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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 0603562N / <i>Submarine Tactical Warfare Sys</i>
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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	104.907	10.820	10.481	14.059	-	14.059	-	-	-	-	-	-
0770: <i>Adv Sub Supp Equip Prog</i>	29.677	4.445	4.752	4.736	-	4.736	-	-	-	-	-	-
1739: <i>Submarine Arctic W/F Development</i>	75.230	6.375	5.729	9.323	-	9.323	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses advanced submarine technology areas in support of the Navy's strategic objective of Assured Access and Combat Credibility. All projects funded in this PE are non-Acquisition Category (ACAT) programs.

PROJECT 0770 - The Advanced Submarine Support Equipment Program (ASSEP) objective is to improve submarine operational effectiveness through the development and implementation of advanced Research and Development (R&D). In order to provide improved operational effectiveness, R&D efforts are focused on advanced Imaging development and advanced Electronic Warfare (EW) support development. A continuing need exists to improve these capabilities in view of the advancements in potential imaging counter-detection, the need to support specialized missions, and the increasingly dense and sophisticated electronic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Ongoing developments in 360-degree imaging systems and electro-optic infra-red (EO/IR) vulnerability signature reduction technologies are supporting these needs.

PROJECT 1739 - The Submarine Arctic Warfare Development Project is aligned to Commander, Undersea Warfighting Development Center (UWDC), Detachment Arctic Submarine Laboratory (ASL). This Project provides the U.S. Navy Submarine Force (SUBFOR) a cadre of trained Arctic Operation Specialists (AOS) and an inventory of unique Arctic sensors that are installed to optimize submarine safety during under-ice operations. AOS personnel assigned from ASL embark on submarines that deploy to the Arctic, cold water and iceberg regions, and marginal ice zones (MIZ) in northern latitudes of the Atlantic and Pacific Oceans, and are advisers to the Commanding Officer. ASL is a shore facility at Naval Base Point Loma with the infrastructure capable of supporting personnel and equipment to conduct the submarine Arctic Warfare Development mission. Improvements and life-cycle expenditures to the facility and warehousing are made as necessary to support the mission.

The Submarine Arctic Warfare Development Project, via ASL, responds to the increased threat of naval activity in the Arctic regions while continuously supporting the Navy's strategic objective of Assured Access and Combat Credibility. ASL provides a unique capability that enables the submarine force to satisfy the requirements laid out in the Arctic Maritime Homeland Defense Initial Capabilities Document (ICD). ASL and SUBFOR demonstrate existing Arctic Warfare capabilities and operational and tactical proficiency while developing advanced submarine technology in unique cold water environments, in under-ice conditions, and in ice-covered shallow water regions during a biennial Ice Exercise (ICEX). ICEX places an emphasis on submarine operability and mission capability in the world's harshest maritime environment. Efforts include assessment of combat system effectiveness, weapons testing, use of High Frequency (HF) sonars in Arctic regions, testing of ice-capable submarine structures, and development of class-specific Arctic operational guidelines. Tactical Development (TACDEV) ICEXs are conducted biennially and require up front comprehensive planning and work-up training, as well as post exercise analysis and reporting. ICEXs provide the framework for various submarine test and evaluation in Arctic regions and at periodic Ice Camps. This program represents DoD's only drifting ice station capability. Emphasis during ICEX is placed on the areas

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>
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of sonar operability, tactical surveillance, weapon utility, and other submarine support missions. These efforts include the assessment of combat system effectiveness, development of Arctic specific improvements for existing sonar and weapons, development of class-specific Arctic operational guidelines, and testing of ice-capable submarine support structures.

A torpedo firing ICEX occurs every four (4) years (FY 2022, FY 2026, etc.) in order to meet minimum Fleet requirements of exercise torpedo (EXTORP) firings in the Arctic. A Torpedo Exercise (TORPEX) requires a significantly higher level of logistics, personnel, and infrastructure to account for the recovery and transportation efforts of the EXTORPs.

