Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy											Date: April 2022	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0101226N *I Submarine Acoustic War Dev*							
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	66.798	37.250	59.752	81.237	-	81.237	93.214	69.387	50.015	50.654	Continuing	Continuing
1265: *Sub Defensive Warfare*	66.798	11.425	16.887	17.917	-	17.917	15.366	14.462	14.730	14.968	Continuing	Continuing
1267: *Compact Rapid Attack Weapon (CRAW)*	0.000	13.363	39.854	60.782	-	60.782	77.848	54.925	35.285	35.686	Continuing	Continuing
1268: *Non-Traditional Acoustic Communications (NTAC)*	0.000	3.297	3.011	2.538	-	2.538	0.000	0.000	0.000	0.000	0.000	8.846
9999: *Congressional Adds*	0.000	9.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.165

A. Mission Description and Budget Item Justification

The Submarine Acoustic Warfare (SAWS) Development Program develops acoustic countermeasures, submarine defense capabilities, external launch systems and all acoustic augmentation systems for the U.S. Navy submarines. The SAWS Development Program is comprised of the Submarine Defensive Warfare Program, Compact Rapid Attack Weapon (CRAW) and Non-Traditional Acoustic Communications (NTAC).

Project 1265 Sub Defensive Warfare
Submarine Torpedo Defense System (SubTDS)
The ADC MK 5 acoustic countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering and Manufacturing Development (E&MD) phase. The first development (Increment 1) effort of the overall SubTDS program is focused on delivering full internal countermeasure launcher (ICL) functionality to all submarine in the fleet via the Acoustic Device Countermeasure (ADC) MK5 effort. The ADC MK5 development includes delivering fully functional test units and Engineering Development Model (EDM) variants. The ADC MK5 will bring new technologies including adaptability packaged in a three-inch diameter body. The ADC MK5 efforts support on- going development including component and subsystem design, in support of the Preliminary Design Review (PDR), Critical Design Review (CDR) and contract award for procurement of multiple ADC MK5 EDM countermeasure developmental variants. FY22 funding will procure four (4) Countermeasure Control Tools (CCT), and procure eight (8) Sonar Test Units ((4) STU-E's (4) STU's), and seventeen (17) EDM-1.

FY23 will complete the Critical Design Review (CDR). FY23 will deliver eight (8) Sonar Test Units ((4) STU-E's (4) STU's), and seventeen (17) EDM-1. FY23 will include the Test Readiness Review (TRR) for STU and EDM-1 and in water developmental testing (DT) for these units. Hardware in the Loop Testing (HWIL) in the Environment Centric Weapons Analysis Facility (EC WAF) on STU-E will begin in FY23 EDM-2 development and production prototyping will continue in preparation for beginning production deliveries in FY24.

The next development (Increment 2) effort focuses on the development of the External Countermeasure Launcher (ECL) 6-inch acoustic countermeasure, Tactical Decision Aid, and integration of communication interfaces with ship systems for enabling improved adaptive capabilities leading up to a contract award in FY26.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*

The Undersea Defense Working Group (UDWG) is a working group comprised of fleet, resource sponsor, (testing community) and acquisition community representatives to assess fleet threats and the effectiveness of our countermeasure and systems against these threats, both known and projected. This includes associated studies, demonstrations, models, and simulations. The Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) will provide hardware and software development support for Acoustic Devices Countermeasure (ADC) as well as Countermeasures Set, Acoustic (CSA) systems, future variants, and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), and advanced communication systems improvements in support of the AASP, including component level technical insertion.

Project 1267 Compact Rapid Attack Weapon (CRAW)
1. Compact Rapid Attack Weapon (CRAW) Development Design
CRAW is a very lightweight torpedo that will have Anti-Submarine Warfare (ASW) and Anti-Torpedo Torpedo (ATT) capabilities. ONR began a follow-on FNC in FY20 to demonstrate the ability to modify a previous design for submarine integration and use as an ASW weapon via TEMPALT in FY23. PMS415 began a Rapid Prototyping (RP) Middle Tier Acquisition (MTA) in FY22 to transition the ONR FNC effort to a lasting Early Operational Capability via a SHIPALT in FY26. The ONR FNC and CRAW MTA program received 24 existing legacy hardware devices that will be updated for submarine integration, and will be known as the CRAW TI-1 hardware baseline. The critical updates consist of integrating a new Safe and Arming (S&A) and Warhead (WH) design, and the development of Anti-Submarine Warfare (ASW) mission software. PSU/ARL will support the ONR FNC demonstration, the development of the CRAW TI-1 hardware and software updates, and the maturation of the design into a permanent capability through the RP MTA approach. Leveraging the existing 24 legacy hardware devices and the long standing technological knowledge of PSU/ARL for designing, testing, and qualifying the CRAW device will enable the program to deliver the leave behind residual capability in FY26 as the TI-1/ASW Early Operational Capability (EOC). The program will then transition the RP MTA into a Major Capability Acquisition Program that will update the TI-1 baseline into a supportable and producible industry design that will be known as the TI-2 hardware baseline. PMS415 intends to execute this approach with the award of a UTIC OTA contract in Q3 FY22. In FY22 and early FY23, the awarded prime contractor will primarily shadow PSU/ARL to transition TI-1 CRAW knowledge and prepare for TI-2 development to begin in late FY23. The prime contractor will address obsolescence issues, develop the production line, improve manufacturing processes, stand-up the vendor base, and deliver TI-2 EDMs in support of future full-rate production. PMS415 intends to initiate the TI-2 program of record in mid to late FY23 as a post MS-B ACAT III program. The program is planning to reach MS-C in FY27.

2. Compact Rapid Attack Weapon (CRAW) Submarine Integration
Submarine integration of CRAW into the external countermeasure launcher (ECL) assembly requires upgrades to the combat systems in support of pre-planning and launch control of the CRAW, a new launch tube assembly that fits into the ECL, and ship alteration and modernization planning documents. This effort requires upgrades to the submarine combat system
as a part of the Submarine Federated and Warfare Tactical Systems (SWFTS) modernization cycle. The major components requiring hardware and software upgrades to support CRAW include the ECL assembly, BYG-1 combat system, and Common Weapon Launcher (CWL). The upgrades will come in two initial phases with a Temporary Alteration (TEMPALT) to Technical Insertion 20 (TI-20) for the ONR FNC demonstration launch from a Virginia Class Submarine (VCS), and then a permanent Ship Alteration (SHIPALT) to TI-24 for VCS Blk III/IV hulls as a part of the Rapid Prototyping MTA. In addition, the necessary TEMPALT and SHIPALT documentation (e.g., design changes, safety reports, test reports, etc.) required for installation aboard a submarine will be developed. An integrated test program and operational testing with the Navy's Command Operational Test and Evaluation Force will be conducted after installation of the TI-24 SHIPALT.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101226N *I Submarine Acoustic War Dev*

In FY2023 the program will complete a TEMPALT data package and coordinate with ONR FNC to demonstrate the launch of a CRAW from an ECL on a submarine in FY23. This test will inform the final SHIPALT configuration needed for permanent integration and installation of CRAW on a submarine beginning in FY2026. The program will also continue development of upgrades necessary to support CRAW launch and control from the BYG-1 combat system. The program will also begin work with ONR on Revolver MP to enable CRAW launch and control via torpedo tubes. This has the potential to significantly reduce DT/OT duration by enabling the launch of test CRAWs from the torpedo room and thereby minimizing the time consuming replacement and reloading of ECL assemblies (which must be accomplished pier side with crane support).

Project 1268 Non-Traditional Acoustic Communications (NTAC)

This capability provides advanced undersea acoustic communications across multiple platforms within the Navy. This program builds upon the baseline NTAC software capability and integrates the software components into new hardware to expand the effectiveness and reliability of the capability. Additional details are available at the classified level.

The SAWS Development Program transitions the research and development of new technologies and capabilities generated under the Future Naval Capabilities (FNC), Small Business and Innovative Research (SBIR), and other Research, Development, Test & Evaluation (RDT&E) initiatives. Hardware and software evaluations in representative acoustic environments, against projected threats utilizing digital and hardware-in-the-loop simulations determines the effectiveness and impact on improving submarine survivability. The technology is then integrated into the appropriate product line. Additionally, this effort also includes advanced studies, product development and improvements for Submarine Acoustic Warfare Systems (SAWS) including but not limited to AASP, CSA, SubTDS, CRAW and NTAC.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	37.693	64.752	0.000	-	0.000
Current President's Budget	37.250	59.752	81.237	-	81.237
Total Adjustments	-0.443	-5.000	81.237	-	81.237
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-5.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.443	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	-	-	81.237	-	81.237

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101226N *I Submarine Acoustic War Dev*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 9999: *Congressional Adds*		
Congressional Add: *Acoustic Device Countermeasures*	9.165	0.000
Congressional Add Subtotals for Project: 9999	9.165	0.000
Congressional Add Totals for all Projects	9.165	0.000

Change Summary Explanation

The FY 2023 funding request was reduced by $2.978 million to account for the availability of prior year execution balances.

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 1265 / *Sub Defensive Warfare*	

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
1265: *Sub Defensive Warfare*	66.798	11.425	16.887	17.917	-	17.917	15.366	14.462	14.730	14.968	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Submarine Acoustic Warfare (SAWS) Development Program develops acoustic countermeasures, submarine defense capabilities, external launch systems and all acoustic augmentation systems for the U.S. Navy submarines. The SAWS Development Program is comprised of the Submarine Defensive Warfare Program.

