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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Navy **Date:** April 2022

<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>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	347.861	28.085	28.804	28.999	-	28.999	30.086	29.955	30.400	30.666	Continuing	Continuing
1916: <i>Surface ASW System Improvement</i>	347.861	28.085	28.804	28.999	-	28.999	30.086	29.955	30.400	30.666	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, Littoral, 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 Project 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 Littoral Combat Ship (LCS) ASW Mission Packages and to the development of the Anti-Submarine Warfare (ASW) component of the guided missile Frigate (CONSTELLATION Class, FFG 62) program.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	29.217	28.804	0.000	-	0.000
Current President's Budget	28.085	28.804	28.999	-	28.999
Total Adjustments	-1.132	0.000	28.999	-	28.999
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.028	0.000			
• SBIR/STTR Transfer	-1.104	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	28.999	-	28.999

**Change Summary Explanation**

FUNDING CHANGES SINCE PREVIOUS PRESIDENT'S BUDGET:

- FY 2021 decrease of \$-1.132M reflects the Small Business Innovation Research (SBIR) transfer (\$-1.104M) and a cancelled accounts execution realignment (\$-0.028M).

FY 2022 TO FY 2023 BUDGET REQUEST INCREASE:

The FY 2022 (\$28.804M) to FY 2023 (\$28.999M) net increase (\$+0.195M) is in line with the inflation expected with the RDT&EN appropriation.

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<p>SCHEDULE CHANGES SINCE PREVIOUS PRESIDENT'S BUDGET:</p> <p>ACB-19: Step 4 at-sea test moved from 3Q21 to 2Q21 due to a platform availability change.</p> <p>ACB-21: Step 3 land-based test* moved from 1Q22 to 3Q22, Delivery to System Integrator moved from 1Q22 to 4Q22, and Step 4 at-sea test moved from 1Q23 to 2Q23. ACB-21 delivers a complete overhaul of the AN/SQQ-89A(V)15 Undersea Control Functional Segment (UCFS) Fire Control System. Additional time is needed to ensure this complicated effort is properly integrated and rigorously tested.</p> <p>ACB-23: Step 3 land-based test moved from 2Q23 to 4Q23, Step 4 at-sea test moved from 3Q24 to 1Q24, and Delivery to System Integrator moved from 3Q23 to 2Q24.</p> <p>ACB-25: Step 3 land-based test moved from 1Q25 to 4Q25, Step 4 At-sea test moved from 3Q26 to 1Q26, and Delivery to System Integrator moved from 3Q25 to 2Q26.</p> <p>*Step 3 land-based test milestone indicated on the R4 schedule indicates when the testing will complete; testing occurs continuously in-line with development.</p> <p>The transition to the DevSecOps Framework drives the schedule realignment for ACB-23 and ACB-25. The DevSecOps Framework is an entirely new development infrastructure requiring new hardware, software tools, automated test routines and development practices. ACB development milestones are moved to accommodate establishment of the new framework and to then align with other surface combat system updates and ship construction and modernization schedules. The Navy is pursuing this 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 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 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.</p> <p>---</p> <p>FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.</p>		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<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 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
1916: <i>Surface ASW System Improvement</i>	347.861	28.085	28.804	28.999	-	28.999	30.086	29.955	30.400	30.666	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, this 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 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 than the previous every-two-years cycle, and provides an

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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)**

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p><b>Title:</b> AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build (ACB) Development</p> <p align="right"><b>Articles:</b></p> <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>	19.919	20.628	20.594	0.000	20.594
	-	-	-	-	-

