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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Navy **Date:** May 2021

<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 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	319.422	28.439	29.217	28.804	-	28.804	-	-	-	-	-	-
1916: <i>Surface ASW System Improvement</i>	319.422	28.439	29.217	28.804	-	28.804	-	-	-	-	-	-

**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 CG47 (select CG59-73 Baseline 3 and 4 ships) and 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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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Navy	<b>Date:</b> May 2021
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<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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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 the Frigate (FFG(X)) program.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	29.572	29.348	29.849	-	29.849
Current President's Budget	28.439	29.217	28.804	-	28.804
Total Adjustments	-1.133	-0.131	-1.045	-	-1.045
• Congressional General Reductions	-	-0.131			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.133	0.000			
• Rate/Misc Adjustments	0.000	0.000	-1.045	-	-1.045

**Change Summary Explanation**

**FUNDING CHANGES SINCE FY 2021:**

- FY 2020 decrease of \$-1.133M reflects Small Business Innovation Research (SBIR) transfer.
- FY 2021 decrease of \$-0.131M reflects the application of a fair-share Congressional undistributed reduction.
- FY 2022 decrease of \$-1.045M reflects the application of contract services savings and Navy Working Capital Fund (NWCF) and miscellaneous rate adjustments.

**FY 2021 TO PB 2022 BUDGET REQUEST DECREASE:**

- FY 2021 (\$29.217M) to FY 2022 (\$28.804M) decrease (\$-0.413M) is due to the application of contract services savings and the incorporation of NWCF and miscellaneous rate adjustments.

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2022 Navy		<b>Date:</b> May 2021
<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>	
<p>SCHEDULE CHANGES SINCE FY 2021:</p> <ul style="list-style-type: none"><li>- ACB-19 Step-4: At-Sea Test moved from Q3 FY 2020 to Q3 FY 2021 because a Fleet asset/test platform was not available as planned.</li><li>- The AN/SQQ-89A(V)15 Surface Ship ASW Test &amp; Evaluation (T&amp;E) schedule has been condensed to not call out each specific AEGIS Integration Event, TEMP, and DT/OT as there are dependencies on platform availabilities that fluctuate causing cycle to cycle changes. Individual events will continue to be captured in R2A Accomplishments/Planned Programs section.</li></ul>		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Navy										<b>Date:</b> May 2021		
<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 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
1916: <i>Surface ASW System Improvement</i>	319.422	28.439	29.217	28.804	-	28.804	-	-	-	-	-	-
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.) by inserting maturing ASW and USW technologies.

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)

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<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 CG47 and 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-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>	20.428	21.051	20.615	0.000	20.615
	-	-	-	-	-

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<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 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct Step 4 at-sea test of ACB-19.</li> <li>- Complete Technical Insertion (TI) trade studies to support ACB-21 integration and ACB-23 development.</li> <li>- Continue planning Step 3 land-based testing of ACB-21.</li> <li>- Initiate planning for Step 4 at-sea test of ACB-21.</li> <li>- Plan ACB-21 Return-On-Investment (ROI) testing.</li> <li>- Initiate planning and development 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>- Begin establishment of DevSecOps framework.</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct TI trade studies to support ACB-23 integration and ACB-25 development.</li> <li>- Conduct ACB-21 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>- Begin ACB deliveries via DevSecOps framework.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b></p>					

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>						
The FY 2021 (\$21.051M) to FY 2022 (\$20.615M) decrease (\$-0.436M) is due to the application of contract services savings and the incorporation of Navy Working Capital Fund (NWCF) and miscellaneous rate adjustments.						
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship ASW Test & Evaluation (T&E)						
<b>Articles:</b>						
		0.714	0.728	0.740	0.000	0.740
		-	-	-	-	-
<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 2021 Plans:</b>						
<ul style="list-style-type: none"> <li>- Continue ACB-13 OT testing and analysis.</li> <li>- Conduct ACB-15 DT testing and analysis.</li> <li>- Complete planning and resourcing for ACB-17 DT event.</li> <li>- Complete ACB-17 TEMP.</li> <li>- Conduct ACB-19 TEMP analysis and resource development.</li> <li>- Conduct ACB-15 Cyber OT analysis and resource development.</li> </ul>						
<b>FY 2022 Base Plans:</b>						
<ul style="list-style-type: none"> <li>- Conduct ACB-15 OT testing and analysis.</li> <li>- Conduct ACB-15 Cyber OT.</li> <li>- Conduct ACB-17 DT/OT testing and analysis.</li> <li>- Continue ACB-19 TEMP analysis and resource development.</li> <li>- Complete planning for ACB-19 DT event.</li> <li>- Continue planning for ACB-19 OT event.</li> <li>- Complete ACB-19 TEMP.</li> </ul>						
<b>FY 2022 OCO Plans:</b>						
N/A						
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>						