Project 1265 Sub Defensive Warfare
Submarine Torpedo Defense System (SubTDS)
The ADC MK 5 acoustic countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering and Manufacturing Development (E&MD) phase. The first development (Increment 1) effort of the overall SubTDS program is focused on delivering full internal countermeasure launcher (ICL) functionality to all submarines in the fleet via the Acoustic Device Countermeasure (ADC) MK5 effort. The ADC MK5 development includes delivering fully functional test units and Engineering Development Model (EDM) variants. The ADC MK5 will bring new technologies including adaptability packaged in a three-inch diameter body. The ADC MK5 efforts support on- going development including component and subsystem design, in support of the Preliminary Design Review (PDR), Critical Design Review (CDR), and contract award for procurement of multiple ADC MK5 EDM countermeasure developmental variants. FY22 funding will procure four (4) Countermeasure Control Tools (CCT), and procure eight (8) Sonar Test Units ((4) STU-E's (4) STU's), and seventeen (17) EDM-1.

FY23 will complete the Critical Design Review (CDR). FY23 will deliver eight (8) Sonar Test Units ((4) STU-E's (4) STU's), and seventeen (17) EDM-1. FY23 will include the Test Readiness Review (TRR) for STU and EDM-1 and in water developmental testing (DT) for these units. Hardware in the Loop Testing (HWIL) in the WAF on STU-E will begin in FY23. EDM-2 development and production prototyping will continue in preparation for beginning production deliveries in FY24.

The next development (Increment 2) effort focuses on the development of the External Countermeasure Launcher (ECL) 6-inch acoustic countermeasure variant, Tactical Decision Aid, and integration of communication interfaces with ship systems for enabling improved adaptive capabilities leading up to a contract award in FY26.

The Undersea Defense Working Group (UDWG) is a working group comprised of fleet, resource sponsor, (testing community) and acquisition community representatives to assess fleet threats and the effectiveness of our countermeasure and systems against these threats, both known and projected. This includes associated studies, demonstrations, models, and simulations. The Technical Direction Agent (TDA) and In-Service Engineering Agent (ISEA) will provide hardware and software development support for Acoustic Devices Countermeasure (ADC) as well as Countermeasures Set, Acoustic (CSA) systems, future variants, and Acoustic Augmentation Support Systems (AASS) in the Acoustic Augmentation Support Program (AASP), and advanced communication systems improvements in support of the AASP, including component level technical insertion.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Submarine Torpedo Defense System (SubTDS)	11.425	16.887	17.917	0.000	17.917
Articles:	-	-	122	-	122
Description: The ADC MK5 Acoustic Countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering & Manufacturing Development phase. The first effort of the overall SubTDS program focuses on delivering full internal countermeasure launcher functionality to all submarines in the fleet via the Acoustic Device Countermeasure (ADC) MK5 effort.					
FY 2022 Plans: - Completion of Preliminary Design Review - Continue ADC MK5 EDM design and prototype builds. - Continue M&S assessment of known and projected torpedo threats. - Continue development of required program documentation. - Continue development of concept of operations and operational tactics. - Continue assessment of Threat for UDWG and WAF with updated vulnerability assessments. - Procure four (4) CCT, four (4) STU, four (4) STU-E, seventeen (17) EDM-1					
FY 2023 Base Plans: - Conduct ADC MK5 Critical Design Review (CDR). - Continue ADC MK5 EDM design and prototype builds. - Continue M&S assessment of known and projected torpedo threats. - Continue development of required program documentation. - Continue development of concept of operations and operational tactics. - Continue assessment of Threat for UDWG and WAF with updated vulnerability assessments. - Deliver four (4) CCT, four (4) STU, four (4) STU-E, seventeen (17) EDM-1 - Initiate procurement of long lead items for twenty (20) EDM-2EQT to be utilized for Environmental Qualification Testing (EQT) - Initiate procurement of long lead items for three (3) EDM-2T to be utilized for Hazards of Electromagnetic Radiation to Ordnance (HERO) Testing - Initiate procurement of long lead items for ninety nine (99) EDM-2 to be utilize for in-water testing - Test Readiness Review (TRR) for STU and EDM-1 - Start in- water developmental testing on STU and EDM-1					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Start Hardware in the Loop (HWIL) Testing on STU-E ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY2022 to FY2023 increase of $1.030 million due to start of in-water developmental testing on EDM-1.					
Accomplishments/Planned Programs Subtotals	11.425	16.887	17.917	0.000	17.917

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• OPN/2210: *Submarine Acoustic Warfare System*	26.066	24.578	31.708	-	31.708	40.769	43.164	39.228	37.550	Continuing	Continuing

Remarks

OPN 2210 includes SubTDS and Compact Rapid Attack Weapon System (CRAW) starting in FY 2023. Funding profile shows SubTDS equity only.

D. Acquisition Strategy

Submarine Acoustic Warfare System (SAWS) develops Undersea Defensive Warfare technologies to improve the survivability of all U.S. Submarine classes.

SUBTDS
Through a full and open competition, the ADC MK5 development contract awarded in Sep 2018. The Cost Plus Incentive Fee (CPIF) contract funds the design and development of Engineering Development Model (EDM) variants, Technical Data Packages (TDP), and Low-Rate Initial Production (LRIP) units for accomplishing Operational Testing (OT). The ADC MK5 contractor subsystem testing and joint contractor/Navy Development Testing (DT) will occur in FY23 through FY25 and Navy OT in FY26. Milestone C is nominally in FY26. Initial Operational Capability (IOC) is nominally FY27 for the Internal Countermeasure Launcher (ICL) configuration. After successfully completing OT and Full Rate Production Decision Review (FRP DR), award of a full and open competitive production contract occurs in FY27. APB and TEMP will be approved in FY22. The next development effort for addressing the overall SubTDS program will begin in FY26 and focus on the development of the External Countermeasure Launcher (ECL) 6-inch acoustic countermeasure variant. Development of the acquisition strategy is beginning, with a contract award planned for FY26.

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 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS WAF ANALYSIS UDWG	WR	NUWC : NEWPORT, RI	13.069	0.000		0.000		2.995	Dec 2022	-		2.995	Continuing	Continuing	Continuing
SubTDS SYSYTEM ENGINEERING	WR	NUWC : NEWPORT, RI	15.116	1.534	Dec 2020	1.536	Nov 2021	1.517	Dec 2022	-		1.517	Continuing	Continuing	Continuing
SubTDS ADC MK5 New Development	C/CPIF	LEIDOS : RESTON, VA	14.478	8.343	Dec 2020	11.663	Nov 2021	11.641	Nov 2022	-		11.641	Continuing	Continuing	Continuing
SubTDS ADC MK5 SYSTEM ENGINEERING	WR	NUWC : KEYPORT, WA	5.110	0.400	Dec 2020	0.200	Nov 2021	0.204	Dec 2022	-		0.204	Continuing	Continuing	Continuing
SubTDS Modeling And Simulation	WR	NUWC : NEWPORT, RI	6.794	0.510	Dec 2020	1.850	Nov 2021	0.830	Dec 2022	-		0.830	Continuing	Continuing	Continuing
SubTDS Tactical Decision Aid TacDA	WR	NUWC : NEWPORT, RI	6.481	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Acoustic Augmentation Support Program (AASP)	WR	NUWC : NEWPORT, RI	0.435	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Sabot Development	WR	NUWC : NEWPORT, RI	1.270	0.000		0.000		0.000		-		0.000	0.000	1.270	-
SubTDS ADC MK5 Principal for Safety	WR	NSWC : INDIAN HEAD, MD	0.000	0.015	Dec 2020	0.000		0.020	Dec 2022	-		0.020	0.000	0.035	-
		Subtotal	62.753	10.802		15.249		17.207		-		17.207	Continuing	Continuing	N/A

Remarks

FY23 funding will deliver eight Special Test Units ((4) STU-E's (4) STU's), seventeen (17) EDM-1 devices that are recoverable, rechargeable, and reusable and will start procurement of EDM-2.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS System Test and Evaluation	WR	NUWC : NEWPORT, RI	0.000	0.137	Dec 2020	1.258	Nov 2021	0.380	Dec 2022	-		0.380	Continuing	Continuing	Continuing
		Subtotal	0.000	0.137		1.258		0.380		-		0.380	Continuing	Continuing	N/A

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 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 1265 / *Sub Defensive Warfare*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

FY23 will include developmental testing for the STU and EDM-1. FY23 will include the Test Readiness Review (TRR) for STU and EDM-1.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SAWS TRAVEL	WR	NAVSEA : Washington, DC	0.842	0.040	Oct 2020	0.040	Oct 2021	0.040	Dec 2022	-		0.040	Continuing	Continuing	Continuing
SubTDS PROGRAM MANAGEMENT SUPPORT	C/CPAF	TECH MARINE : Washington, DC	0.900	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SubTDS PROGRAM MANAGEMENT SUPPORT	C/CPAF	BOOZ ALLEN : Washington, DC	2.303	0.066	Feb 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SubTDS PROGRAM MANAGEMENT SUPPORT	C/CPAF	Synchron : Washington, DC	0.000	0.380	Jun 2021	0.340	Jun 2022	0.290	Dec 2022	-		0.290	Continuing	Continuing	Continuing
		Subtotal	4.045	0.486		0.380		0.330		-		0.330	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	66.798	11.425		16.887		17.917		-		17.917	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

