Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
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 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	47.432	11.102	6.815	69.190	-	69.190	92.483	115.179	73.127	50.909	Continuing	Continuing
1265: *Sub Defensive Warfare*	47.432	11.102	6.815	16.342	-	16.342	30.697	39.501	24.590	23.961	Continuing	Continuing
1267: *Compact Rapid Attack Weapon (CRAW)*	0.000	0.000	0.000	49.508	-	49.508	58.745	73.130	48.537	26.948	Continuing	Continuing
1268: *Non-Traditional Acoustic Communications (NTAC)*	0.000	0.000	0.000	3.340	-	3.340	3.041	2.548	0.000	0.000	0.000	8.929

Note

Projects 1267 (Compact Rapid Attack Weapon) and 1268 (Non-Traditional Acoustic Communications) are new starts for FY21.

A. Mission Description and Budget Item Justification

The Submarine Acoustic Warfare (SAWS) Development Program includes Submarine Torpedo Defense System (SubTDS), Compact Rapid Attack Weapon (CRAW) and Non-Traditional Acoustic Communications (NTAC). The SAWS Development Programs improve the survivability of all U.S. Submarines. The SubTDS efforts include acoustic countermeasures, submarine defense capabilities, external launch systems, all acoustic augmentation systems for the U.S. Navy submarines and Undersea Defense Working Group (UDWG). In FY21 SubTDS begins development testing of ADC MK5 EDM-1 countermeasure variants. The Compact Rapid Attack Weapon (CRAW) and Non-Traditional Acoustic Communications (NTAC) efforts begin in FY21.

Project 1265 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. FY20 funding supports on-going SubTDS development including component and subsystem design, in support of the ADC MK5 Preliminary Design Review. FY21 funding will provide for completion of the Critical Design Review and procurement of multiple ADC MK5 EDM countermeasure variants, which includes four (4) Countermeasure Control Tools (CCT), Sonar Test Units ((4) STU-E's, (4) STU-A's), and seventeen (17) EDM-1 devices that are recoverable, rechargeable, and reusable. FY21 will include in water developmental testing at test facilities, test lakes and at sea from US Navy surface ships. EDM-2 development and prototyping will begin in preparation for FY22 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
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*

FY 2021 funding for SubTDS will continue the development, mature the capability, and deliver multiple Engineering Development Models for supporting contractor and government testing. 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 can double as a submarine hard kill countermeasure. The Office of Naval Research (ONR) developed the initial CRAW design to be a multi-platform and multi-mission weapon. This program will finish design gaps in the CRAW hardware and transition the technology into a production ready design. In addition, it will mature the software currently in development under an ONR Future Naval Capability (FNC) program and transition it into CRAW baseline system. The program will establish a baseline production design, incrementally improve software through Advanced Processor Build (APB) software upgrades, test and qualify the system for safe operations, and stand-up a production line to achieve full rate production.

2. Compact Rapid Attack Weapon (CRAW) Submarine Integration
Integration of CRAW into the external countermeasure launcher (ECL) assembly and the upgrades to the combat systems supports pre-planning and launch control of the CRAW. 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, Countermeasure Set Acoustic (CSA) launcher, BYG-1 combat system, and Common Weapon Launcher (CWL). The upgrades will come in two initial phases with a Tactical Temporary Alteration (TEMPALT) to Technical Insertion 20 (TI-20) for installation of capability on Virginia (VA) Block (BLK) III/IV ships in FY24, and then a permanent Ship Alteration (SHIPALT) in TI-24 for all VA 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.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
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 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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	11.311	6.815	14.663	-	14.663
Current President's Budget	11.102	6.815	69.190	-	69.190
Total Adjustments	-0.209	0.000	54.527	-	54.527
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.209	0.000			
• Program Adjustments	0.000	0.000	54.733	-	54.733
• Rate/Misc Adjustments	0.000	0.000	-0.206	-	-0.206

Change Summary Explanation

FY19 decreased by $0.209M for Small Business Innovative Research.

FY21 funding request was increased by $54.733M for SubTDS updated estimates ($1.845M); NTAC sub-to-sub effort (3.342M); CRAW development ($44.010M); and CRAW submarine integration ($5.536M). Also, FY21 funding request was decreased by $0.206M for rate adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
1265: *Sub Defensive Warfare*	47.432	11.102	6.815	16.342	-	16.342	30.697	39.501	24.590	23.961	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. In FY21 SubTDS begins development testing of ADC MK5 EDM-1 variants. The SAWS Development Program is comprised of the Submarine Defensive Warfare Program, which improves the survivability of all U.S. Submarines.