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<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>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>					
	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
The FY 2021 (\$0.728M) to FY 2022 (\$0.740M) increase (\$+0.012M) is in line with the inflation associated with the RDT&EN appropriation.					
<b>Title:</b> AN/SQQ-89A(V)15 Surface Ship Engineering Measurement Program (SSEMP)					
<b>Articles:</b>					
	3.140	3.203	3.250	0.000	3.250
<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 2021 Plans:</b>					
<ul style="list-style-type: none"> <li>- Support ACB-13 IOT&amp;E/OT data collection and analysis.</li> <li>- Support ACB-15 IOT&amp;E/OT data collection.</li> <li>- Begin ACB-17 IOT&amp;E/OT data collection.</li> <li>- Begin ACB-19 IOT&amp;E/OT data collection planning.</li> <li>- Continue analysis of performance data from real-world SSEMP cases/exercises.</li> </ul>					
<b>FY 2022 Base Plans:</b>					
<ul style="list-style-type: none"> <li>- Support ACB-15 IOT&amp;E/OT data collection and analysis.</li> <li>- Support ACB-17 IOT&amp;E/OT data collection and analysis.</li> <li>- Support ACB-19 IOT&amp;E/OT data collection.</li> <li>- Continue analysis of performance data from real-world SSEMP cases/exercises.</li> </ul>					
<b>FY 2022 OCO Plans:</b>					
N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>					
The FY 2021 (\$3.203M) to FY 2022 (\$3.250M) increase (\$+0.047M) is in line with the inflation associated with the RDT&EN appropriation.					
<b>Title:</b> AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade					
	4.157	4.235	4.199	0.000	4.199
<b>Articles:</b>					
	-	-	-	-	-

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<p><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.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>- Implement capabilities and update development processes to reduce cyber risks in ACB software as part of DevSecOps.</li> <li>- Continue to incorporate system-wide access control and monitoring improvements focusing on TI-20 ACB-19.</li> <li>- Execute cyber penetration testing of TI-20 ACB-19 during system development.</li> <li>- Initiate development of processes and approaches to update aspects of cybersecurity capabilities for various fielded TI/ACB combinations without re-certification.</li> <li>- Conduct planning for cybersecurity and resiliency improvements for ACB-21, including improvements to support integration with the next TI hardware architecture.</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 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue implementing capabilities and update development processes to reduce cyber risks in ACB software as part of DevSecOps.</li> <li>- Continue to execute Risk Management Framework (RMF) Assessment &amp; Authorization (A&amp;A) process for various TI/ACB combinations including continuous monitoring for authorized baselines.</li> <li>- Implement cybersecurity and resiliency improvements for ACB-21 software.</li> <li>- Execute cyber penetration testing of ACB-21 during system development.</li> <li>- Conduct planning for further cybersecurity and resiliency improvements for ACB-23.</li> </ul> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> The FY 2021 (\$4.235M) to FY 2022 (\$4.199M) decrease (\$-0.036M) is the result of miscellaneous rate adjustments.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	28.439	29.217	28.804	0.000	28.804

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

Line Item	FY 2020	FY 2021	FY 2022	FY 2022	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Cost To	
			Base	OCO	Total					Complete	Total Cost
• OPN/2136: AN/SQQ-89 <i>Surface ASW Combat System</i>	121.966	128.664	131.829	-	131.829	-	-	-	-	-	-
• RDTEN/0603553N/1704: <i>Undersea Warfare</i>	1.098	1.156	1.144	-	1.144	-	-	-	-	-	-
• RDTEN/0603561N/0223: <i>Sub Combat System Improvement (ADV)</i>	49.205	55.171	55.442	-	55.442	-	-	-	-	-	-

**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 2022 Navy** **Date:** May 2021

<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>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	C/CPFF	AAC : NY	6.505	0.000		0.000		0.000		-		0.000	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Alion (now SERCO) : IL	11.094	1.500	Nov 2019	1.275	Dec 2020	1.300	Dec 2021	-		1.300	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Adaptive Methods : VA	16.911	0.711	Dec 2019	0.810	Dec 2020	0.825	Dec 2021	-		0.825	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Applied Physical Sciences : CT	2.121	0.800	Jan 2020	1.128	Dec 2020	1.125	Dec 2021	-		1.125	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	GD-AIS : VA	11.322	0.000		0.000		0.000		-		0.000	-	-	-
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	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	JHU/APL : MD	55.658	4.900	Jan 2020	4.802	Mar 2021	4.850	Dec 2021	-		4.850	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Metron : VA	6.994	0.555	Jan 2020	0.544	Dec 2020	0.550	Dec 2021	-		0.550	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Lockheed Martin : NY	10.205	0.000		0.000		0.000		-		0.000	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Lockheed Martin : VA	28.769	6.026	Dec 2019	5.905	Nov 2020	5.995	Nov 2021	-		5.995	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Carderock : MD	21.626	0.000		0.000		0.000		-		0.000	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy** **Date:** May 2021

