.542	30.822	31.311	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

The objective of this Program Element (PE) is to significantly improve existing AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) sonar system capabilities through quick and affordable development and integration of emergent, transformational technologies in support of Surface Ship and Theater ASW (TASW) as 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 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, foretelling that the adversary submarine of the future will have a significantly larger sphere of influence, while presenting less vulnerability to U.S. 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. U.S. 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 PE takes advantage of the AN/SQQ-89A(V)15 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. The AN/SQQ-89A(V)15 COTS-based Surface Ship ASW Combat System is planned as a backfit program for all DDG51 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.

Undersea Warfare (USW) 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 USW communities. The ACB and APB programs 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.

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This PE includes funding for the AN/SQQ-89A(V)15 Surface Ship ASW Test & Evaluation (T&E) program, which conducts testing and analysis to support certification of AN/SQQ-89A(V)15 Surface Ship ASW Combat System ACBs prior to fielding. Additionally, finalization of Test & Evaluation Master Plans (TEMPs) and AN/SQQ-89(V) Developmental Test (DT) and Operational Test (OT) events are conducted under this program.

This PE includes funding for the AN/SQQ-89A(V)15 Surface Ship Engineering Measurement Program (SSEMP), which will measure the performance of existing and new AN/SQQ-89A(V)15 Surface Ship ASW Combat System Technical Insertion (TI)/ACB baselines and enables data-based assessment of the capabilities and shortfalls in the performance of these systems in realistic scenarios.

This PE includes funding to support cyber security initiatives to align future AN/SQQ-89A(V)15 Surface Ship ASW Combat System baselines with future AEGIS Integrated Combat Systems.

This PE contributes to the development of the ASW component of the guided missile Frigate (CONSTELLATION Class, FFG 62) program.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	28.804	28.999	30.086	-	30.086
Current President's Budget	27.781	28.999	29.973	-	29.973
Total Adjustments	-1.023	0.000	-0.113	-	-0.113
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.023	0.000			
• Program Adjustments	0.000	0.000	-0.298	-	-0.298
• Rate/Misc Adjustments	0.000	0.000	0.185	-	0.185

**Change Summary Explanation**

FUNDING CHANGES SINCE PREVIOUS PRESIDENT'S BUDGET:

- FY 2024 decrease of \$-0.113M reflects the incorporation of a miscellaneous program/rate adjustments.

FY 2023 TO FY 2024 BUDGET REQUEST INCREASE:

The FY 2023 (\$28.999M) to FY 2024 (\$29.973M) increase (\$+0.974M), in addition to the inflation expected with the RDT&EN appropriation, is required for the development of signal processing improvements and downstream integration of sonobuoy acoustic data for incorporation into future ACBs.

SCHEDULE CHANGES:

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**Appropriation/Budget Activity**  
1319: *Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development*

**R-1 Program Element (Number/Name)**  
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- The ACB program has transitioned its software development practices to an Agile/DevSecOps framework. Within this construct, Step-3 land-based testing will be conducted on a continuing basis in parallel with integration as opposed to the legacy approach of testing at the conclusion of integration activities. The schedule has been revised to capture Step-3 as an on-going process vice a singular milestone.
- The ACB program is also migrating to state-of-the-art virtualized Hypervisor Technology (HT) to enable longer hardware lifetimes, ease of software updates, and reduced number of fielded AN/SQQ-89A(V)15 variants, thereby reducing life-cycle costs. Supply chain delays of HT hardware components have driven the delivery of ACB-21 beyond the planned 2Q23 Step-4 at-sea test date. ACB-21 Step-4 will therefore be deferred, and content combined with ACB-23 for a single 1Q24 Step-4 at-sea test as an ACB-23 product. Facilitated by our Agile framework, this will allow more content for ACB-23 and will further reduce the number of AN/SQQ-89A(V)15 variants in the Fleet.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Navy										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 1319 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>				<b>Project (Number/Name)</b> 1916 / <i>Surface ASW System Improvement</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
1916: <i>Surface ASW System Improvement</i>	375.946	27.781	28.999	29.973	-	29.973	30.077	30.542	30.822	31.311	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The Surface Anti-Submarine Warfare (ASW) Systems Improvements project will support essential performance enhancements to the AN/SQQ-89A(V)15 Surface Ship ASW Combat System. This project will improve Measures of Performance (MOP) by enhancing operator interface methods and tools; active and passive detection; tracking, classification, and localization; Torpedo Detection, Classification, and Localization (TDCL); sonobuoy data processing and display capabilities; and increasing acoustic sensor frequency bandwidth (Operational Requirements Document (ORD) #667-76-05 titled 'AN/SQQ-89 Improvement Program' and Test & Evaluation Master Plan (TEMP) 802-2).