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	11.192	10.528	14.291	-	14.291
Current President's Budget	10.820	10.481	14.059	-	14.059
Total Adjustments	-0.372	-0.047	-0.232	-	-0.232
• Congressional General Reductions	-	-0.047			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.372	0.000			
• Rate/Misc Adjustments	0.000	0.000	-0.232	-	-0.232

Change Summary Explanation

FUNDING CHANGES SINCE THE PREVIOUS PRESIDENT'S BUDGET AT THE OVERALL PE LEVEL:

- FY 2020 decrease of \$-0.372M reflects Small Business Innovative Research (SBIR) transfer.
- FY 2021 decrease of \$-0.047M reflects the fair-share application of a Congressional undistributed reduction.
- FY 2022 decrease of \$-0.232M reflects Navy Working Capital Fund (NWCF) and miscellaneous rate adjustments.

PROJECT 0770 - FY 2021 TO FY 2022 BUDGET REQUEST DECREASE:

- FY 2021 (\$4.752M) to FY 2022 (\$4.736M) decrease (\$-0.016M) is the result of miscellaneous rate adjustments.

PROJECT 1739 - FY 2021 to FY 2022 BUDGET REQUEST INCREASE:

- FY 2021 (\$5.729M) to FY 2022 (\$9.323M) increase (\$+3.594M) is driven by FY 2022 being an ICEX execution year with a supporting ice camp deployment onto Arctic drifting sea ice. ICEX ice camp deployments require significantly higher costs to support commercial air charter services (fixed and rotary wing), personnel labor, equipment transportation, travel, and temporary warehousing support. FY 2022 also includes a TORPEX event at ICEX that increases cost significantly as EXTORP firings in the Arctic require a significantly higher level of logistics, air charter services, personnel, and infrastructure to account for the recovery and transportation efforts of the EXTORPs, as well as additional costs for post-event analysis of EXTORP performance.

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

Appropriation/Budget Activity
1319: *Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)*

R-1 Program Element (Number/Name)
PE 0603562N / *Submarine Tactical Warfare Sys*

SCHEDULE CHANGES SINCE THE PREVIOUS PRESIDENT'S BUDGET:
PROJECT 0770 - Responsibility for this project transitioned from Submarine Electromagnetic Systems Program Office (PMS 435) to Program Executive Office, Integrated Warfare Systems (PEO IWS 5.0) effective 1 October 2020. This transition takes advantage of PEO IWS 5.0's experience in advanced sensor development under the Advanced Rapid Commercial-Off-The-Shelf (COTS) Insertion (ARCI) program to deliver better sensors for submarine Imaging and Electronic Warfare (EW), aligning with complimentary efforts under PE 0603561N, Project 0223, Submarine Combat System Improvements (Advanced). PEO IWS 5.0 will no longer report on efforts funded outside this PE, such as Small Business Innovative Research (SBIR), Small Business Technology Transfer (STTR) and Future Naval Capabilities (FNC). Early work in Imaging Vulnerability Improvements has completed and transitioned to production. Further work in this area will be funded by PMS 435. The Imaging Buoy development effort has been retitled Tethered Buoy. The Advanced Capabilities for Virginia Class EW scheduled to begin in FY 2022 has been replaced with an effort to prototype an advanced imaging and EW sensor configuration for submarine periscopes combining more capable EW and imaging sensors in mission-optimized arrangements.

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>				Project (Number/Name) 0770 / <i>Adv Sub Supp Equip Prog</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
0770: <i>Adv Sub Supp Equip Prog</i>	29.677	4.445	4.752	4.736	-	4.736	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A continuing need exists to improve Imaging and Electronic Warfare (EW) support capabilities in view of the advancements in potential imaging counter detection and the increasingly dense electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Improvements are necessary for submarine EW and Imaging to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare, Intelligence Collection, Maritime Protection, and Joint Strike. This project, previously divided into two project categories, Advanced Imaging Project Development and Advanced Electronic Warfare Support Project Development, is now operating under a single category titled Imaging and Electronic Warfare (EW) Support Capabilities, going forward the project will concurrently consider both domains as improved mast systems are designed. The evaluation of state-of-the-art technology to implement periscope/mast improvements via EW electromagnetic and electro-optic sensors results in improved capability. Engineering Development Models (EDMs) are developed, evaluated, and validated in the lab and through at-sea testing.