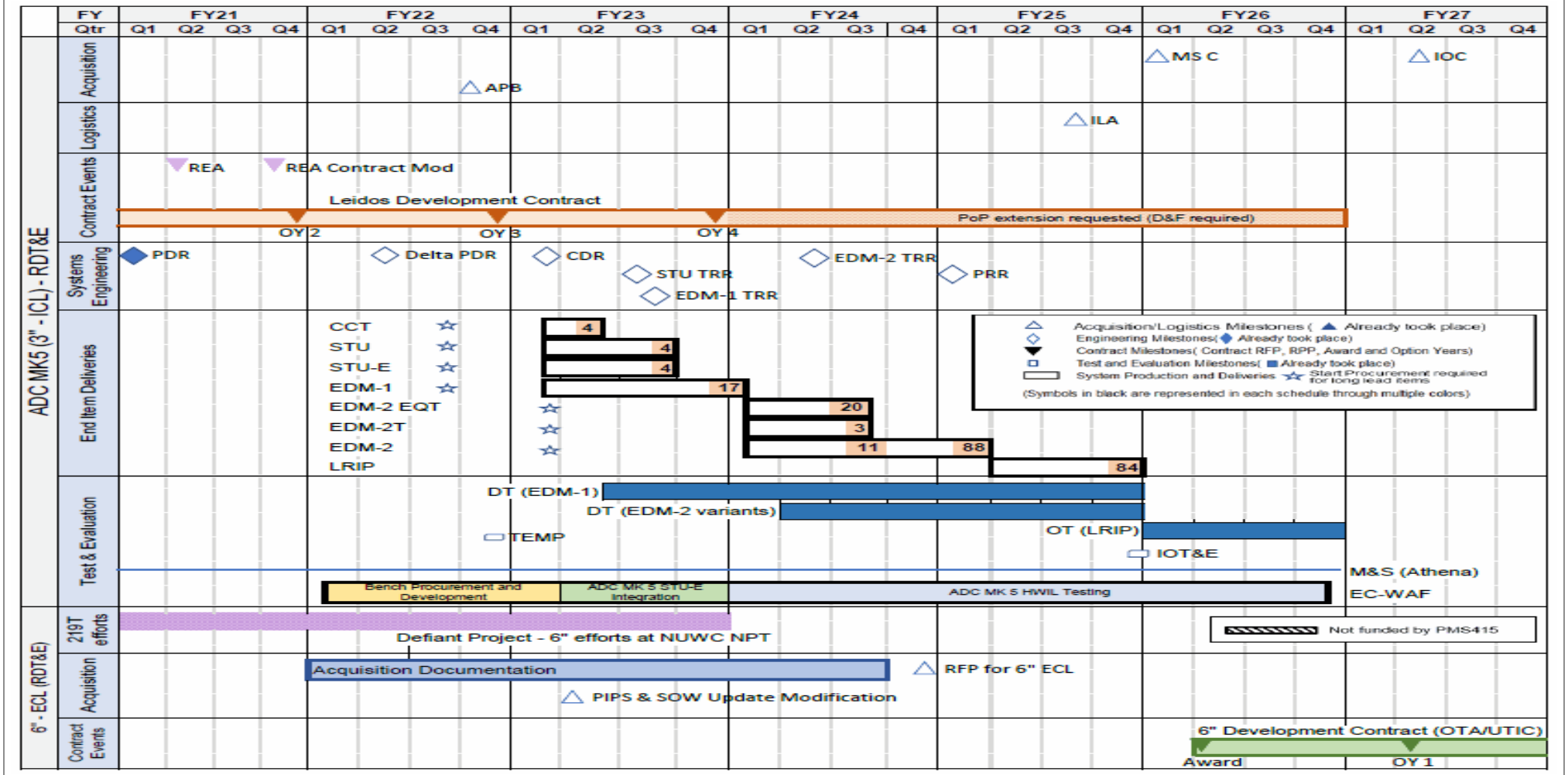

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1265				
Schedule Detail	1	2021	1	2027
Weapons Analysis Facility (WAF): Countermeasure (CM) Effectiveness/Weapon Analysis Facility (WAF) Vulnerability	1	2021	4	2026
Submarine Torpedo Defense Systems (SubTDS): SubTDS M&S	1	2021	4	2025
Submarine Torpedo Defense Systems (SubTDS): TEMP Development	1	2022	4	2022
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 5 PDR	1	2021	1	2021
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 5 Delta PDR/IPR	2	2022	2	2022
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 Critical Design Review (CDR)	1	2023	1	2023
Submarine Torpedo Defense Systems (SubTDS): EDM-1 Production and Deliveries	3	2022	1	2024
Submarine Torpedo Defense Systems (SubTDS): DT (EDM-1)	2	2023	4	2025
Submarine Torpedo Defense Systems (SubTDS): EDM-2 Variant Production and Deliveries	1	2024	1	2025
Submarine Torpedo Defense Systems (SubTDS): DT (EDM-2 Variants)	2	2024	4	2025
Submarine Torpedo Defense Systems (SubTDS): LRIP Production and Deliveries	2	2025	4	2025
Submarine Torpedo Defense Systems (SubTDS): MS-C Decision Reviews	1	2026	1	2026
Submarine Torpedo Defense Systems (SubTDS): OT (LRIP)	1	2026	4	2026
Submarine Torpedo Defense Systems (SubTDS): ECL Development Start	1	2026	1	2026

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 1267 / *Compact Rapid Attack Weapon (CRAW)*	

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
1267: *Compact Rapid Attack Weapon (CRAW)*	0.000	13.363	39.854	60.782	-	60.782	77.848	54.925	35.285	35.686	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Compact Rapid Attack Weapon (CRAW) Development Design

Compact Rapid Attack Weapon (CRAW) Development Design CRAW is a very lightweight torpedo that will have Anti-Submarine Warfare (ASW) and Anti-Torpedo Torpedo (ATT) capabilities. ONR began a follow-on FNC in FY20 to demonstrate the ability to modify a previous design for submarine integration and use as an ASW weapon via TEMPALT in FY23. PMS415 began a Rapid Prototyping (RP) Middle Tier Acquisition (MTA) in FY22 to transition the ONR FNC effort to a lasting Early Operational Capability via a SHIPALT in FY26. The ONR FNC and CRAW MTA program received 24 existing legacy hardware devices that will be updated for submarine integration, and will be known as the CRAW TI-1 hardware baseline. The critical updates consist of integrating a new Safe and Arming (S&A) and Warhead (WH) design, and the development of Anti-Submarine Warfare (ASW) mission software. PSU/ARL will support the ONR FNC demonstration, the development of the CRAW TI-1 hardware and software updates, and the maturation of the design into a permanent capability through the RP MTA approach. Leveraging the existing 24 legacy hardware devices and the long standing technological knowledge of PSU/ARL for designing, testing, and qualifying the CRAW device will enable the program to deliver the leave behind residual capability in FY26 as the TI-1/ASW Early Operational Capability (EOC). The program will then transition the RP MTA into a Major Capability Acquisition Program that will update the TI-1 baseline into a supportable and producible industry design that will be known as the TI-2 hardware baseline. PMS415 intends to execute this approach with the award of a UTIC OTA contract in Q3 FY22. In FY22 and early FY23, the awarded prime contractor will primarily shadow PSU/ARL to transition TI-1 CRAW knowledge and prepare for TI-2 development to begin in late FY23. The prime contractor will address obsolescence issues, develop the production line, improve manufacturing processes, stand-up the vendor base, and deliver TI-2 EDMs in support of future full-rate production. PMS415 intends to initiate the TI-2 program of record in mid to late FY23 as a post MS-B ACAT III program. The program is planning to reach MS-C in FY27.

Compact Rapid Attack Weapon (CRAW) Submarine Integration

Submarine integration of CRAW into the external countermeasure launcher (ECL) assembly requires upgrades to the combat systems in support of pre-planning and launch control of the CRAW, a new launch tube assembly that fits into the ECL, and ship alteration and modernization planning documents. This effort requires upgrades to the submarine combat system
as a part of the Submarine Federated and Warfare Tactical Systems (SWFTS) modernization cycle. The major components requiring hardware and software upgrades to support CRAW include the ECL assembly, BYG-1 combat system, and Common Weapon Launcher (CWL). The upgrades will come in two initial phases with a Temporary Alteration (TEMPALT) to Technical Insertion 20 (TI-20) for the ONR FNC demonstration launch from a Virginia Class Submarine (VCS), and then a permanent Ship Alteration (SHIPALT) to TI-24 for VCS Blk III/IV hulls as a part of the Rapid Prototyping MTA. In addition, the necessary TEMPALT and SHIPALT documentation (e.g., design changes, safety reports, test reports, etc.)

required for installation aboard a submarine will be developed. An integrated test program and operational testing with the Navy's Command Operational Test and Evaluation Force will be conducted after installation of the TI-24 SHIPALT.