This project will take advantage of the AN/SQQ-89A(V)15 Surface Ship ASW Combat System Open System Architecture (OSA) and Acoustic Rapid Commercial-Off-The-Shelf (COTS) Insertion (ARCI) initiatives to integrate TDCL and ASW sonar and combat system capability improvements. The AN/SQQ-89A(V)15 Surface Ship ASW Combat System is planned as a backfit program for CG47 (select CG59-73 Baseline 3 and 4 ships) and all DDG51 class ships.

The OSA and high performance COTS processing hardware on ships fielded with the AN/SQQ-89A(V)15 Surface Ship ASW Combat System provides an opportunity to integrate emergent, transformational ASW and Undersea Warfare (USW) technological improvements that were previously unachievable. The ASW/USW suites on these ships will require periodic upgrades to remain effective well into the 21st century and to pace the threat. Software upgrades developed under this project will target capability increases in high interest areas as prescribed by the Fleet and captured in campaign analysis. To achieve this, the project will package and deliver incremental upgrades every two (2) years to the AN/SQQ-89A(V)15 Surface Ship ASW Combat System production program via an Advanced Capability Build (ACB) spiral development process (ACB-19, ACB-21, etc.).

The project is currently undergoing a transition in software development methodology from a legacy waterfall approach to an Agile DevSecOps approach. This new Agile approach involves modern Continuous Integration/Continuous Delivery (CI/CD) modular software architectures, coding, and automated testing to enable much more rapid delivery of updated capabilities as required to address cyber or operational performance needs. The Navy is pursuing a transformation across all Tactical Systems to maximize cyber-resiliency and the speed of capability delivery. The transformation will be accomplished through a transition to an agile development processes comprised of a continuous series of 12-week software program increments in a development, security, and operations (DevSecOps) environment. This process will better align with industry practice and enable the AN/SQQ-89 combat systems to leverage industry capability improvements in Artificial Intelligence (AI) and Machine Learning (ML) and other emerging technologies, while also being more responsive to cyber needs. As ACB delivers, changes are required in the project's software development and integration methodologies to remain well synchronized with the production programs. Instead of delivering an improved ACB to the production programs at the end of development (which the production program then had to integrate, mature, test, and certify), development capabilities will now be integrated into the latest production hardware baseline as they are ready, on a continuing basis. This adds flexibility to the program, allowing urgent changes to be fielded more rapidly

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than the previous every-two-years cycle, and provides an integrated software build requiring less effort at the end of development. For major capability updates, the project will maintain an every-other-year delivery posture to ensure mature products are supporting Fleet Integrated Logistic Support (ILS) and Training.

Primary areas of ASW and USW improvements are as follows:

- Undersea Fire Control/Engagement
- Medium Frequency (MF) Pulsed Active Sonar
- Continuous Active Sonar (CAS)
- Acoustic Communications
- TDCL
- Torpedo Defense
- Passive Sonar
- Sonar Tactical Decision Aids (STDA)

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build (ACB) Development	19.605	20.594	21.406	0.000	21.406
<b>Articles:</b>	-	-	-	-	-
<p><b>Description:</b> Develop enhancements to the AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) Combat System Open System Architecture (OSA) via the integration of transformational technologies through the four step ACB spiral development process. These items will be integrated and delivered to DDG51 class AN/SQQ-89A(V)15 Surface Ship ASW Combat System backfit production programs via ACB updates.</p> <p>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.</p> <p>ACB rapidly addresses problems/deficiencies in processing, capability, or operations within the following areas of the AN/SQQ-89A(V)15 Surface Ship ASW Combat System architecture; sensor processing, acoustics, fire control, contact management, performance prediction, operator productivity and on-board training, Multi-</p>					