All programs funded in this project are non-Acquisition Category (ACAT) programs. The test articles identified consist of critical components that will be fully developed during Engineering Manufacturing and Development phase into EDMs.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Imaging and Electronic Warfare (EW) Support Capabilities	4.445	4.752	4.736	0.000	4.736
Articles:	-	-	-	-	-
FY 2021 Plans:					
- Continue Imaging and EW tethered buoy development to support lab demonstration in 3Q22. Operationally relevant metrics will be evaluated as part of this demonstration to verify approach meets Fleet requirements.					
- Initiate high-level design, create alternative sensor arrangements, and begin development of an advanced imaging and EW sensor concept for submarine periscopes.					
- Update RADAR Vulnerability Assessment Tool (RVAT) and Low Probability of Intercept (LPI) RADAR improvements based on FY 2020 test results. Complete development of Virginia Class Submarine Direction Finding (VA DF) improvement. Integrate capabilities into system for laboratory testing for performance evaluation and operator feedback.					
- Initiate development of a prototype low frequency antenna to support EW operational needs and reduce physical size, weight, and power.					
FY 2022 Base Plans:					

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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
<p>- Continue development of the advanced imaging and EW sensor configuration for submarine periscopes. Conduct lab testing of new sensors under consideration as part of design to verify performance meets operational needs. Initiate complete sensor stack prototype to support testing in lab and in representative at-sea environment to validate approach before transitioning to PMS 435 for integration into submarine masts. At-sea test planned for FY 2024.</p> <p>- Continue Imaging and EW tethered buoy development with focus on laboratory demonstration of the body and payload.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The FY 2021 (\$4.752M) to FY 2022 (\$4.736M) decrease (\$-0.016M) is the result of miscellaneous rate adjustments.</p>					
Accomplishments/Planned Programs Subtotals	4.445	4.752	4.736	0.000	4.736

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/0603561N/0223: <i>Combat System Improvement (ADV)</i>	49.205	55.171	55.442	-	55.442	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

- This project is a non-Acquisition Category (ACAT) program.

- This project optimizes technology insertion using a build-test-build approach to support EW and Imaging operational needs. Operational needs have been based on the tactical requirements identified in the Common Submarine Imaging System (CSIS) (CDD# 849-87-11) dated 22 Dec 2011, with an updated Capability Development Document (CDD) approved on 15 Mar 2018, for Submarine Imaging Systems, and the Common Submarine Electronic Warfare System (CSEWS) (CDD# 907-97-16) dated 27 Sep 2016 for the Electronic Warfare Systems. Project efforts develop submarine unique improvements to mast, periscope, and EW electromagnetic spectrum and electro-optic sensors based on emerging technologies that are available from DoD Exploratory Development Programs, industry Independent Research and Development, and other sources. Engineering Development Models (EDMs) will be developed to provide a realistic method of evaluating the improvements, including deployment on submarines for testing.

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 0770 / <i>Adv Sub Supp Equip Prog</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			
Imaging and EW Support Capability Development	C/CPFF	JHU/APL : MD	0.000	2.478	Nov 2019	0.000		0.000		-		0.000	-	-	-
Imaging and EW Support Capability Development	MIPR	MIT/LL : MA	0.590	0.100	Nov 2019	0.864	Jan 2021	0.875	Dec 2021	-		0.875	-	-	-
Imaging and EW Support Capability Development	WR	NUWC : RI	28.702	0.646	Nov 2019	1.410	Nov 2020	1.425	Nov 2021	-		1.425	-	-	-
Imaging and EW Support Capability Development	C/FFP	PSU/ARL : PA	0.000	0.000		0.975	Nov 2020	1.000	Dec 2021	-		1.000	-	-	-
Imaging and EW Support Capability Development	C/FFP	Toyon Research Corp : CA	0.000	0.000		0.500	Jan 2021	0.500	Dec 2021	-		0.500	-	-	-
Imaging and EW Support Capability Development	C/FFP	VAR : VAR*	0.000	1.180	Dec 2019	0.336	Mar 2021	0.271	Dec 2021	-		0.271	-	-	-
Subtotal			29.292	4.404		4.085		4.071		-		4.071	-	-	N/A

Remarks

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

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 Office Travel	WR	NAVSEA : DC	0.385	0.041	Jan 2020	0.027	Apr 2021	0.025	Oct 2021	-		0.025	-	-	-
Program Management	C/FFP	KMS Solutions* : VA	0.000	0.000		0.640	Mar 2021	0.640	Dec 2021	-		0.640	-	-	-
Subtotal			0.385	0.041		0.667		0.665		-		0.665	-	-	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) for technical Peer Review Working Groups and Integrated Product Teams (IPTs) in support Electronic Warfare capability development.