In FY2023 the program will complete a TEMPALT data package and coordinate with ONR FNC to demonstrate the launch of a CRAW from an ECL on a submarine in FY23. This test will inform the final SHIPALT configuration needed for permanent integration and installation of CRAW on a submarine beginning in FY2026. The program will also continue development of upgrades necessary to support CRAW launch and control from the BYG-1 combat system. The program will also begin work with ONR on Revolver MP to enable CRAW launch and control via torpedo tubes. This has the potential to significantly reduce DT/OT duration by enabling the launch of test CRAWs from the torpedo room and thereby minimizing the time consuming replacement and reloading of ECL assemblies (which must be accomplished pier side with crane support).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Compact Rapid Attack Weapon (CRAW) Development Design	10.228	35.089	47.378	0.000	47.378
Articles:	-	-	12	-	12
Description: Compact Rapid Attack Weapon (CRAW) development will transition the current ONR design effort into a Middle Tier Acquisition rapid prototyping POR. The CRAW vehicle design and technology will be matured to meet Submarine ASW and Torpedo Defense requirements, system safety and reliability qualification standards, device interface with ship system of system launchers and combat control and development of a technical data package that can be utilized for transition to TI-2 full-rate production.					
FY 2022 Plans: - Obtain Acquisition Decision Memorandum (ADM) approval for MTA rapid prototyping initiation - Award OTA/UTIC contract for CRAW TI-2 hardware development - Continue assembly of TI-1 CRAW devices - Begin design and development of manufacturing test equipment - Complete ASW software transition from ONR FNC ASW SW configuration - Conduct in-water performance testing of ASW software - Complete development of S&A design - Begin development of Warhead design - Conduct System Requirements Review (SRR) - Complete SCEPS Thermite Start Charge development - Continue execution of CRAW system safety program - Continue development of launch tube assembly (LTA) all-up-round design - Conduct Launch Tube test 2 (LT-2)					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Obtain approval of CRAW ANNEX to SubTDS CDD - Begin development of program planning documents including Cyber Strategy, System Safety, Systems Engineering Plan, - Test Strategy, Life Cycle Sustainment Plan, and Program Life Cycle Cost Estimate					
FY 2023 Base Plans: - Continue TI-1/ASW MTA Rapid Prototyping execution - Obtain Acquisition Decision Memorandum (ADM-2) approval for post Milestone B CRAW TI-2 (ATT). - Begin OTA/UTIC TI-2 hardware development - Continue assembly of TI-1 CRAW devices - Conduct Preliminary Design Review for TI-2 - Continue design and development of manufacturing test equipment - Continue ASW SW testing - Begin development of ATT software - Conduct Critical Design Review of TI-2 - Begin Launch Tube Assembly builds for testing - Conduct in-water performance testing of ASW software - Continue development of Warhead design - Procure WH/S&A test articles for qualification - Continue execution of CRAW system safety program - Begin transition Multi Vehicle Torpedo Tube Deployment System (MVTTDS) to Revolver MP - Begin Submarine qualification of Revolver MP for live fire testing - Continue development of program planning documents including Cyber Strategy, System Safety, Life Cycle Sustainment Plan, and Program Life Cycle Cost Estimate - Conduct ONR FNC launch demonstration from a VA CL submarine - Continue execution of CRAW system safety program - Begin Revolver MP transition					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: FY 2022 to FY 2023 increase of $12.289 million for assembly and acceptance of the initial 12 TI-1 devices for qualification and demonstration. Note: TI-1 is only 24 devices which require transition to the TI-2 design due to					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
obsolescence and producibility. FY23 includes initiation of TI-2/ATT Program of Record entering post-MS B. The first year of Industry development of the TI-2 CRAW hardware, procurement of long lead material for EDM builds, finalizing warhead development and procurement of test articles. Also in FY23, the CRAW program will demonstrate a submarine launch from a Virginia Class Submarine (VCS) platform. Revolver - Multi Payload (MP) Transitions from ONR to PMS 415 in FY23 to complete submarine integration and initial fielding.					
Title: Compact Rapid Attack Weapon (CRAW) Submarine Integration	3.135	4.765	13.404	0.000	13.404
Articles:	-	-	-	-	-
Description: Compact Rapid Attack Weapon (CRAW) platform design work and systems integration for submarines. This includes the engineering and design effort to modify submarine hardware systems, update the combat system, and create the necessary alteration documentation needed to integrate the CRAW capability onto a submarine.					
FY 2022 Plans: - Conduct in-water test of launch tube assembly - Update launch tube assembly design based upon testing results - Continue development of External Countermeasure Launcher (ECL) design changes - Perform Critical Design Review of BYG-1 software upgrade - Develop initial release of combat software (BYG-1) software upgrade - Continue development of countermeasure set, acoustic (CSA) integration with Combat Weapons Launcher (CWL) - Continue development of TEMPALT package for Virginia Class sub					
FY 2023 Base Plans: - Complete in-water testing of launch tube assembly - Finalize development of External Countermeasure Launcher (ECL) design changes - Increased work for tactics/submarine interface development of combat software (BYG-1) for TI-24 Virginia Class baseline - Advance integration of existing countermeasure set, acoustic (CSA) with Combat Weapons Launcher (CWL) - Expand Common Weapon Launcher simulator for increased migration of submarine launcher functionality - Deliver CWL prototype for Submarine demonstration launch in FY23 - Complete required drawing and training packages for fully approved TEMPALT package for Virginia Class sub					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Install and conduct submarine launched demonstration ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 increase of $8.639 million due to the continuing of critical ship integration changes for External Countermeasure Launch, which includes completing testing and qualification of the launch tube assembly integration. Also, increased combat systems development of tactical software and submarine interfaces for integrating CSA functionality into CWL, BYG-1 for providing own ship and situational inputs to CRAW prior to launch. Delivery of a CWL prototype in FY23 will be integrated with the combat systems TI-20 submarine and delivered as part of the TEMPALT design package for submarine launch demonstration in FY23 and as a risk reduction in further development of the TI-24 SHIPALT design package.					
Accomplishments/Planned Programs Subtotals	13.363	39.854	60.782	0.000	60.782

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• OPN/2210: *Submarine Acoustic Warfare System*	0.000	0.000	1.791	-	1.791	8.419	9.896	5.985	6.100	Continuing	Continuing

Remarks

OPN 2210 includes Submarine Torpedo Defense System (SubTDS) and CRAW. Funding profile shows CRAW equity only. In FY23, OPN funding will procure 3 Launch tube assemblies for integration with Virginia submarine External Countermeasure Launchers and procurement for Revolver MP.

D. Acquisition Strategy

The Office of Naval Research (ONR) developed the initial CRAW design to be a multi-platform and multi-mission weapon. The ONR FNC investment and demonstration is aligned to the POR Rapid prototyping approach to provide a common solution that will provide the design spiral for transitioning to the Production and Deployment Phase. CRAW is a very lightweight torpedo that will have Anti-Submarine Warfare (ASW) and Anti-Torpedo Torpedo (ATT) capabilities. ONR began a follow-on FNC in FY20 to demonstrate the ability to modify a previous design for submarine integration and use as an ASW weapon via TEMPALT in FY23. PMS415 began a Rapid Prototyping (RP) Middle Tier Acquisition (MTA) in FY22 to transition the ONR FNC effort to a lasting Early Operational Capability via a SHIPALT in FY26. The ONR FNC and CRAW MTA program received 24 existing legacy hardware devices that will be updated for submarine integration, and will be known as the CRAW TI-1 hardware baseline. The critical updates consist of integrating a new Safe and Arming (S&A) and Warhead (WH) design and development of Anti-Submarine Warfare (ASW) mission software. PSU/ARL will support the ONR FNC demonstration, for the development of the CRAW TI-1 hardware and software, and for maturing the design into

a permanent capability through the RP MTA approach. Leveraging the existing 24 legacy hardware devices and the long standing technological knowledge of PSU/ARL for designing, testing, and qualifying the CRAW device will enable the program to deliver the leave behind residual capability in FY26 as the TI-1/ASW Early Operational Capability (EOC). The program will transition the RP MTA into a Major Capability Acquisition Program that will update the TI-1 baseline into a supportable and producible industry design that will be known as the TI-2 hardware baseline. PMS415 intends to execute this approach with the award of a UTIC OTA contract in Q3 FY22. In FY22 and early FY23, the awarded prime contractor will primarily shadow PSU/ARL to transition TI-1 CRAW knowledge and prepare for TI-2 development to begin in late FY23. The prime contractor will address obsolescence issues, develop the production line, improve manufacturing processes, stand-up the vendor base, and deliver TI-2 EDMs in support of future full-rate production. PMS415 intends to initiate the TI-2 program of record in mid to late FY23 as a post MS-B ACAT program focused on the development and testing of the TI-2 hardware baseline and the Anti Torpedo-Torpedo (ATT) software. The program is planning to reach MS-C in FY27.
In FY28, the qualified and tested TI-2 CRAW devices integrated with the full ASW/ATT capability will transition from MS-C into Low-Rate Initial Production (LRIP). Listed below are the major efforts and milestones that mature the CRAW capability from the ONR FNC/PMS 415 shared efforts (FY20-FY23) through transitioning the CRAW program of record to Production and Deployment:

ONR FNC/PMS415 shared effort (FY21-FY23)
ONR FNC efforts will complete and transition fully to PMS 415 CRAW POR with the submarine launched demonstration from a VA class boat. Planned activities include:
- Awarded a contract to PSU/ARL in Q3FY21 to complete the ONR FNC configuration in support of the ONR FNC Demonstration.
- Complete combat system integration efforts to support the TI-20 TEMPALT needed for the ONR FNC demonstration.
- Complete Launch Tube Assembly (LTA) prototype design baseline for demonstration
- Complete ASW SW baseline development for demonstration
- Complete Safe and Arm baseline development for demonstration
- Complete External Countermeasure Launcher changes required to support demonstration
- Platform identified to support 2023 install of TEMPALT for submarine launched demonstration

CRAW TI-1 MTA (FY22-FY26)
After CRAW TI-1 MTA establishment in FY22, the program will begin efforts to transition the ONR FNC CRAW HW configuration and deliver ASW operational capability to the fleet by EOC in FY26. Planned activities include:
- Begin Rapid Prototyping (RP) in FY22
- Support the ONR FNC demonstration in FY23 and transfer technology to CRAW TI-1 MTA
- Complete CRAW TI-1 HW and ASW software development, integration, and testing
- Finalize and qualify the LTA design
- Develop a SHIPALT package to support EOC installations (mods to BYG-1 Combat System and CWL on VCS)
- Complete S&A device integration and testing
- Develop Warhead capability and complete integration and qualification by NSWC IHEOD

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PSU/ARL will execute the rapid prototyping effort (RP) via sole source UARC contract (~$40M) by modifying the 24 legacy configuration devices to CRAW TI-1 HW configurations for submarine launch and ASW software baselines while completing the ONR FNC demonstration in FY23. The ONR FNC demo will utilize the prototype representative LTA configuration for use with the final CRAW ASW baseline configuration. This configuration will result in a final LTA TDP and support EOC in FY26 and transitioning the TI-1/ASW operational capability to VCS.