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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p>Function Towed Array (MFTA), Digital Fire Control Interface (DFCI), Mid-Frequency Active (MFA) processing, Torpedo Detection Classification and Localization (TDCL), Torpedo Defense (TD), and adaptive beamforming.</p> <p>ACB requirements are generated through discussions with the Fleet, then vetted and provided as direction by the Chief of Naval Operations (CNO), OPNAV N96. Steps 1 and 2 are 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-21, ACB-23, ACB-25) and allows for development of longer lead technologies. The content of a specific ACB build (every two years on the odd year) is then 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 is then performed followed by Steps 3 and 4, as applicable, and transitioned to production.</p> <p>Additionally, advanced development capabilities from the submarine Advanced Processing Build (APB) and Advanced Surveillance Build (ASB) projects are re-used in ACB, as appropriate. ACB capabilities are also shared with submarine APB and ASB. The ACB development program also resolves issues/deficiencies discovered through the AN/SQQ-89(V) Test &amp; Evaluation program.</p> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue execution of Step 3 land-based testing of ACB-23.</li> <li>- Continue planning Step 4 at-sea test to incorporate ACB-21 and ACB-23 content.</li> <li>- Continue development and integration of enhancements to AN/SQQ-89A(V)15 for ACB-23.</li> <li>- Continue planning and initiate execution of ACB-23 Return on Investment (ROI) testing.</li> <li>- Initiated planning of enhancements for ACB-25.</li> <li>- Continue refining DevSecOps framework.</li> </ul> <p><b>FY 2024 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue planning and conduct Step 4 at-sea test of ACB-21 and ACB-23 content.</li> <li>- Continue execution of ACB-23 ROI testing.</li> <li>- Continue development and integration of enhancements to AN/SQQ-89A(V)15 for ACB-25. Anticipate developing capabilities to continue to improve the attack/engage phase of the kill chain, improve passive and active detection, improve contact localization, and increase performance of a ship as a contributor to strike group performance.</li> <li>- Initiate execution of Step 3 land-based testing of ACB-25.</li> </ul>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
- Initiate planning for ACB-25 ROI testing. <b>FY 2024 OCO Plans:</b> N/A <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> - FY 2023 (\$20.594M) to FY 2024 (\$21.406M) increase (\$+0.812M) is required for the development of signal processing improvements and downstream integration of sonobuoy acoustic data for incorporation into future ACBs.					
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship ASW Test & Evaluation (T&E) <b>Articles:</b> <b>Description:</b> The AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) Test & Evaluation (T&E) Program conducts testing and analysis to support certification of AN/SQQ-89A(V)15 Surface Ship ASW Combat System Advanced Capability Builds (ACBs) prior to fielding. Additionally, finalization of Test & Evaluation Master Plans (TEMPs) and AN/SQQ-89(V) Developmental Test (DT) and Operational Test (OT) events are conducted under this program. In general, testing events and the testing schedule are driven by the availability of both platform and target assets. <b>FY 2023 Plans:</b> - Conduct planning for ACB-19 DT event. - Continue planning for ACB-19 OT event. - Conduct ACB-17 DT/OT combined event. - Complete ACB-19 TEMP. <b>FY 2024 Base Plans:</b> - Initiate ACB-21 TEMP analysis and resource development. - Conduct ACB-19 DT event. - Conduct ACB-19 OT Readiness Review (OTRR). - Conduct ACB-19 OT event. <b>FY 2024 OCO Plans:</b> N/A <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>	0.740	0.740	0.750	0.000	0.750
	-	-	-	-	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>					
	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
- FY 2023 (\$0.740M) to FY 2024 (\$0.750M) increase (\$+0.010M) is in line with the inflation expected with the RDT&EN appropriation.					
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship Engineering Measurement Program (SSEMP)					
<b>Articles:</b>					
	3.250	3.250	3.315	0.000	3.315
<b>Description:</b> Analyze the AN/SQQ-89A(V)15 Surface Ship ASW Combat System and employment in the operational setting and report results for improvement of future systems, training and employment guidance. Perform Fleet exercise data reconstruction and post-test analysis each year. Conduct selected at-sea data collection activities (Initial Operational Test & Evaluation (IOT&E) and Operational Test (OT)) 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 USW assets, and provide summary reports to document results.					
<b>FY 2023 Plans:</b>					
- Support ACB-17 IOT&E/OT data collection and analysis.					
- Initiate planning for ACB-19 IOT&E/OT data collection and analysis.					
- Support planning for ACB-21 IOT&E/OT Test & Evaluation Master Plan (TEMP) update.					
- Continue analysis of performance data from real-world SSEMP cases/exercises.					
<b>FY 2024 Base Plans:</b>					
- Support conduct of ACB-19 IOT&E/OT data collection.					
- Initiate analysis of ACB-19 IOT&E/OT data and results.					
- Support ACB-21 IOT&E/OT data collection planning.					
- Initiate planning for ACB-23 IOT&E/OT TEMP update, data collection and analysis.					
- Continue analysis of performance data from real-world SSEMP cases/exercises.					
<b>FY 2024 OCO Plans:</b>					
N/A					
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>					
- FY 2023 (\$3.250M) to FY 2024 (\$3.315M) increase (\$+0.065M) is in line with the inflation expected with the RDT&EN appropriation.					
<b>Title:</b> AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade					
	4.186	4.415	4.502	0.000	4.502
<b>Articles:</b>					
	-	-	-	-	-