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 addressing 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. FY20 funding will primarily support on-going SubTDS development including component and subsystem design, in support of the ADC MK5 Preliminary Design Review. FY21 funding will provide for completion of the Critical Design Review and procurement of multiple ADC MK5 EDM countermeasure variants, which includes four (4) Countermeasure Control Tools (CCT), four (4) STU-E's, (4) STU-A's, and seventeen (17) EDM-1 devices that are recoverable, rechargeable, and reusable. FY21 will also include in water developmental testing at test facilities, test lakes and at sea from US Navy surface ships. Additionally, EDM-2 development and prototyping will begin for maturing the technologies and improve the capability, in preparation of FY22 deliveries. The next development (Increment 2) effort for addressing the overall SubTDS program will 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 improved adaptive capabilities.

FY 2021 funding for SubTDS will continue the development, mature the capability, and deliver multiple Engineering Development Models for supporting contractor and government testing. 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.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Submarine Torpedo Defense System (SubTDS)	11.102	6.815	16.342	0.000	16.342
Articles:	-	3	25	-	25

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Description: The ADC MK5 Acoustic Countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering & Manufacturing phase. The first effort of addressing the overall SubTDS program focuses on delivering full internal countermeasure launcher functionality providing the ADC MK5 capability to all submarines in the fleet. ***FY 2020 Plans:*** - Continue to develop four (4) STU-E hardware in the loop for M&S assessment of known and projected torpedo threats. - Continue ADC MK5 EDM Designs and Prototype Builds - Conduct ADC MK5 Preliminary Design Review. - Continue development of required program documentation - Continue development of Concept of Operations (CONOPS) and operational tactics - Continue assessment of threat by UDWG and WAF with updated vulnerability assessments ***FY 2021 Base Plans:*** - Deliver four (4) CCT computers for pre-programming test articles - Deliver four (4) hardware in the loop for M&S analysis group - Deliver four (4) STU-A acoustic nose cones for development testing. - Procure seventeen (17) EDM-1 countermeasure test articles for development testing. - Continue ADC MK5 EDM design and prototype Builds. - Conduct ADC MK5 critical design review. - Begin EDM-2 NRE development and prototype. - 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 - Begin Development Testing (DT) of EDM-1 Recoverable, Rechargeable and Reusable variants. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The FY20 to FY21 increase supports completion of the technical design, conducting the CDR, and procurement of 29 test articles of four different ADC MK5 Engineering Development Models delivered to the government.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY21 increase will also cover in-water contractor and government developmental testing including EDM CM test facilities, lake testing, and surface ship testing. FY21 will also begin development and prototyping of EDM-2 devices for maturing FY22 deliveries.					
Accomplishments/Planned Programs Subtotals	11.102	6.815	16.342	0.000	16.342

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN/2210: *Submarine Acoustic Warfare System*	21.615	22.331	26.066	-	26.066	25.236	29.633	35.562	37.582	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. ADC MK5 contractor subsystem testing and joint contractor/Navy Development Testing (DT) will occur in FY2021 through FY2023 and Navy Operational Testing (OT) in FY2023 through FY2024. Milestone C is nominally in FY2023. Initial Operational Capability (IOC) is nominally FY2025 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 FY2024. 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 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 FY20.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS WAF ANALYSIS UDWG	WR	NUWC : NEWPORT, RI	12.789	0.280	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
SubTDS SYSYTEM ENGINEERING	WR	NUWC : NEWPORT, RI	13.206	1.095	Dec 2018	1.400	Dec 2019	1.500	Dec 2020	-		1.500	Continuing	Continuing	Continuing
SubTDS ADC MK5 New Development	C/CPIF	LEIDOS : RESTON, VA	2.805	5.057	Dec 2018	3.024	Dec 2019	9.016	Dec 2020	-		9.016	Continuing	Continuing	Continuing
SubTDS CSA MK5 SYSTEM ENGINEERING	WR	NUWC : KEYPORT, WA	4.215	0.700	Dec 2018	0.800	Dec 2019	1.212	Dec 2020	-		1.212	Continuing	Continuing	Continuing
SubTDS Modeling And Simulation	WR	NUWC : NEWPORT, RI	5.194	1.100	Dec 2018	0.800	Dec 2019	1.000	Dec 2020	-		1.000	Continuing	Continuing	Continuing
SubTDS Tactical Decision Aid TacDA	WR	NUWC : NEWPORT, RI	4.181	2.300	Dec 2018	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	-
		Subtotal	44.095	10.532		6.024		12.728		-		12.728	Continuing	Continuing	N/A