	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		29.677	4.445	4.752	4.736	4.736	-	-	N/A

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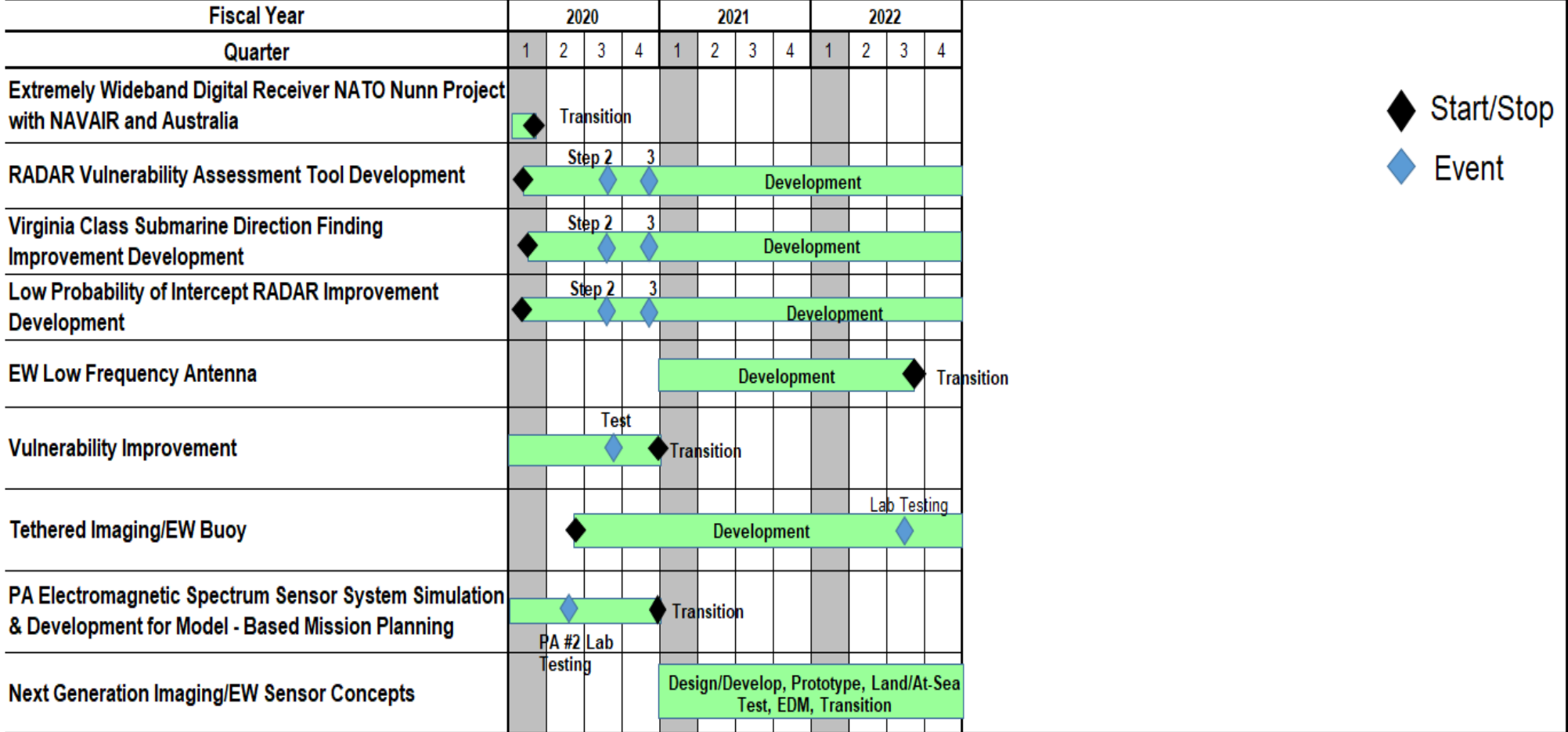
Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy							Date: May 2021			
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603562N / <i>Submarine Tactical Warfare Sys</i>			Project (Number/Name) 0770 / <i>Adv Sub Supp Equip Prog</i>				
	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract	

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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 0770 / <i>Adv Sub Supp Equip Prog</i>