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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
<p><b>Description:</b> Cyber security capability development to improve cyber security and resiliency posture within the combat system, and align future AN/SQQ-89A(V)15 Surface Ship ASW Combat System baselines with future AEGIS integrated combat system baselines.</p> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue executing processes and update aspects of cybersecurity capabilities for various fielded Technical Insertion (TI) / Advanced Capability Build (ACB) combinations without re-certification.</li> <li>- Continue improving upon ACB application security as part of development, security, and operations (DevSecOps).</li> <li>- Conduct cyber-related testing of ACB-23 software during system development.</li> <li>- Implement cybersecurity and resiliency improvements for ACB-23 software.</li> <li>- Initiate planning of further cybersecurity and resiliency improvements for ACB-25 software.</li> <li>- Improve advanced development processes to seamlessly incorporate cyber best practices throughout design and engineering of new capabilities.</li> <li>- Experiment with cyber metrics to establish long-term tracking for effectiveness of cyber efforts and their development processes.</li> <li>- Continue to execute Risk Management Framework (RMF) Assessment and Authorization (A&amp;A) process for various TI/ACB combinations including continuous monitoring for authorized baselines.</li> </ul> <p><b>FY 2024 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue executing processes and update aspects of cybersecurity capabilities for various fielded TI/ACB combinations without re-certification.</li> <li>- Initiate conduct of cyber related testing of ACB-25 software during system development.</li> <li>- Implement cybersecurity and resiliency improvements for ACB-25 software.</li> <li>- Initiate planning of further cybersecurity and resiliency improvements for ACB-27 software.</li> <li>- Improve advanced development processes to seamlessly incorporate cyber best practices throughout design and engineering of new capabilities.</li> <li>- Experiment with cyber metrics to establish long-term tracking for effectiveness of cyber efforts and their development processes.</li> <li>- Continue to execute RMF A&amp;A process for various TI/ACB combinations including continuous monitoring for authorized baselines.</li> </ul> <p><b>FY 2024 OCO Plans:</b></p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A					
<b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>					
- FY 2023 (\$4.415M) to FY 2024 (\$4.502M) increase (\$+0.087M) is in line with the inflation expected with the RDT&EN appropriation.					
<b>Accomplishments/Planned Programs Subtotals</b>	27.781	28.999	29.973	0.000	29.973

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024 Base</u>	<u>FY 2024 OCO</u>	<u>FY 2024 Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN/2136: AN/SQQ-89 <i>Surface ASW Combat System</i>	126.871	140.157	138.065	-	138.065	139.468	140.799	143.627	146.896	Continuing	Continuing
• RDTEN/0603553N/1704: <i>Undersea Warfare</i>	1.099	1.180	1.189	-	1.189	1.196	1.215	1.224	1.246	Continuing	Continuing
• RDTEN/0603561N/0223: <i>Sub Combat System Improvement (ADV)</i>	53.922	57.691	60.360	-	60.360	61.336	62.917	62.880	62.198	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

- Utilize the Small Business Innovation Research (SBIR) program and full and open competition for new and improved innovative capability development.
- Deliver incremental capability increases in high interest areas, as prescribed by the Fleet and captured in campaign analysis, every two (2) years to the AN/SQQ-89A(V)15 Surface ASW Combat System production program via an ACB spiral development process (ACB-19, ACB-21, etc.) by inserting maturing ASW and USW technologies.