Remarks

FY21 funding will provide for completion of the Critical Design Review and procurement of multiple ADC MK5 EDM countermeasure variants, which includes four (4) Countermeasure Control Tools (CCT), four (4) STU-E's, (4) STU-A's, seventeen (17) EDM-1 devices that are recoverable, rechargeable, and reusable. FY21 will also include in water developmental testing at test facilities, test lakes and at sea from US Navy surface ships.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SubTDS System Test and Evaluation	WR	NUWC : NEWPORT, RI	0.000	0.000		0.500	Dec 2019	3.290	Dec 2020	-		3.290	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.500		3.290		-		3.290	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

The ADC MK5 Acoustic Countermeasure (ACAT III) developmental contract awarded in Sep 2018 and is currently in the Engineering & Manufacturing phase. The first effort of addressing the overall SubTDS program focuses on delivering full internal countermeasure launcher functionality providing the ADC MK5 capability to all submarines in the fleet.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SAWS TRAVEL	WR	NAVSEA : Washington, DC	0.772	0.070	Oct 2018	0.071	Oct 2019	0.100	Oct 2020	-		0.100	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	1.665	0.500	Dec 2018	0.220	Feb 2020	0.224	Feb 2021	-		0.224	Continuing	Continuing	Continuing
		Subtotal	3.337	0.570		0.291		0.324		-		0.324	Continuing	Continuing	N/A

Remarks

FY21 increase in travel due to beginning EDM-1 Development Testing.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	47.432	11.102		6.815		16.342		-		16.342	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