Advanced Submarine Support Equipment Program



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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Imaging and Electronic Warfare Support Capabilities</i>				
Extremely Wideband Digital Receiver NATO Nunn Project with NAVAIR and Australia Development	1	2020	1	2020
Extremely Wideband Digital Receiver NATO Nunn Project with NAVAIR and Australia Transition to EW	1	2020	1	2020
RADAR Vulnerability Assessment Tool - Development	1	2020	4	2022
RADAR Vulnerability Assessment Tool - Step 2 Test	3	2020	3	2020
RADAR Vulnerability Assessment Tool - Step 3 Test	4	2020	4	2020
Virginia Class Submarine Direction Finding Improvement - Development	1	2020	4	2022
Virginia Class Submarine Direction Finding Improvement - Step 2 Test	3	2020	3	2020
Virginia Class Submarine Direction Finding Improvement - Step 3 Test	4	2020	4	2020
Low Probability of Intercept RADAR Improvement - Development	1	2020	4	2022
Low Probability of Intercept RADAR Improvement - Step 2 Test	3	2020	3	2020
Low Probability of Intercept RADAR Improvement - Step 3 Test	4	2020	4	2020
Electronic Warfare Low Frequency Antenna - Development	1	2021	3	2022
Electronic Warfare Low Frequency Antenna - Transition	3	2022	3	2022
Vulnerability Improvement - Development	1	2020	4	2020
Vulnerability Improvement - Test	3	2020	3	2020
Vulnerability Improvement - Transition	4	2020	4	2020
Tethered Imaging/Electronic Warfare Buoy - Development	2	2020	4	2022
Tethered Imaging/Electronic Warfare Buoy - Lab Test	3	2022	3	2022
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - Development	1	2020	4	2020

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 0770 / <i>Adv Sub Supp Equip Prog</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - PA Lab Test #2	2	2020	2	2020
PA Electromagnetic Spectrum Sensor System Simulation & Dev for Model - Transition	4	2020	4	2020
Next Generation Imaging/Electronic Warfare Sensor Development	1	2021	4	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy										Date: May 2021		
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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
1739: <i>Submarine Arctic W/F Development</i>	75.230	6.375	5.729	9.323	-	9.323	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Submarine Arctic Warfare Development Project is aligned to Commander, Undersea Warfighting Development Center (UWDC), Detachment Arctic Submarine Laboratory (ASL). This Project provides the U.S. Navy Submarine Force (SUBFOR) a cadre of trained Arctic Operation Specialists (AOS) and an inventory of unique Arctic sensors that are installed to optimize submarine safety during under-ice operations. AOS personnel assigned from ASL embark on submarines that deploy to the Arctic, cold water and iceberg regions, and marginal ice zones in northern latitudes of the Atlantic and Pacific Oceans, and are advisers to the Commanding Officer. ASL is a shore facility at Naval Base Point Loma with the infrastructure capable of supporting personnel and equipment to conduct the submarine Arctic Warfare Development mission. Improvements and life-cycle expenditures to the facility and warehousing are made as necessary to support the mission.

The Submarine Arctic Warfare Development Project, via ASL, responds to the increased threat of naval activity in the Arctic regions while continuously supporting the Navy's strategic objective of Assured Access and Combat Credibility. ASL provides a unique capability that enables the submarine force to satisfy the requirements laid out in the Arctic Maritime Homeland Defense Initial Capabilities Document (ICD). ASL and SUBFOR demonstrate existing Arctic Warfare capabilities and operational and tactical proficiency while developing advanced submarine technology in unique cold water environments, in under-ice conditions, and in ice-covered shallow water regions during a biennial Ice Exercise (ICEX). ICEX places an emphasis on submarine operability and mission capability in the world's harshest maritime environment. Efforts include assessment of combat system effectiveness, weapons testing, use of High Frequency (HF) sonars in Arctic regions, testing of ice-capable submarine structures, and development of class-specific Arctic operational guidelines. Tactical Development (TACDEV) ICEXs are conducted biennially and require up front comprehensive planning and work-up training, as well as post exercise analysis and reporting. ICEXs provide the framework for various submarine test and evaluation in Arctic regions and at periodic Ice Camps. This program represents DoD's only drifting ice station capability. Emphasis during ICEX is placed on the areas of sonar operability, tactical surveillance, weapon utility, and other submarine support missions. These efforts include the assessment of combat system effectiveness, development of Arctic specific improvements for existing sonar and weapons, development of class-specific Arctic operational guidelines, and testing of ice-capable submarine support structures. Torpedo ICEXs, occurring every four (4) years (FY 2022, FY 2026, etc.) include a Fleet requirement to conduct exercise torpedo (EXTORP) firings in the Arctic. A Torpedo Exercise (TORPEX) requires a significantly higher level of logistics, personnel, and infrastructure to account for the recovery and transportation efforts of the EXTORPs.