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy												Date: March 2023			
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)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	AAC : NY	6.505	0.000		0.000		0.000		-		0.000	0.000	6.505	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Alion (now SERCO) : IL	13.869	1.300	Mar 2022	1.325	Dec 2022	1.350	Dec 2023	-		1.350	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Adaptive Methods : VA	18.432	0.825	Nov 2021	0.825	Dec 2022	0.825	Dec 2023	-		0.825	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Applied Physical Sciences : CT	4.049	1.100	Mar 2022	1.150	Dec 2022	1.200	Dec 2023	-		1.200	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	GD-AIS : VA	11.322	0.000		0.000		0.000		-		0.000	0.000	11.322	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	In-Depth Engineering : VA	2.975	0.000		0.000		0.000		-		0.000	0.000	2.975	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	JHU/APL : MD	65.360	4.650	Feb 2022	4.925	Dec 2022	5.050	Dec 2023	-		5.050	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Metron : VA	8.093	0.550	Mar 2022	0.560	Dec 2022	0.575	Dec 2023	-		0.575	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Lockheed Martin : NY	10.205	0.000		0.000		0.000		-		0.000	0.000	10.205	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Lockheed Martin : VA	40.700	5.695	Nov 2021	6.110	Nov 2022	6.245	Nov 2023	-		6.245	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Carderock : MD	21.626	0.292	Oct 2021	0.295	Nov 2022	0.300	Nov 2023	-		0.300	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205620N / Surface ASW Cmbt Sys Integr	<b>Project (Number/Name)</b> 1916 / Surface ASW System Improvement
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<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Dahlgren : VA	2.156	0.100	Nov 2021	0.100	Nov 2022	0.100	Nov 2023	-		0.100	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NUWC/Newport : RI	22.309	0.267	Nov 2021	0.270	Nov 2022	0.275	Nov 2023	-		0.275	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Sedna Digital : VA	9.407	0.000		0.000		0.000		-		0.000	0.000	9.407	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	UT/ARL : TX	31.521	2.750	Mar 2022	2.900	Dec 2022	3.000	Dec 2023	-		3.000	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	VAR : VAR*	34.624	0.806	Jan 2022	0.844	Dec 2022	1.196	Dec 2023	-		1.196	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade	C/CPFF	Lockheed Martin : VA	13.944	4.186	Nov 2021	4.415	Nov 2022	4.502	Nov 2023	-		4.502	Continuing	Continuing	Continuing
<b>Subtotal</b>			317.097	22.521		23.719		24.618		-		24.618	Continuing	Continuing	N/A

**Remarks**

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

<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test & Evaluation (DT&E)	WR	NUWC/Newport : RI	4.030	0.210	Nov 2021	0.210	Nov 2022	0.210	Nov 2023	-		0.210	Continuing	Continuing	Continuing
Developmental Test & Evaluation (DT&E)	WR	VAR : VAR*	5.023	0.530	Nov 2021	0.530	Dec 2022	0.540	Dec 2023	-		0.540	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	C/CPFF	JHU/APL : MD	26.561	2.125	Feb 2022	2.125	Dec 2022	2.190	Dec 2023	-		2.190	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>	<b>Project (Number/Name)</b> 1916 / <i>Surface ASW System Improvement</i>
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Operational Test & Evaluation (OT&E)	WR	NUWC/Newport : RI	6.365	0.500	Nov 2021	0.500	Nov 2022	0.500	Nov 2023	-		0.500	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	C/CPFF	UT/ARL : TX	7.850	0.625	Mar 2022	0.625	Dec 2022	0.625	Dec 2023	-		0.625	Continuing	Continuing	Continuing
<b>Subtotal</b>			49.829	3.990		3.990		4.065		-		4.065	Continuing	Continuing	N/A