NSWC IHEOD will continue integration and testing with TI-1 HW and procure sufficient WH/S&A devices to begin qualification testing in FY24. After qualification testing is completed in FY25, NSWC IHEOD will be responsible for manufacturing the CRAW warhead for all CRAW configurations.

CRAW TI-2 (Post-MS B starting in FY23)
Beginning in FY23, the CRAW program will begin TI-2 hardware and ATT software development as a Major Capability Acquisition program for transitioning the full ASW/ATT operational capability. During this phase, the CRAW TI-2 HW production baseline will be developed by an industry partner (TBD) through an OTA/UTIC contract award in late FY22. As part of the Engineering and Manufacturing Development phase, the developer will design, build, test and deliver EDM's and stand-up the vendor base and production line to transition to Production and Deployment following a MS C decision in FY27. Operational Testing of the full TI-2/ASW/ATT capability will begin in FY28, and achieve Initial Operational Capability (IOC) in FY30. Planned activities include:
- Initiate CRAW TI-2 HW and ATT software development efforts in FY23
- Industry partner development of TI-2 hardware and build/deliver EDM's. Scope of work will include establishing a TI-2 hardware production baseline that resolves TI-1 obsolescence and enhances manufacturing methods
- Integrate a certified WH/S&A device
- Transition to initial production of the TI-2 production baseline configurations for device/system testing and qualification as a Launcher Assembly (LA)

The TI-2/ATT development will be accomplished by industry through a five-year competitive UTIC OTA development contract that will be awarded in FY22 to start transitioning
the TI-1 baseline to the TI-2 production representative configuration. The industry partner will focus on addressing TI-1 hardware obsolescence, establishing the vendor base, improving manufacturing methods, and enabling the stand-up and establishment of a production line. Between FY25 to FY26, the industry partner will build and deliver twenty-five (25) TI-2 CRAW devices for use in qualification testing, Developmental Testing (DT), Live Fire Test and Evaluation (LFT&E).

Concurrently, PSU/ARL will continue to be the design agent for all tactical software and build upon the ASW software baseline to develop the ATT software. The TI-2 production representative configuration will be baselined after integrating CRAW TI-2 device hardware with the ATT software baseline along with the previously developed and qualified ASW and Warhead/S&A.

CRAW Program Submarine Integration
PMS 415 and the CRAW program will be responsible for developing the Non-Tactical TEMPALT and SHIPALT work packages for coordinating installations with in-service ship programs during scheduled availabilities.

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Initial submarine integration of combat control and ECL launch capability began under the ONR FNC and will continue in FY23 as part of rapid prototyping. Submarine integration of CRAW into the external countermeasure launcher (ECL) assembly requires upgrades to the combat systems in support of pre-planning and launch control of the CRAW, a new launch tube assembly that fits into the ECL, and ship alteration and modernization planning documents. This effort requires upgrades to the submarine combat systems as a part of the Submarine Federated and Warfare Tactical Systems (SWFTS) modernization cycle. The major components requiring hardware and software upgrades to support CRAW include the ECL assembly, BYG-1 combat system, and Common Weapon Launcher (CWL). The upgrades will come in two initial phases with a Temporary Alteration (TEMPALT) to Technical Insertion 20 (TI-20) for ONR FNC demonstration launch from a Virginia Class Submarine (VCS) in FY23, and then a permanent Ship Alteration (SHIPALT) in TI-24 for VCS Blk III/IV via in-service modernization and Blk V New Construction class hulls. In addition, the necessary TEMPALT and SHIPALT documentation (e.g., design changes, safety reports, test reports, etc.) required for installation aboard a submarine will be developed. An integrated test program and operational testing with the Navy's Command Operational Test and Evaluation Force will be conducted post installation.

In FY2023 the program will complete a TEMPALT data package and coordinate with ONR FNC to demonstrate the launch of a CRAW from an ECL on a submarine in FY23. This test will inform the final SHIPALT needed for early integration and install of CRAW on a submarine beginning in FY2026. The program will also continue development of upgrades necessary to support CRAW launch and control from the BYG-1 combat system.

Additionally, the Revolver MP transition will result in a TEMPALT package that will enable the launch testing of CRAW via the torpedo tubes during FY27 CRAW DT.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - ONR FNC System Engineering	WR	NUWC : Newport, RI	0.000	0.500	Mar 2021	1.786	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
CRAW - ONR FNC Launch Tube Assembly	WR	Applied Research Laboratory Penn State University : State College, PA	0.000	1.700	Apr 2021	2.786	Jan 2022	0.000		-		0.000	Continuing	Continuing	Continuing
CRAW - Launch Tube Assembly	WR	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		0.000		2.830	Jan 2023	-		2.830	0.000	2.830	-
Revolver	TBD	TBD : TBD	0.000	0.000		0.000		1.000	Jan 2023	-		1.000	0.000	1.000	-
CRAW - Hardware Design (TI-1)	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	1.500	Apr 2021	1.525	Jan 2022	1.000	Jan 2023	-		1.000	Continuing	Continuing	Continuing
CRAW - Engineering Development Models (TI-2)	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
CRAW - Software Development	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		2.350	Jan 2022	4.000	Jan 2023	-		4.000	Continuing	Continuing	Continuing
CRAW - Safe and Arm Design / Development	WR	NSWC : Indian Head, MD	0.000	2.900	Mar 2021	4.343	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
CRAW - Warhead Design Analysis	WR	NSWC : Indian Head, MD	0.000	0.000		5.100	Dec 2021	10.006	Dec 2022	-		10.006	Continuing	Continuing	Continuing
CRAW - Systems Engineering (Requirements)	WR	NUWC : Newport, RI	0.000	1.050	Mar 2021	1.485	Dec 2021	2.810	Dec 2022	-		2.810	Continuing	Continuing	Continuing
CRAW - Systems Engineering (Safety)	WR	NSWC : Indian Head, MD	0.000	0.250	Mar 2021	0.750	Dec 2021	1.350	Dec 2022	-		1.350	Continuing	Continuing	Continuing
CRAW - Systems Engineering (Cyber)	WR	NUWC : Keyport, WA	0.000	0.196	Mar 2021	0.486	Dec 2021	0.380	Dec 2022	-		0.380	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Systems Engineering (Integration)	WR	Applied Research Laboratory Penn State University : State College, PA	0.000	0.475	Apr 2021	1.429	Dec 2021	1.500	Dec 2022	-		1.500	Continuing	Continuing	Continuing
CRAW - Systems Engineering (Ship Design Manager	WR	NSWC : Carderock, MD	0.000	0.035	Mar 2021	0.150	Dec 2021	0.870	Dec 2022	-		0.870	Continuing	Continuing	Continuing
CRAW - Systems Engineering (Requirements)	C/CPFF	Amentum : Washington, DC	0.000	0.150	Apr 2021	0.200	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
CRAW - Engineering Developmental Models (TI-1) Assembly	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		1.286	Jan 2022	2.000	Jan 2023	-		2.000	Continuing	Continuing	Continuing
CRAW - Modeling and Simulation	WR	NUWC : Newport, RI	0.000	0.000		1.786	Jan 2022	3.500	Dec 2022	-		3.500	Continuing	Continuing	Continuing
CRAW - Engineering Development Models (TI-1) Assembly	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
CRAW - Modeling and Simulation	C/CPFF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		0.300	Jan 2022	0.400	Jan 2023	-		0.400	Continuing	Continuing	Continuing
CRAW - Integrated Logistics Planning	WR	NUWC : Keyport, WA	0.000	0.000		0.770	Dec 2021	0.760	Dec 2022	-		0.760	Continuing	Continuing	Continuing
CRAW - Integration - Ship Alteration Design	WR	NUWC : Newport, RI	0.000	0.500	Mar 2021	1.475	Dec 2021	2.450	Dec 2022	-		2.450	Continuing	Continuing	Continuing
CRAW - Manufacturing and Assembly Planning	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.000	Mar 2023	-		0.000	0.000	0.000	-
CRAW - Integration - Combat System ECL Control	WR	NUWC : Keyport, WA	0.000	0.000		0.700	Dec 2021	0.350	Dec 2022	-		0.350	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Integration - Combat Systems Integration	C/CPAF	Progeny : Washington, DC	0.000	0.400	Mar 2021	2.387	Jan 2022	2.613	Jan 2023	-		2.613	Continuing	Continuing	Continuing
CRAW Integration - Combat System Systems Engineering	WR	NUWC : Newport, RI	0.000	1.200	Mar 2021	1.000	Dec 2021	2.250	Dec 2022	-		2.250	Continuing	Continuing	Continuing
CRAW - Integration - CSA/ CWL development	C/CPAF	General Dyamics Electric Boat : Not Specified	0.000	1.500	Mar 2021	1.210	Jan 2022	3.030	Jan 2023	-		3.030	Continuing	Continuing	Continuing
CRAW - Hardware Design (TI-2)	C/CPFF	TBD : TBD	0.000	0.000		2.000	Mar 2022	8.522	Mar 2023	-		8.522	Continuing	Continuing	Continuing
		Subtotal	0.000	12.356		35.304		51.621		-		51.621	Continuing	Continuing	N/A

