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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					R-1 Program Element (Number/Name) PE 0603553N / <i>Surface ASW</i>							
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	189.070	1.098	1.156	1.144	-	1.144	-	-	-	-	-	-
1704: <i>Undersea Warfare</i>	189.070	1.098	1.156	1.144	-	1.144	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The objective of this Program Element (PE) is to pursue the development of technologies with the goal of improving Anti-Submarine Warfare (ASW) effectiveness to the point of rendering the enemy submarine irrelevant against U.S. and coalition forces. The Rest-of-the-World (ROW) continues to produce quieter, more lethal submarine technologies. Adaptable commercial technologies are readily available to the ROW navies. These trends increase the threats to U.S. surface combatants, thus requiring a focused effort to identify the most promising ASW technologies through a process of discovery, assessment, experimentation, and analysis. Studies, experiments, and/or technology developments under this PE will seek to improve the ability of surface combatants to detect, classify, localize, and track submerged contacts and detect and defend against modern torpedoes. To achieve these objectives, it is essential to develop new ASW technologies. The products from these efforts will be provided to the Advanced Capability Build (ACB) program supporting the continuing improvement of the AN/SQQ-89A(V)15 Surface Ship ASW Combat System.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	1.137	1.161	1.183	-	1.183
Current President's Budget	1.098	1.156	1.144	-	1.144
Total Adjustments	-0.039	-0.005	-0.039	-	-0.039
• Congressional General Reductions	-	-0.005			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.039	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.039	-	-0.039

Change Summary Explanation

FUNDING CHANGES SINCE FY 2021:

- FY 2020 decrease of \$-0.039M reflects the Small Business Innovative Research (SBIR) transfer.
- FY 2021 decrease of \$-0.005M reflects the fair-share application of a Congressional undistributed reduction.
- FY 2022 decrease of \$-0.039M reflects the application of service contract savings and miscellaneous rate adjustments.

FY 2021 TO FY 2022 BUDGET REQUEST DECREASE:

- FY 2021 (\$1.156M) to FY 2022 (\$1.144M) decrease (\$-0.012M) is due to the application of service contracts savings.

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603553N / <i>Surface ASW</i>				Project (Number/Name) 1704 / <i>Undersea Warfare</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
1704: <i>Undersea Warfare</i>	189.070	1.098	1.156	1.144	-	1.144	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The objective of this Project is to pursue the development of technologies with the goal of improving Anti-Submarine Warfare (ASW) effectiveness to the point of rendering the enemy submarine irrelevant against U.S. and coalition forces. The Rest-of-the-World (ROW) continues to produce quieter, more lethal submarine technologies. Adaptable commercial technologies are readily available to the ROW navies. These trends increase the threats to U.S. surface combatants, thus requiring a focused effort to identify the most promising ASW technologies through a process of discovery, assessment, experimentation, and analysis. Studies, experiments, and/or technology developments under this PE will seek to improve the ability of surface combatants to detect, classify, localize, and track submerged contacts and detect and defend against modern torpedoes. To achieve these objectives, it is essential to develop new ASW technologies. The products from these efforts will be provided to the Advanced Capability Build (ACB) program supporting the continuing improvement of the AN/SQQ-89A(V)15 Surface Ship ASW Combat System.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: ASW Concept Development/Studies	1.098	1.156	1.144	0.000	1.144
Articles:	-	-	-	-	-
FY 2021 Plans:					
- Continue to develop capabilities for eventual transition via Advanced Capability Build (ACB)-23 for Step-3 land-based testing.					
-Begin transition of technologies to the AN/SQQ-89A(V)15 Surface Ship ASW Combat System production program for fielding.					
- Award new development contracts via Broad Agency Announcement (BAA) solicitation process in support of AN/SQQ-89A(V)15 Surface Ship ASW Combat System Fleet requirements.					
- Continue development of new capabilities focused on ASW and Torpedo Defense (TD) improvements.					
- Develop passive and active Operator Machine Interface (OMI) concepts and demonstrations with the goal of improving watch station performance and shortening the detect-to-engage timelines.					
FY 2022 Base Plans:					
- Integrate Joint Passive and Active Localization (JPAL) algorithm into the TD Functional Segment for inclusion in ACB-23.					
- Develop Passive Coherent Processor (PCP) algorithms which are designed to provide passive alerting and state estimation of torpedo kinematics using advanced coherent multi-path/multi-array correlation processing technology.					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> - Evaluate data collected from new sea trials and data collected using programmable waveforms to understand its benefits and advantages for TD. - Extend the Doppler Matched Active Processing (DMAP) for ASW capability to towed arrays. - Investigate concepts of employment to be used by the Fleet to determine optimal waveforms. - Update ping jitter sequencing with the goal of reducing blanking regions and ambiguous range tracking. - Award new development contract via BAA solicitation process in support of AN/SQQ-89A(V)15 Surface Ship ASW Combat System Fleet requirements. <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: FY 2021 (\$1.156M) to FY 2022 (\$1.144M) decrease (\$-0.012M) is due to the application of service contracts savings.</p>					
Accomplishments/Planned Programs Subtotals	1.098	1.156	1.144	0.000	1.144