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

<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support - Acquisition, Business & Finance	C/CPAF	BAE Systems : MD	2.999	0.000		0.000		0.000		-		0.000	0.000	2.999	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal : VA	3.658	0.000		0.000		0.000		-		0.000	0.000	3.658	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	KMS Solutions* : VA	1.175	1.200	Feb 2022	1.200	Dec 2022	1.200	Dec 2023	-		1.200	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	1.188	0.070	Oct 2021	0.090	Nov 2022	0.090	Nov 2023	-		0.090	Continuing	Continuing	Continuing
<b>Subtotal</b>			9.020	1.270		1.290		1.290		-		1.290	Continuing	Continuing	N/A

**Remarks**  
\*In addition to program office support, KMS Solutions provides technical planning, systems engineering, and test support. KMS Solutions also provides Subject Matter Experts (SMEs) as members of AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) Combat System Advanced Capability Build (ACB) technical Peer Review Working Groups and Integrated Product Teams (IPTs) in support of designing and refining candidate technologies for inclusion into ACB deliveries.



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**Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>	<b>Project (Number/Name)</b> 1916 / <i>Surface ASW System Improvement</i>
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Project 1916	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
AN/SQQ-89A(V)15 Advanced Capability Build (ACB) Development Pipeline / Integration	ACB Steps 1 & 2 - Development Pipeline and Integration																											
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-21)	Step 3: Land-Based Test ▲				■ Delivery to Production Program																							
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-23)					Step 3: Land-Based Testing				△ Step 4: At-Sea Test																			
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-25)									Step 3: Land-Based Testing				△ Step 4: At-Sea Test															
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-27)																	Step 3: Land-Based Testing				△ Step 4: At-Sea							
AN/SQQ-89A(V)15 Surface Ship ASW Test & Evaluation (T&E)	T&E Events for all ACBs to include: AEGIS Integration Events (AIEs), T&E Master Plans (TEMP), Developmental/Operational Tests (DTs/OTs)																											
AN/SQQ-89A(V)15 Surface Ship Engineering Measurement Program (SSEMP)	SSEMP																											
AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade	Cyber Security Upgrades																											

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Navy		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>	<b>Project (Number/Name)</b> 1916 / <i>Surface ASW System Improvement</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 1916</b>				
AN/SQQ-89A(V)15 Advanced Capability Build: AN/SQQ-89A(V)15 Advanced Capability Build Development Pipeline	1	2022	4	2028
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 Step 3 Land-Based Test	3	2022	3	2022
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 S/W Delivery to Integrator	4	2022	4	2022
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-23): AN/SQQ-89A(V)15 ACB-23 Continuous Step 3 Land-Based Test	3	2022	4	2023
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-23): AN/SQQ-89A(V)15 ACB-23 Step 4 At-Sea Test	1	2024	1	2024
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-23): AN/SQQ-89A(V)15 ACB-23 S/W Delivery to Integrator	2	2024	2	2024
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-25): AN/SQQ-89A(V)15 ACB-25 Continuous Step 3 Land-Based Test	1	2024	4	2025
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-25): AN/SQQ-89A(V)15 ACB-25 Step 4 At-Sea Test	1	2026	1	2026
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-25): AN/SQQ-89A(V)15 ACB-25 S/W Delivery to Integrator	2	2026	2	2026
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-27): AN/SQQ-89A(V)15 ACB-27 Continuous Step 3 Land-Based Test	1	2026	4	2027
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-27): AN/SQQ-89A(V)15 ACB-27 Step 4 At-Sea Test	1	2028	1	2028
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-27): AN/SQQ-89A(V)15 ACB-27 S/W Delivery to Integrator	2	2028	2	2028

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2024 Navy **Date:** March 2023

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205620N / <i>Surface ASW Cmbt Sys Integr</i>	<b>Project (Number/Name)</b> 1916 / <i>Surface ASW System Improvement</i>
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<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
AN/SQQ-89(V) Test & Evaluation: AN/SQQ-89A(V)15 ACB AEGIS Integration Events, T&E Master Plans (TEMPS), DTs/OTs	1	2022	4	2028
Surface Ship Engineering Measurement Program (SSEMP): Surface Ship Engineering Measurement Program (SSEMP)	1	2022	4	2028
AN/SQQ-89A(V)15 Cyber Security Upgrades: AN/SQQ-89A(V)15 Cyber Security Upgrades	1	2022	4	2028