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

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 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-17, ACB-19) 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 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct Technical Insertion (TI) trade studies to support ACB-23 integration and ACB-25 development.</li> <li>- Conduct ACB-21 Return-on-Investment (ROI) testing.</li> <li>- Conduct Step 3 land-based testing of ACB-21.</li> <li>- Continue planning and conduct Step 4 at-sea test of ACB-21.</li> <li>- Continue development and integration of enhancements to AN/SQQ-89A(V)15 for ACB-23. Anticipate developing capabilities continuing to improve the attack/engage phase of the kill chain, improve contact localization, improve sonobuoy processing, and increase performance of a ship as a contributor to strike group performance.</li> <li>- Initiate planning for Step 3 land-based testing of ACB-23.</li> <li>- Initiate planning for ACB-23 ROI testing.</li> <li>- Continue establishing DevSecOps framework.</li> <li>- Initiate transition of ACB software into DevSecOps framework.</li> </ul> <p><b>FY 2023 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue planning and conduct Step 4 at-sea test of ACB-21.</li> <li>- Continue development and integration of enhancements to AN/SQQ-89A(V)15 for ACB-23.</li> </ul>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<ul style="list-style-type: none"> <li>- Continue planning and initiate execution of Step 3 land-based testing of ACB-23.</li> <li>- Continue planning and initiate execution of ACB-23 ROI testing.</li> <li>- Initiate planning for Step 4 at-sea test of ACB-23.</li> <li>- Initiated planning of enhancements for ACB-25.</li> <li>- Continue refining DevSecOps framework.</li> </ul> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> The FY 2022 (\$20.628M) to FY 2023 (\$20.594M) decrease (\$-0.034M) was driven by the application of a program adjustment to the FY 2023 budget control.</p>					
<p><b>Title:</b> AN/SQQ-89A(V)15 Surface Ship ASW Test &amp; Evaluation (T&amp;E)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> The AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) Test &amp; Evaluation (T&amp;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 &amp; 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.</p> <p><b>FY 2022 Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct ACB-15 OT testing and analysis.</li> <li>- Conduct ACB-15 Cyber OT.</li> <li>- Continue ACB-19 TEMP analysis and resource development.</li> <li>- Conduct planning for ACB-19 DT event.</li> <li>- Continue planning for ACB-19 OT event.</li> <li>- Complete ACB-19 TEMP.</li> </ul> <p><b>FY 2023 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct ACB-17 DT/OT combined event.</li> <li>- Complete ACB-19 TEMP.</li> <li>- Initiate ACB-21 TEMP analysis and resource development.</li> <li>- Conduct ACB-19 DT event.</li> </ul>	0.728	0.740	0.740	0.000	0.740
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>					
	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
- Conduct ACB-19 OT event.					
<b>FY 2023 OCO Plans:</b> N/A					
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship Engineering Measurement Program (SSEMP)					
	3.203	3.250	3.250	0.000	3.250
<b>Articles:</b>	-	-	-	-	-
<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 2022 Plans:</b>					
- Support ACB-15 IOT&E/OT data collection and analysis.					
- Support ACB-17 IOT&E/OT data collection planning.					
- Support ACB-19 IOT&E/OT data collection and analysis.					
- Continue analysis of performance data from real-world SSEMP cases/exercises.					
<b>FY 2023 Base Plans:</b>					
- Support ACB-17 IOT&E/OT data collection and analysis.					
- Support ACB-19 IOT&E/OT data collection and analysis.					
- Support ACB-21 IOT&E/OT data collection planning.					
- Continue analysis of performance data from real-world SSEMP cases/exercises.					
<b>FY 2023 OCO Plans:</b> N/A					
<b>Title:</b> AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade					
	4.235	4.186	4.415	0.000	4.415
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> Cyber security capability development to align future AN/SQQ-89A(V)15 Surface Ship ASW Combat System baselines with future AEGIS integrated combat system baselines.					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<p><b><i>FY 2022 Plans:</i></b></p> <ul style="list-style-type: none"> <li>- Continue implementing capabilities and update development processes to reduce cybersecurity risks in ACB software as part of DevSecOps infrastructure establishment.</li> <li>- Obtain approval, execute processes, and update aspects of cybersecurity capabilities for various fielded Technical Insertion (TI)/ACB combinations without re-certification.</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> <li>- Implement cybersecurity and resiliency improvements for TI-18 ACB-21. Anticipate incorporating additional access-control improvements and applying development process improvements to improve ACB application security.</li> <li>- Execute cybersecurity penetration testing of TI-18 ACB-21 during system development.</li> <li>- Conduct planning for further cybersecurity and resiliency improvements for ACB-23.</li> </ul> <p><b><i>FY 2023 Base Plans:</i></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>- Execute development processes to reduce cybersecurity risks and improve ACB application security as part of DevSecOps.</li> <li>- Initiate planning for cybersecurity penetration 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>- Continue to execute RMF A&amp;A process for various TI/ACB combinations including continuous monitoring for authorized baselines.</li> </ul> <p><b><i>FY 2023 OCO Plans:</i></b> N/A</p> <p><b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> The FY 2022 (\$4.186M) to FY 2023 (\$4.266M) increase (\$+0.229M) is in line with the inflation expected with the RDT&amp;EN appropriation.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	28.085	28.804	28.999	0.000	28.999

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**C. Other Program Funding Summary (\$ in Millions)**