<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 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NSWC/Dahlgren : VA	1.912	0.123	Dec 2019	0.121	Dec 2020	0.100	Nov 2021	-		0.100	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	WR	NUWC/Newport : RI	21.753	0.281	Oct 2019	0.275	Dec 2020	0.267	Nov 2021	-		0.267	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	Sedna Digital : VA	9.407	0.000		0.000		0.000		-		0.000	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	UT/ARL : TX	26.069	2.585	Jan 2020	2.867	Mar 2021	2.900	Dec 2021	-		2.900	-	-	-
AN/SQQ-89A(V)15 Surface ASW ACB Development	C/CPFF	VAR : VAR*	31.940	1.757	Dec 2019	2.059	Dec 2020	1.413	Dec 2021	-		1.413	-	-	-
AN/SQQ-89A(V)15 Cyber Security Architecture Upgrade	C/CPFF	Lockheed Martin : VA	5.552	4.157	Dec 2019	4.235	Nov 2020	4.199	Nov 2021	-		4.199	-	-	-
<b>Subtotal</b>			270.813	23.395		24.021		23.524		-		23.524	-	-	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 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
AN/SQQ-89A(V)15 Surface Ship ASW T&E	WR	NUWC/Newport : RI	3.626	0.200	Oct 2019	0.204	Nov 2020	0.210	Nov 2021	-		0.210	-	-	-
AN/SQQ-89A(V)15 Surface Ship ASW T&E	WR	VAR : VAR*	3.985	0.514	Oct 2019	0.524	Dec 2020	0.530	Dec 2021	-		0.530	-	-	-
AN/SQQ-89A(V)15 SSEMP	C/CPFF	JHU/APL : MD	22.390	2.065	Jan 2020	2.106	Dec 2020	2.125	Dec 2021	-		2.125	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy** **Date:** May 2021

<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>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
AN/SQQ-89A(V)15 SSEMP	WR	NUWC/Newport : RI	5.387	0.484	Oct 2019	0.494	Nov 2020	0.500	Nov 2021	-		0.500	-	-	-
AN/SQQ-89A(V)15 SSEMP	C/CPFF	UT/ARL : TX	6.656	0.591	Jan 2020	0.603	Dec 2020	0.625	Dec 2021	-		0.625	-	-	-
<b>Subtotal</b>			42.044	3.854		3.931		3.990		-		3.990	-	-	N/A

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

<b>Management Services (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
Program Management Support - Acquisition, Business & Finance	C/CPAF	BAE Systems : MD	2.999	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal* : VA	2.506	1.152	Jan 2020	0.000		0.000		-		0.000	-	-	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	KMS Solutions* : VA	0.000	0.000		1.175	Feb 2021	1.200	Dec 2021	-		1.200	-	-	-
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	1.060	0.038	Nov 2019	0.090	Nov 2020	0.090	Nov 2021	-		0.090	-	-	-
<b>Subtotal</b>			6.565	1.190		1.265		1.290		-		1.290	-	-	N/A

**Remarks**  
\*In addition to program office support, CGI Federal and KMS Solutions provide technical planning, systems engineering, and test support. CGI Federal and 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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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2022 Navy</b>								<b>Date: May 2021</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>					
	<b>Prior Years</b>	<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	319.422	28.439		29.217		28.804		-		28.804	-	-	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy** **Date:** May 2021

<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 2020				FY 2021				FY 2022				
	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				
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-23)									□				
AN/SQQ-89A(V)15 Surface Ship ASW Advanced Capability Build Development (ACB-25)									ACB-21 Delivery (to System Integrator/ Production Program)				
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 2022 Navy		<b>Date:</b> May 2021
<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	2020	4	2022
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-19): AN/SQQ-89A(V)15 ACB-19 Step 4 At-Sea Test	3	2021	3	2021
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 Step 3 Land-Based Test (LBT)	1	2022	1	2022
AN/SQQ-89A(V)15 Advanced Capability Build (ACB-21): AN/SQQ-89A(V)15 ACB-21 S/W Delivery to Integrator	1	2022	1	2022
AN/SQQ-89(V) Test & Evaluation: AN/SQQ-89A(V)15 ACB AEGIS Integration Events, T&E Master Plans, DTs/OTs	1	2020	4	2022
Surface Ship Engineering Measurement Program (SSEMP): Surface Ship Engineering Measurement Program (SSEMP)	1	2020	4	2022
AN/SQQ-89A(V)15 Cyber Security Upgrades: AN/SQQ-89A(V)15 Cyber Security Upgrades	1	2020	4	2022