All programs funded in this project are non-Acquisition Category (ACAT) programs.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	6.375	5.729	9.323	0.000	9.323
Articles:	-	-	-	-	-

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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
<p><i>FY 2021 Plans:</i></p> <ul style="list-style-type: none"> - Conduct Arctic work-up training. - Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. - Investigate, research, develop, and deploy new systems for Arctic submarine support. - Conduct Arctic operations to support ice camp equipment evaluation, systems development, extreme cold weather training, also perform drifting sea ice analysis required to improve drifting sea ice camp Arctic operations. - Support testing and tactical development required to improve submarine Arctic operability and warfighting. - Initiate planning, logistics support, procurement, and preparation for ICEX mission 2022 and Ice Camp 2022. <p><i>FY 2022 Base Plans:</i></p> <ul style="list-style-type: none"> - Conduct Arctic work-up training, ICEX mission 2022 with Ice Camp 2022. - Conduct ICEX 2022 as a TACDEV and TORPEX event. Operate a submarine tracking range for approximately 14 days, conduct complex and coordinated operations from a drifting ice station. Logistically and operationally support submarine and camp operations from a drifting ice station that will be re-supplied via contracted commercial rotary and fixed-wing aviation services, via US Transportation Command (USTRANSCOM), from temporary infrastructure and services on the North Slope of Alaska. - Support Arctic deployments, including inter-Fleet transfers, as required by the SUBFOR Commanders. - Investigate, research, develop, and deploy new systems for Arctic submarine support. - Support testing and tactical development required to improve submarine Arctic operability and warfighting. - Conduct Arctic operations to support ice camp equipment evaluation, systems development and extreme cold weather training, and to also perform drifting sea ice analysis required to improve drifting sea ice camp Arctic operations. <p><i>FY 2022 OCO Plans:</i> N/A</p> <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> The FY 2021 (\$5.729M) to FY 2022 (\$9.323M) increase (\$+3.594M) is driven by FY 2022 being an ICEX execution year with a supporting ice camp deployment onto Arctic drifting sea ice. ICEX ice camp deployments require significantly higher costs to support commercial air charter services (fixed and rotary wing), personnel labor, equipment transportation, travel, and temporary warehousing support. FY 2022 also includes a TORPEX event at ICEX that increases cost significantly as EXTORP firings in the Arctic require a significantly higher level</p>					

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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
of logistics, air charter services, personnel, and infrastructure to account for the recovery and transportation efforts of the EXTORPs, as well as additional costs for post-event analysis of EXTORP performance.					
Accomplishments/Planned Programs Subtotals	6.375	5.729	9.323	0.000	9.323

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

N/A

Remarks

D. Acquisition Strategy

- This project is a non-Acquisition Category (ACAT) program.
- Use Naval Undersea Warfare Center (NUWC) to provide technical assistance awarded through NAVSEA Reimbursable Work Order for submarine tracking and TORPEX capability.
- Use sole source and competitively awarded contracts through the U.S. Army Corps of Engineers (USACE) Alaska regional office for ICEX Ice Camp logistics, engineering, and operations support.
- Use sole source and competitively awarded contracts through the Fleet Logistics Center (FLC) regional contracting office and Defense Logistics Agency (DLA) for equipment procurement and technical services.
- Use sole source and competitively awarded contracts through the U.S. Transportation Command (USTRANSCOM) for ICEX aviation support.