Remarks

FY2023 Product Development increase of $16.317M to CRAW TI-1 modifications and assembly of the initial 12 TI-1 devices. Industry contractor development of the TI-2 hardware configurations. Additionally in FY23, increased and continued development of the of the combat systems interfaces for submarine integration with CWL, and BYG-1 for supporting a submarine launch demonstration for TI-20 TEMPALT and the eventual TI-24 SHIPALT for early operational capability in FY26. Systems engineering, Warhead development, and Systems Safety is increased in FY23 for supporting increased testing, qualification and analysis for TEMPALT and SHIPALT packages, and submarine launch planned for demonstration. Revolver - Multi Payload (MP) Transitions from ONR to PMS 415 in FY23 to complete submarine integration and initial fielding.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Test Planning	WR	NUWC : Keyport, RI	0.000	0.075	Mar 2021	0.500	Dec 2021	1.161	Dec 2022	-		1.161	Continuing	Continuing	Continuing
CRAW - Test Planning	WR	COMPOTEVFOR : Norfolk, VA	0.000	0.000		0.250	Dec 2021	0.250	Dec 2022	-		0.250	Continuing	Continuing	Continuing
CRAW - ONR FNC In Water Testing	WR	NUWC : Keyport, WA	0.000	0.200	Mar 2021	0.800	Dec 2021	0.600	Dec 2022	-		0.600	Continuing	Continuing	Continuing
CRAW - ASW Testing	WR	NUWC : Keyport, WA	0.000	0.350	Mar 2021	0.900	Dec 2021	2.550	Dec 2022	-		2.550	Continuing	Continuing	Continuing
CRAW - Test Asset Preparation	C/CPFF	Applied Research Laboratory Penn	0.000	0.000		1.000	Jan 2022	3.000	Jan 2023	-		3.000	Continuing	Continuing	Continuing

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 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1267 / *Compact Rapid Attack Weapon (CRAW)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		State University : State College, PA													
		Subtotal	0.000	0.625		3.450		7.561		-		7.561	Continuing	Continuing	N/A

Remarks

In FY2023 there is an increase of $4.111M to support additional hardware and software developmental testing of TI-1 and TI-2.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Program Management Support	C/CPAF	Booz Allen Hamilton : Washington, DC	0.000	0.375	Apr 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
CRAW Travel	WR	NAVSEA : Washington, DC	0.000	0.007	Mar 2021	0.100	Dec 2021	0.200	Dec 2022	-		0.200	Continuing	Continuing	Continuing
CRAW - Program Management Support	C/CPAF	Synchron : Washington, DC	0.000	0.000		1.000	Jan 2022	1.400	Jan 2023	-		1.400	Continuing	Continuing	Continuing
		Subtotal	0.000	0.382		1.100		1.600		-		1.600	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	13.363		39.854		60.782		-		60.782	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1267 / *Compact Rapid Attack Weapon (CRAW)*

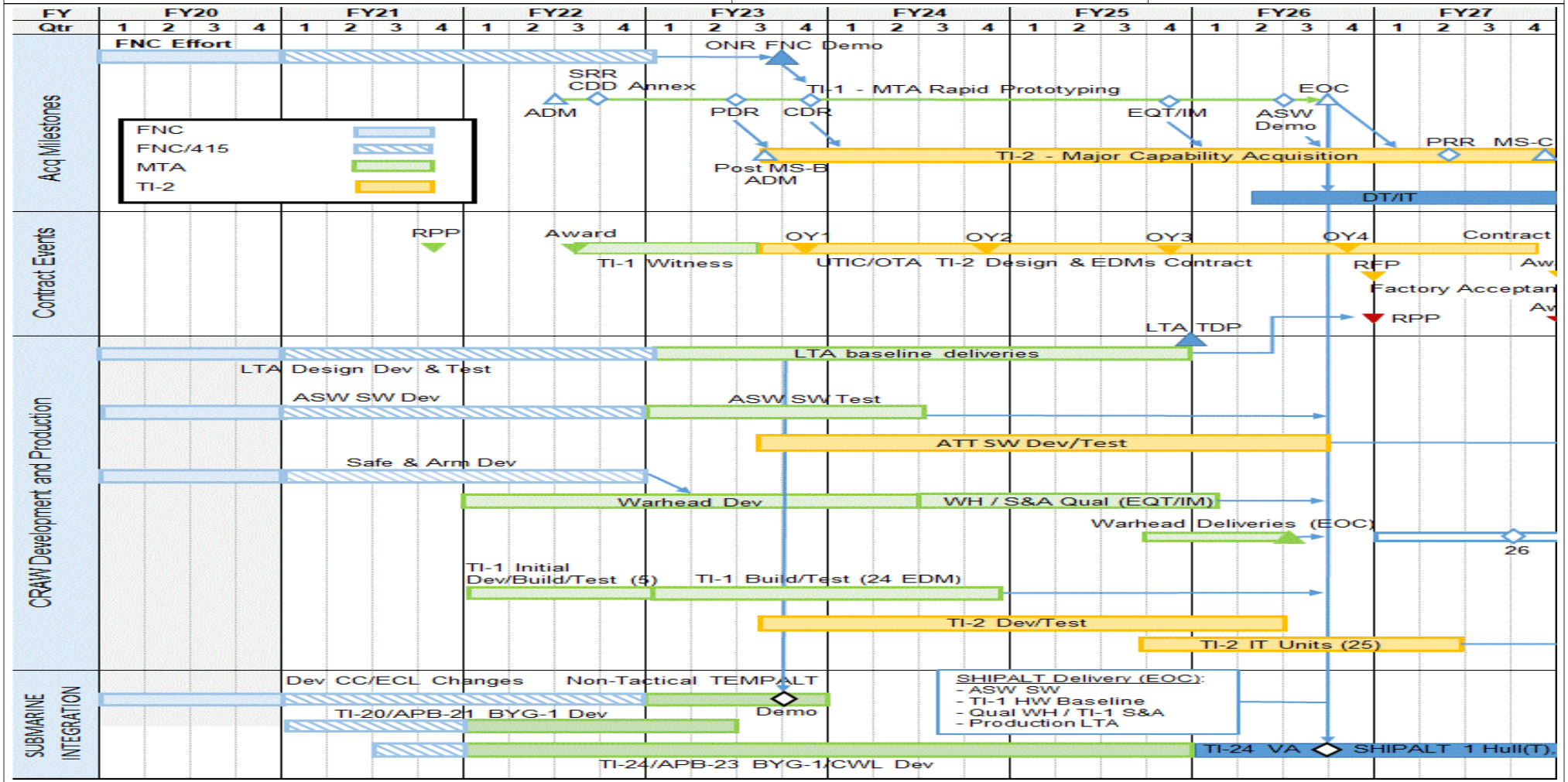

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1267 / *Compact Rapid Attack Weapon (CRAW)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1267				
REQUIREMENTS: SubTDS Capabilities Development Document (CDD) CRAW ANNEX Approval	2	2022	4	2022
AQUISITION MILESTONES: Rapid Prototyping (RP) Acquisition Decision Memorandum (ADM)	3	2022	3	2022
AQUISITION MILESTONES: Early Operational Capability (EOC)	3	2026	4	2026
AQUISITION MILESTONES: Milestone C (MS/C)	3	2027	4	2027
MAJOR CONTRACT EVENTS: Undersea Technology Innovation Consortium: OTA Request for Proposal (RFP)	4	2021	4	2021
MAJOR CONTRACT EVENTS: UTIC / OTA TI-1 Knowledge Transfer Build-Up	3	2022	3	2023
MAJOR CONTRACT EVENTS: UTIC / OTA TI-2 Design & EDMs Contract	3	2023	4	2027
MAJOR CONTRACT EVENTS: Sole Source TI-2 Production Contract Request for Proposal (RFP)	4	2026	4	2026
MAJOR CONTRACT EVENTS: Sole Source TI-2 Production Contract: Award	4	2027	4	2027
MAJOR CONTRACT EVENTS: Launch Tube Assembly FoS Contract: Request for Proposal (RFP)	4	2026	4	2026
MAJOR CONTRACT EVENTS: Launch Tube Assembly FoS Contract: Award	4	2027	4	2027
SYSTEMS ENGINEERING: System Requirements Review (SRR)	3	2022	3	2022
SYSTEMS ENGINEERING: Preliminary Design Review (PDR)	2	2023	3	2023
SYSTEMS ENGINEERING: Critical Design Review (CDR)	3	2023	4	2024
SYSTEMS ENGINEERING: Environmental Qualification Test/ Insensitive Munitions Test Readiness Review (EQT/IM TRR)	2	2024	1	2026
SYSTEMS ENGINEERING: Operational Test (OT) Unit Build	4	2027	4	2027
SYSTEMS ENGINEERING: Production Readiness Review (PRR)	2	2027	2	2027

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1267 / *Compact Rapid Attack Weapon (CRAW)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CRAW DEVELOPMENT & PRODUCTION: Anti-Surface Warfare (ASW) Dev/Test	1	2022	2	2024
CRAW DEVELOPMENT & PRODUCTION: Anti-Torpedo (ATT) Dev/Test	3	2023	4	2026
CRAW DEVELOPMENT & PRODUCTION: Technical Insertion-1 Dev/Test/Build (24 Engineering Development Model (EDM)	1	2023	4	2024
CRAW DEVELOPMENT & PRODUCTION: Technical Insertion-2 Dev/Test	3	2023	3	2026
CRAW DEVELOPMENT & PRODUCTION: Technical Insertion-2 Engineering Development Model (EDM) Build	3	2025	3	2027
CRAW DEVELOPMENT & PRODUCTION: S&A Dev	1	2021	2	2023
CRAW DEVELOPMENT & PRODUCTION: Warhead Development	1	2022	3	2024
CRAW DEVELOPMENT & PRODUCTION: Warhead Lot 1 (26)	4	2027	4	2027
CRAW DEVELOPMENT & PRODUCTION: Production Line Development	2	2027	4	2027
TEST & EVALUATION (VCS TI-20 TEMPALT): Dev CC / External Countermeasure Launcher (ECL) Changes	1	2021	3	2023
TEST & EVALUATION (VCS TI-20 TEMPALT): Dev PCS/BYG-1 Changes	1	2021	3	2023
TEST & EVALUATION (VCS TI-20 TEMPALT): Advanced Processor Build (APB)-21 / Technical Insertion-20 BYG-1 Dev Demo	2	2023	4	2023
TEST & EVALUATION (VCS TI-24 SHIPALT): Advanced Processor Build-23 / Technical Insertion-24 BYG-1 / CWL Dev	3	2021	4	2025
TEST & EVALUATION (VCS TI-24 SHIPALT): VIRGINIA Ship Alteration (SHIPALT)	3	2026	4	2027
S&T EFFORTS - Future Naval Capability (FNC): Submarine Demo	3	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 1268 / *Non-Traditional Acoustic Communications (NTAC)*	

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
1268: *Non-Traditional Acoustic Communications (NTAC)*	0.000	3.297	3.011	2.538	-	2.538	0.000	0.000	0.000	0.000	0.000	8.846
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Non-Traditional Acoustic Communications (NTAC) is a software based solution that leverages existing hardware components on target platforms, including submarines. The NTAC program is responsible for establishing formal program requirements, support installation of NTAC software on various platforms, and upgrade the software to support new hardware to improve NTAC performance. The new software capability at an unclassified level is referred to as NTAC software delivery package.