Line Item	FY 2021	FY 2022	FY 2023	FY 2023	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Cost To	
			Base	OCO	Total					Complete	Total Cost
• OPN/2136: AN/SQQ-89 <i>Surface ASW Combat System</i>	128.664	126.871	141.591	-	141.591	143.258	145.000	146.803	149.597	Continuing	Continuing
• RDTEN/0603553N/1704: <i>Undersea Warfare</i>	1.113	1.144	1.180	-	1.180	1.197	1.195	1.213	1.222	Continuing	Continuing
• RDTEN/0603561N/0223: <i>Sub Combat System Improvement (ADV)</i>	53.536	55.442	57.691	-	57.691	58.487	58.546	59.499	60.214	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 2023 Navy												Date: April 2022			
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 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	12.594	1.275	Dec 2020	1.300	Mar 2022	1.325	Dec 2022	-		1.325	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Adaptive Methods : VA	17.622	0.810	Dec 2020	0.825	Nov 2021	0.825	Dec 2022	-		0.825	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Applied Physical Sciences : CT	2.921	1.128	Dec 2020	1.125	Mar 2022	1.150	Dec 2022	-		1.150	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	60.558	4.802	Mar 2021	4.850	Feb 2022	4.925	Dec 2022	-		4.925	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Metron : VA	7.549	0.544	Dec 2020	0.550	Mar 2022	0.560	Dec 2022	-		0.560	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	34.795	5.905	Nov 2020	5.995	Nov 2021	6.110	Nov 2022	-		6.110	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Carderock : MD	21.626	0.000		0.292	Oct 2021	0.295	Nov 2022	-		0.295	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<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>				<b>FY 2021</b>		<b>FY 2022</b>		<b>FY 2023 Base</b>		<b>FY 2023 OCO</b>		<b>FY 2023 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Dahlgren : VA	2.035	0.121	Dec 2020	0.100	Nov 2021	0.100	Nov 2022	-		0.100	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NUWC/Newport : RI	22.034	0.275	Dec 2020	0.267	Nov 2021	0.270	Nov 2022	-		0.270	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	28.654	2.867	Mar 2021	2.900	Mar 2022	2.900	Dec 2022	-		2.900	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	VAR : VAR*	33.697	0.927	Dec 2020	1.134	Jan 2022	0.844	Dec 2022	-		0.844	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade	C/CPFF	Lockheed Martin : VA	9.709	4.235	Nov 2020	4.186	Nov 2021	4.415	Nov 2022	-		4.415	Continuing	Continuing	Continuing
<b>Subtotal</b>			294.208	22.889		23.524		23.719		-		23.719	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>				<b>FY 2021</b>		<b>FY 2022</b>		<b>FY 2023 Base</b>		<b>FY 2023 OCO</b>		<b>FY 2023 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/SQQ-89A(V)15 Surface Ship ASW T&E	WR	NUWC/Newport : RI	3.826	0.204	Nov 2020	0.210	Nov 2021	0.210	Nov 2022	-		0.210	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 Surface Ship ASW T&E	WR	VAR : VAR*	4.499	0.524	Dec 2020	0.530	Nov 2021	0.530	Dec 2022	-		0.530	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 SSEMP	C/CPFF	JHU/APL : MD	24.455	2.106	Dec 2020	2.125	Feb 2022	2.125	Dec 2022	-		2.125	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<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 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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 SSEMP	WR	NUWC/Newport : RI	5.871	0.494	Nov 2020	0.500	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
AN/SQQ-89A(V)15 SSEMP	C/CPFF	UT/ARL : TX	7.247	0.603	Dec 2020	0.625	Mar 2022	0.625	Dec 2022	-		0.625	Continuing	Continuing	Continuing
<b>Subtotal</b>			45.898	3.931		3.990		3.990		-		3.990	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 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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	0.000	1.175	Feb 2021	1.200	Feb 2022	1.200	Dec 2022	-		1.200	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	1.098	0.090	Nov 2020	0.090	Oct 2021	0.090	Nov 2022	-		0.090	Continuing	Continuing	Continuing
<b>Subtotal</b>			7.755	1.265		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 2023 Navy** **Date:** April 2022

<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 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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-19)	▲ Step-4: At-Sea Test																											
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-21)					Step-3: △ Land-Based Test				△ Step-4: At-Sea Test																			
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-23)					ACB-21 Delivery (to System Integrator/ Production Program)				Step-3: △ Land-Based Test				△ Step-4: At-Sea Test															
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-25)													ACB-23 Delivery (to System Integrator/ Production Program)				Step-3: △ Land-Based Test				△ Step-4: At-Sea Test							
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-27)																					ACB-25 Delivery (to System Integrator/ Production Program)				Step-3: △ Land-Based Test			
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: PB 2023 Navy</b>		<b>Date: April 2022</b>
<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**

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
<b>Proj 1916</b>				
AN/SQQ-89A(V)15 Advanced Capability Build: AN/SQQ-89A(V)15 Advanced Capability Build Development Pipeline	1	2021	4	2027
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-19): AN/SQQ-89A(V)15 ACB-19 Step 4 At-Sea Test	2	2021	2	2021
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-21): AN/SQQ-89A(V)15 ACB-21 Step 4 At-Sea Test	2	2023	2	2023
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-23): AN/SQQ-89A(V)15 ACB-23 Step 3 Land-Based Test	4	2023	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 Step 3 Land-Based Test	4	2025	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 Step 3 Land-Based Test	4	2027	4	2027

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2023 Navy **Date:** April 2022

<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	2021	4	2027
Surface Ship Engineering Measurement Program (SSEMP): Surface Ship Engineering Measurement Program (SSEMP)	1	2021	4	2027
AN/SQQ-89A(V)15 Cyber Security Upgrades: AN/SQQ-89A(V)15 Cyber Security Upgrades	1	2021	4	2027