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTEN/0205620N/1916: <i>Surface ASW System Improvement</i>	28.439	29.217	28.804	-	28.804	-	-	-	-	-	-
• OPN/2136: <i>AN/SQQ-89 Surf ASW Cmbt Sys</i>	121.966	128.664	131.829	-	131.829	-	-	-	-	-	-

Remarks

D. Acquisition Strategy
 - Use competitively awarded contracts from Broad Agency Announcement (BAA) solicitations. Successful technologies are transitioned to the AN/SQQ-89A(V)15 Surface Ship Anti-Submarine Warfare (ASW) Combat System Advanced Capability Build (ACB) development program funded under PE 0205620N Project 1916 for integration and test. Technologies are delivered every two years to the AN/SQQ-89A(V)15 Surface Ship ASW Combat System production program via the ACB spiral development process (ACB-19, ACB-21, ACB-23, etc.).

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603553N / <i>Surface ASW</i>	Project (Number/Name) 1704 / <i>Undersea Warfare</i>
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Product Development (\$ in Millions)				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			
ASW Concept Development/Studies	C/CPFF	AAC : NY	2.201	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	Adaptive Methods : VA	3.788	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	Alion Sciences : VA	8.749	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	Applied Physical Sciences : CT	1.451	0.307	Jan 2020	0.675	Feb 2021	0.675	Dec 2021	-		0.675	-	-	-
ASW Concept Development/Studies	C/CPFF	In-Depth Engineering : VA	3.635	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	JHU/APL : MD	28.068	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	L-3 Communications : VA	3.000	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	Lockheed Martin - ISS : NY	7.110	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NAVWAR : CA	0.277	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NAWC/Pax River : MD	2.400	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NFESC/PH : CA	5.350	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	Northrop Grumman : VA	4.684	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NRL : DC	3.037	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NSMA : VA	0.907	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NSWC/Carderock : MD	4.373	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	WR	NUWC/Keyport : WA	0.790	0.000		0.000		0.000		-		0.000	-	-	-

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Product Development (\$ in Millions)				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			
ASW Concept Development/Studies	WR	NUWC/Newport : RI	44.915	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	MIPR	SSGC : MS	3.253	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	UT/ARL : TX	6.752	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies	C/CPFF	VAR : VAR*	33.903	0.281	Jan 2020	0.381	Feb 2021	0.369	Dec 2021	-		0.369	-	-	-
Subtotal			168.643	0.588		1.056		1.044		-		1.044	-	-	N/A

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

Test and Evaluation (\$ in Millions)				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			
ASW Concept Development/Studies - At-Sea Test/Experiment	WR	ONR : VA	5.500	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies - Enhanced Data Collection	C/CPFF	JHU/APL : MD	4.462	0.000		0.000		0.000		-		0.000	-	-	-
ASW Concept Development/Studies - Enhanced Data Collection	C/CPFF	UT/ARL : TX	2.000	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			11.962	0.000		0.000		0.000		-		0.000	-	-	N/A

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

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Management Services (\$ in Millions)				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			
Program Management Support - Acquisition, Business & Finance	C/CPAF	EG&G : VA	2.050	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support - Acquisition, Business & Finance	C/CPAF	BAE Systems : MD	4.824	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal* : VA	1.241	0.510	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		0.100	Mar 2021	0.100	Dec 2021	-		0.100	-	-	-
Program Office Travel	Allot	NAVSEA PEO IWS 5 : DC	0.350	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			8.465	0.510		0.100		0.100		-		0.100	-	-	N/A

Remarks
 *In addition to program office support, CGI Federal/KMS Solutions provide technical planning, systems engineering, and test support. CGI Federal/KMS Solutions also provide Subject Matter Experts (SMEs) as members of AN/SQQ-89 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.

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	189.070	1.098	1.156	1.144	-	1.144	-	-	N/A

Remarks

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603553N / <i>Surface ASW</i>	Project (Number/Name) 1704 / <i>Undersea Warfare</i>
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Project 1704	FY 2020				FY 2021				FY 2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Broad Agency Announcement (BAA) Awards		▲ BAA Award			▲ BAA Award		△ BAA Award		△ BAA Award			
Technology Development and Analysis	Technology Development and Analysis											

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603553N / <i>Surface ASW</i>	Project (Number/Name) 1704 / <i>Undersea Warfare</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 1704.L24</i>				
Broad Agency Announcement (BAA) Awards: BAA Award - 2020	3	2020	3	2020
Broad Agency Announcement (BAA) Awards: BAA Award - 2021 (1)	2	2021	2	2021
Broad Agency Announcement (BAA) Awards: BAA Award - 2021 (2)	4	2021	4	2021
Broad Agency Announcement (BAA) Awards: BAA Award - 2022	2	2022	2	2022
Technology Development and Analysis: Technology Development and Analysis	1	2020	4	2022