Additional details are available at the classified level.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Non-Traditional Acoustic Communications (NTAC)	3.297	3.011	2.538	0.000	2.538
Articles:	-	-	-	-	-
Description: Non-Traditional Acoustic Communications (NTAC) This capability provides advanced undersea acoustic communications. Additional details can be provided at the classified level. This program will build upon the baseline NTAC capability and integrate it into new hardware to expand the capability effectiveness and reliability. ***FY 2022 Plans:*** - Continue secure communications development - Improve transmit and receive operability - Integrate into ARCI - At Sea Testing of advanced transmission capability - Finalize formal Security Classification Guide (SCG) ***FY 2023 Base Plans:*** Complete ARCI Integration Complete advanced transmission capability integration Complete improved transmit and receive software build ***FY 2023 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1268 / *Non-Traditional Acoustic Communications (NTAC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2022 to FY 2023 decrease of $0.473 million is due to completion of ARCI integration and software package development.					
Accomplishments/Planned Programs Subtotals	3.297	3.011	2.538	0.000	2.538

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

NTAC is a Government developed software application that integrates into other system components. NUWC Newport will continue to do the required software development and hardware integration required to enhance the NTAC capability. In Fiscal Year (FY) 2021, the program will formally document top level requirements, system level requirements and concept of operation for fleet integration. In addition, the program will begin evaluating a new approach to integrating NTAC on a submarine and conduct the necessary studies and requirements development to complete preliminary design of the NTAC software package development package capability on new hardware.

In FY22, the program will continue detailed design of the NTAC software development package and conduct developmental testing of the advanced transmission capability, that meet the criteria of the top level and system level requirements developed in FY21. Additionally NTAC will be integrated into ARCI. In FY23, the program will prepare its software development package for integration into various nodes pending fleet demand and program financing beyond FY23.

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 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 1268 / *Non-Traditional Acoustic Communications (NTAC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTAC - Systems Engineering	WR	NUWC : Newport, RI	0.000	0.984	Mar 2021	0.250	Jan 2022	0.258	Jan 2023	-		0.258	0.000	1.492	-
NTAC - Software Development	WR	NUWC : Newport, RI	0.000	0.984	Mar 2021	2.618	Jan 2022	2.145	Jan 2023	-		2.145	0.000	5.747	-
NTAC - Fleet Data Analysis	C/CPAF	NTT : Not Specified	0.000	0.752	Mar 2021	0.000		0.000		-		0.000	0.000	0.752	-
NTAC - Tactical Decision Aid	WR	NUWC : Newport, RI	0.000	0.320	Mar 2021	0.000		0.000		-		0.000	0.000	0.320	-
		Subtotal	0.000	3.040		2.868		2.403		-		2.403	0.000	8.311	N/A

Remarks

FY22 continues design efforts started and begins developmental testing.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTAC - Program Management Support	C/CPAF	Booz Allen Hamilton : Washington, DC	0.000	0.250	Apr 2021	0.000		0.000		-		0.000	0.000	0.250	-
NTAC - Travel	WR	NAVSEA : Washington, DC	0.000	0.007	Sep 2021	0.051	Jan 2022	0.051	Jan 2023	-		0.051	0.000	0.109	-
NTAC - Program Management Support	C/CPAF	Synchron : Washington, DC	0.000	0.000		0.092	Jan 2022	0.084	Jan 2023	-		0.084	0.000	0.176	-
		Subtotal	0.000	0.257		0.143		0.135		-		0.135	0.000	0.535	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.297		3.011		2.538		-		2.538	0.000	8.846	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1268 / *Non-Traditional Acoustic Communications (NTAC)*

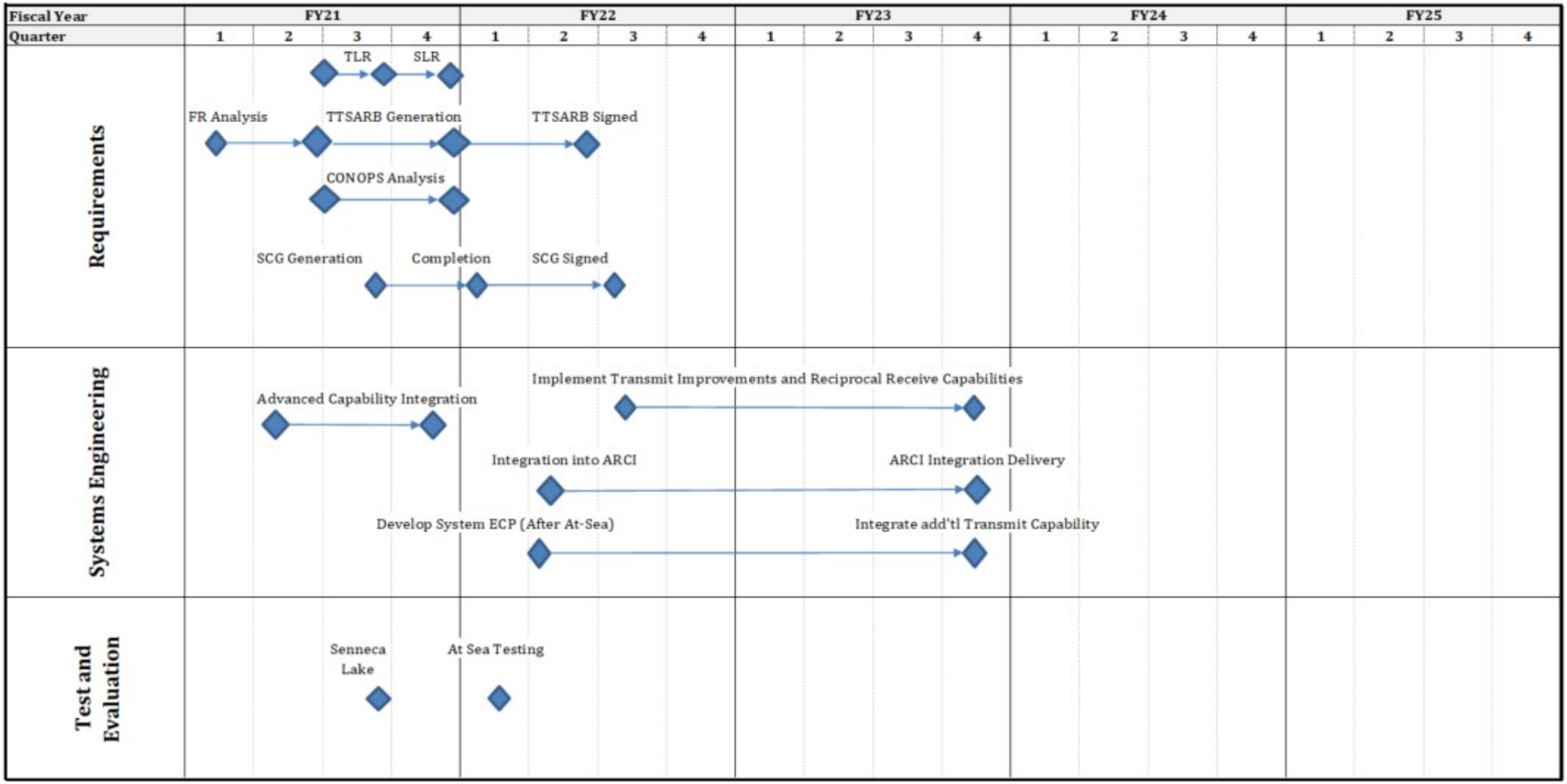

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1268 / *Non-Traditional Acoustic Communications (NTAC)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1268				
Top Level Requirements Development	3	2021	3	2021
CONOPS/CONEMPS Analysis	3	2021	4	2021
TTSARB generation	2	2021	4	2021
TTSARB Signed	2	2022	2	2022
System Level Requirements Development	3	2021	4	2021
Requirements: SCG Generation	3	2021	1	2022
Requirements: SCG Signature	3	2022	3	2022
Requirements: Foreign Release-ability Analysis	1	2021	2	2021
System Engineering: Advanced Capability Integration	2	2021	4	2021
System Engineering: Improve Transmit/Receive Capabilities	3	2022	4	2023
System Engineering: ARCI Integration	2	2022	4	2024
Test and Evaluation: Seneca Lake Testing	3	2021	3	2021
Test and Evaluation: At-Sea Testing	1	2022	1	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101226N / *Submarine Acoustic War Dev*	Project (Number/Name) 9999 / *Congressional Adds*	

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
9999: *Congressional Adds*	0.000	9.165	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.165
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Submarine Acoustic Warfare (SAWS) Development Program develops acoustic countermeasures, submarine defense capabilities, external launch systems and all acoustic augmentation systems for the U.S. Navy submarines. The SAWS Development Program is comprised of the Submarine Defensive Warfare Program, which improves the survivability of all U.S. Submarines.