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 1739 / <i>Submarine Arctic W/F Development</i>
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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			
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	WR	COMSUBLANT : VA	11.349	3.755	Oct 2019	3.464	Oct 2020	4.219	Oct 2021	-		4.219	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	WR	COMSUBPAC : CA	36.101	0.000		0.000		0.000		-		0.000	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	WR	NUWC/Keyport : WA	0.843	0.149	Oct 2019	0.729	Oct 2020	0.295	Nov 2021	-		0.295	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	WR	NUWC/Newport : RI	1.795	0.121	Oct 2019	0.230	Nov 2020	1.100	Nov 2021	-		1.100	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	MIPR	USACE : AK	4.201	0.420	Nov 2019	1.150	Nov 2020	1.234	Dec 2021	-		1.234	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	MIPR	USTRANSCOM : IL	1.570	1.600	Dec 2019	0.000		2.119	Dec 2021	-		2.119	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	C/CPFF	UT/ARL : TX	1.444	0.000		0.000		0.000		-		0.000	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX Workup and Training, Ice Camps	C/CPFF	UW/APL : WA	15.827	0.000		0.000		0.000		-		0.000	-	-	-
Conduct ICEX and Arctic Transit Mission, ICEX	C/CPFF	VAR* : VAR	0.339	0.000		0.000		0.000		-		0.000	-	-	-

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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			
Workup and Training, Ice Camps															
Subtotal			73.469	6.045		5.573		8.967		-		8.967	-	-	N/A

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

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	0.311	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support - Acquisition, Business & Finance	C/CPAF	BAE SYSTEMS : MD	1.088	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support - Acquisition, Business & Finance	C/CPIF	TMB : DC	0.322	0.104	Jan 2020	0.106	Mar 2021	0.110	Dec 2021	-		0.110	-	-	-
Program Office Travel	Allot	NAVSEA PEO IWS 5 : DC	0.040	0.000		0.000		0.000		-		0.000	-	-	-
ICEX Event Travel	Allot	NAVSEA PEO : DC	0.000	0.226	Oct 2020	0.050	Oct 2021	0.246	Oct 2021	-		0.246	-	-	-
Subtotal			1.761	0.330		0.156		0.356		-		0.356	-	-	N/A

Remarks
* ICEX Event Travel category has been added in FY 2020 because ICEX travel is no longer managed via COMSUBLANT, but by NAVSEA PEO IWS via the Defense Travel System (DTS) Cross-Organization process.

	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	75.230	6.375	5.729	9.323	-	9.323	-	-	N/A

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 1739 / <i>Submarine Arctic W/F Development</i>
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Project 1739	FY 2020				FY 2021				FY 2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
ICEX Missions	ICEX 2020 Plan-ning	▲	ICEX 2020 Analysis/Reporting		ICEX 2022 Planning				△	ICEX 2022 Analysis/Reporting		
	ICEX 2020 (TACDEV)				ICEX 2022 (TACDEV / TORPEX)							
Ice Camps (Arctic Ocean)	Ice Camp 2020				Ice Camp 2022							
Arctic Workup (at sea)	Arctic Workup											
Arctic Training	Arctic Training											
Arctic Deployment (at sea)	Arctic Deployment											
Arctic Transit Mission (at sea)	Arctic Transit Mission											

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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 0603562N / <i>Submarine Tactical Warfare Sys</i>	Project (Number/Name) 1739 / <i>Submarine Arctic W/F Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1739				
ICEX Missions: ICEX Mission 2020 (TACDEV) Planning/Logistics	1	2020	1	2020
ICEX Missions: ICEX Mission 2020 (TACDEV)	2	2020	2	2020
ICEX Missions: ICEX Mission 2020 (TACDEV) Post-ICEX Analysis/Reporting	3	2020	4	2020
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX) Planning/Logistics	1	2021	1	2022
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX)	2	2022	2	2022
ICEX Missions: ICEX Mission 2022 (TACDEV / TORPEX) Post-ICEX Analysis/Reporting	3	2022	4	2022
Ice Camps: Ice Camp (Arctic Ocean) 2020	1	2020	4	2020
Ice Camps: Ice Camp (Arctic Ocean) 2022	1	2022	4	2022
Arctic Workup (At-Sea): Arctic Workup (At Sea)	1	2020	4	2022
Arctic Training: Arctic Training	1	2020	4	2022
Arctic Submarine Deployment as required by the Submarine Type Commander: Arctic Submarine Deployment as required by the Submarine Type Commander	1	2020	4	2022
Arctic Transit Mission (At Sea): Arctic Transit Mission (At Sea)	1	2020	4	2022