The Congressional add will be used to advance development of ADC MK5 (Next Generation Countermeasure). Technical areas of focus will include acoustic transducer / hydrophone development, modeling and simulation environment updates to incorporate new capabilities, device mobility introduction, and power improvements.

SubTDS
The ADC MK 5 acoustic countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering and Manufacturing Development (E&MD) phase. The first development (Increment 1) effort of the overall SubTDS program is focused on delivering full internal countermeasure launcher (ICL) functionality providing the Acoustic Device Countermeasure (ADC) MK5 capability to all submarines in the fleet. The ADC MK5 development will result in delivering fully functional test units and Engineering Development Model (EDM) variants. The ADC MK5 will bring new technologies including adaptability packaged in a three-inch diameter body. The ADC MK5 efforts support on- going development including component and subsystem design, in support of the Preliminary Design Review (PDR). Completion of the Critical Design Review (CDR) and contract award for procurement of multiple ADC MK5 EDM countermeasure variants will occur in FY22.

FY22 funding will build and deliver four (4) Countermeasure Control Tools (CCT), eight (8) Sonar Test Units ((4) STU-E's (4) STU's), and seventeen (17) EDM-1. FY22 will include the Test Readiness Review (TRR) for EDM-1 and in water developmental testing for these units.

EDM-2 development and prototyping will continue in preparation for FY23 deliveries. The next development (Increment 2) effort focuses on the development of the External Countermeasure Launcher (ECL) 6-inch acoustic countermeasure, Tactical Decision Aid, and integration of communication interfaces with ship systems for enabling improved adaptive capabilities leading up to a contract award in FY24.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: Acoustic Device Countermeasures	9.165	0.000
FY 2021 Accomplishments: - Continue ADC MK5 EDM design and prototype Builds. - Conduct ADC MK5 critical design review (CDR). - Continue M&S assessment of known and projected torpedo threats.		

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
- Continue development of required program documentation. - Continue development of concept of operations and operational tactics. - Continue assessment of Threat for UDWG and WAF with updated vulnerability assessments. - Procure four (4) Configuration Control Tool (CCT) for remotely programming and reprogramming the ADC MK 5, checking the ADC MK 5 device's status in-situ and retrieving recorded test data from the STU and EDM-1 devices. - Procure four (4) ADC MK 5 Special Test Units (STUs) to be utilized for the Government's preliminary acoustic testing. - Procure four (4) ADC MK 5 Special Test Units Electronics (STU-E) to be utilized for Hardware-In-the-Loop (HWIL) integration into the Weapons Analysis Facility (WAF) at the Naval Undersea Warfare Center, Division Newport (NUWCDIVNPT). - Contract award for procurement of seventeen (17) EDM-1 countermeasures test articles to be utilized in preliminary system testing, and shall be recovered and re-used. ***FY 2022 Plans:*** N/A		
Congressional Adds Subtotals	9.165	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• OPN/2210: *Submarine Acoustic Warfare System*	26.066	24.897	29.322	-	29.322	35.237	37.248	38.001	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

Submarine Acoustic Warfare System (SAWS) develops Undersea Defensive Warfare technologies to improve the survivability of all U.S. Submarine classes.

SUBTDS

Through a full and open competition, the ADC MK5 development contract awarded in Sep 2018. The Cost Plus Incentive Fee (CPIF) contract funds the design and development of Engineering Development Model (EDM) variants, Technical Data Packages (TDP), and Low-Rate Initial Production (LRIP) units for accomplishing Operational Testing (OT). ADC MK5 contractor subsystem testing and joint contractor/Navy Development Testing (DT) will occur in FY23 through FY24 and Navy OT in FY2025 through FY2026. Milestone C is nominally in FY2025. Initial Operational Capability (IOC) is nominally FY2026 for the Internal Countermeasure Launcher (ICL) configuration. After successfully completing OT and Full Rate Production Decision Review (FRP DR), award of a full and open competitive production contract occurs in FY2025. This contract award will be a build to spec with a technical data package approach. The next development effort for addressing the overall SubTDS program will

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

begin in FY24 and focus on the development of the External Countermeasure Launcher (ECL) 6-inch acoustic countermeasure, Tactical Decision Aid, and integration of communication interfaces with ship systems for enabling mobility with adaptive capabilities. Development of the acquisition strategy will begin in FY21.

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 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS ADC MK5 New Development	C/CPIF	LEIDOS : RESTON, VA	0.000	6.903	Apr 2021	0.000		0.000		-		0.000	0.000	6.903	-
SubTDS WAF Analysis UDWG	WR	NUWC : NEWPORT, VA	0.000	1.537	Mar 2021	0.000		0.000		-		0.000	0.000	1.537	-
		Subtotal	0.000	8.440		0.000		0.000		-		0.000	0.000	8.440	N/A

Remarks

FY22 funding will build and deliver four (4) Countermeasure Control Tools (CCT), eight (8) Sonar Test Units ((4) STU-E's (4) STU's) and seventeen (17) EDM-1 devices that are recoverable, rechargeable, and reusable. EDM-2 prototyping will begin in FY22 in preparation for FY23 deliveries.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS System Engineering	WR	NUWC : NEWPORT, RI	0.000	0.680	Mar 2021	0.000		0.000		-		0.000	0.000	0.680	-
		Subtotal	0.000	0.680		0.000		0.000		-		0.000	0.000	0.680	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS Program Mgmt Support	Allot	NAVSEA : Washington, DC	0.000	0.045	Apr 2021	0.000		0.000		-		0.000	0.000	0.045	-
		Subtotal	0.000	0.045		0.000		0.000		-		0.000	0.000	0.045	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	9.165		0.000		0.000		-		0.000	0.000	9.165	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

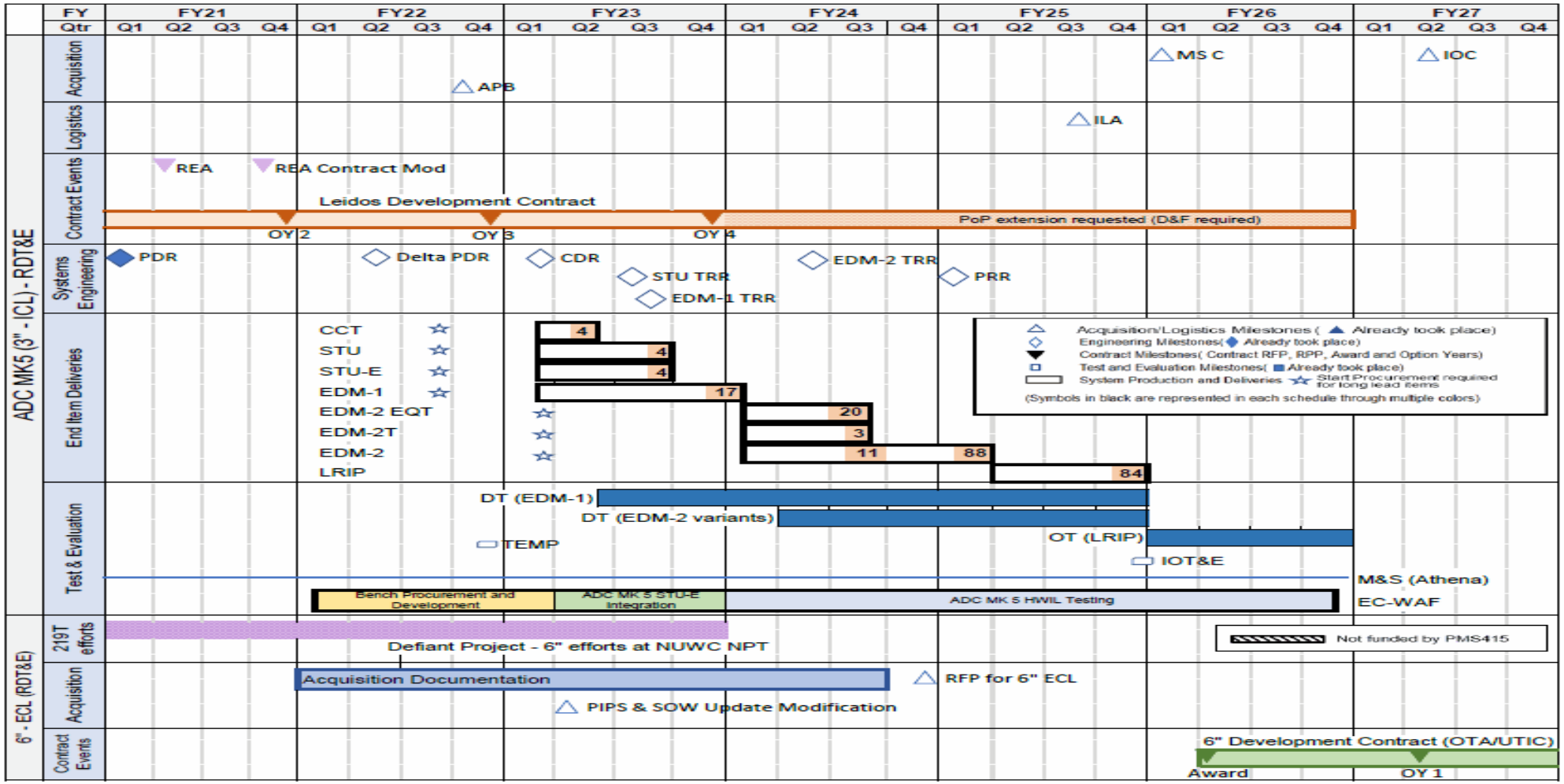

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
SubTDS Development: ADC MK 5	1	2021	4	2021