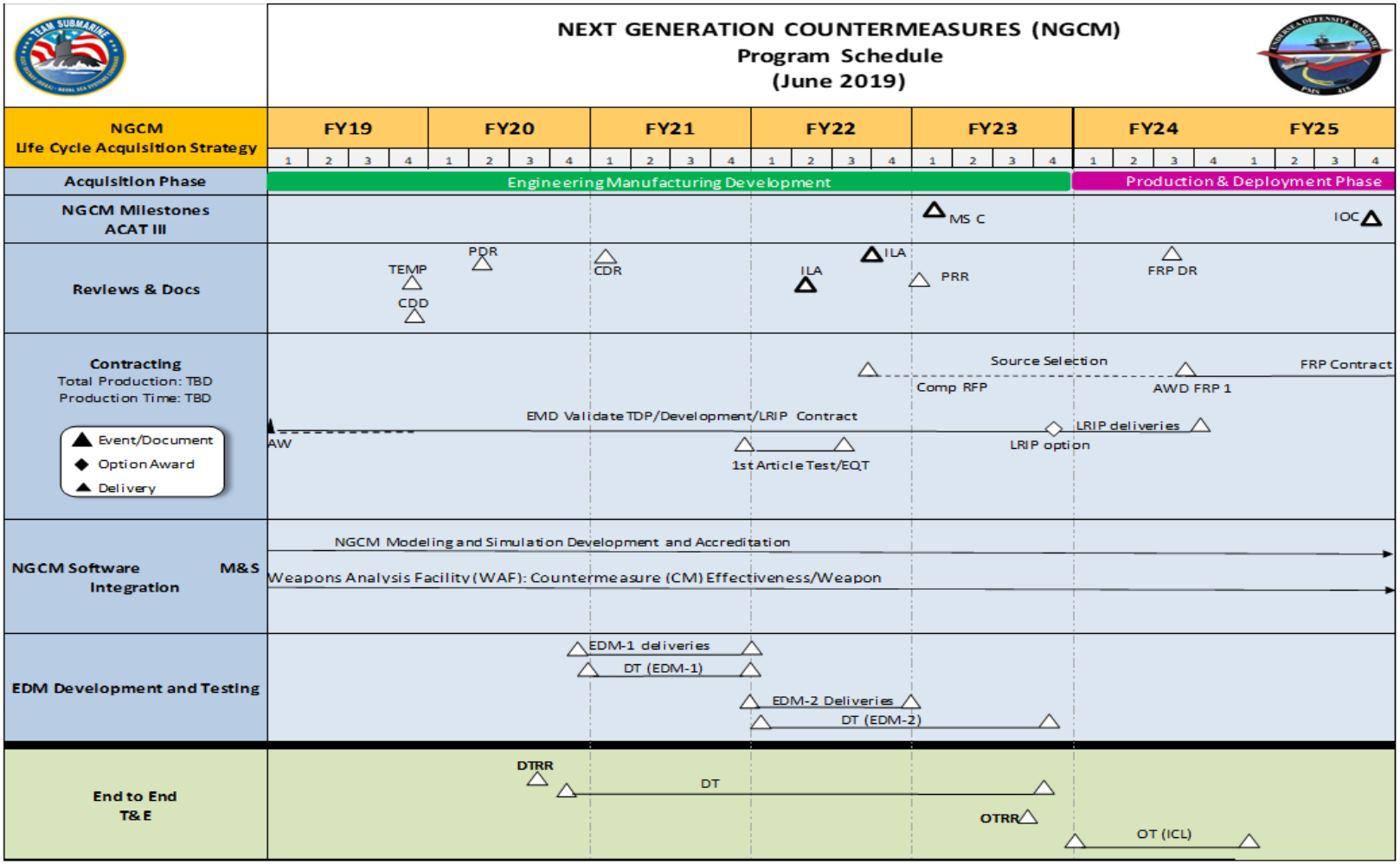

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1265				
Undersea Defense Working Group (UDWG): FY20 UDWG	3	2020	3	2020
Undersea Defense Working Group (UDWG): FY22 UDWG	3	2022	3	2022
Undersea Defense Working Group (UDWG): FY24 UDWG	3	2024	3	2024
Undersea Defense Working Group (UDWG): UDWG Modeling & Simulation (M&S)	1	2019	4	2025
Weapons Analysis Facility (WAF): Countermeasure (CM) Effectiveness/Weapon Analysis Facility (WAF) Vulnerability	1	2019	4	2025
Submarine Torpedo Defense Systems (SubTDS): SubTDS M&S	1	2019	4	2025
Submarine Torpedo Defense Systems (SubTDS): TEMP Development	1	2019	4	2019
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 Devlopment Contract Award	4	2019	4	2019
Submarine Torpedo Defense Systems (SubTDS): Engineering & Manufacturing Development (EMD)	4	2019	3	2024
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 CDD Development	1	2019	4	2019
Submarine Torpedo Defense Systems (SubTDS): ADC MK5 Critical Design Review (CDR)	1	2021	2	2021
Submarine Torpedo Defense Systems (SubTDS): EDM-1 Deliveries	1	2021	4	2021
Submarine Torpedo Defense Systems (SubTDS): DT (EDM-1)	1	2021	4	2021
Submarine Torpedo Defense Systems (SubTDS): EDM-2 Deliveries	1	2022	4	2022
Submarine Torpedo Defense Systems (SubTDS): DT (EDM-2)	1	2022	4	2023
Submarine Torpedo Defense Systems (SubTDS): LRIP Deliveries	4	2023	3	2024
Submarine Torpedo Defense Systems (SubTDS): MS-C Decision Reviews	1	2023	1	2023
Submarine Torpedo Defense Systems (SubTDS): OT (LRIP)	1	2024	1	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1265 / *Sub Defensive Warfare*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Submarine Torpedo Defense Systems (SubTDS): IOC	2	2025	4	2025
Submarine Torpedo Defense Systems (SubTDS): ECL Development Start	1	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
1267: *Compact Rapid Attack Weapon (CRAW)*	0.000	0.000	0.000	49.508	-	49.508	58.745	73.130	48.537	26.948	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Project 1267 is a new start project for FY21.

A. Mission Description and Budget Item Justification

Compact Rapid Attack Weapon (CRAW) Development Design

CRAW is a very lightweight torpedo that can double as a submarine hard kill countermeasure. The Office of Naval Research (ONR) developed the initial CRAW design to be a multi-platform and multi-mission weapon. This program will finish design gaps in the CRAW hardware and transition the technology into a production ready design. In addition, it will mature the software currently in development under an ONR Future Naval Capability (FNC) program and transition it into CRAW baseline system. The program will address obsolescence issues with the current design (TI-1), establish a baseline production design (TI-2), incrementally improve software through Advanced Processor Build (APB) software upgrades, test and qualify the system for safe operations, and stand-up a production line to achieve full rate production.

Compact Rapid Attack Weapon (CRAW) Submarine Integration

Integration of CRAW into the external countermeasure launcher (ECL) assembly and the upgrades to the combat systems supports pre-planning and launch control of the CRAW. 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, Countermeasure Set Acoustic (CSA) launcher, 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 initial fielding of capability on Virginia (VA) Block (BLK) III/IV ships in FY24, and then a permanent Ship Alteration (SHIPALT) in TI-24 for all VA 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.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Compact Rapid Attack Weapon (CRAW) Development Design	0.000	0.000	43.972	0.000	43.972
Articles:	-	-	-	-	-
Description: Compact Rapid Attack Weapon (CRAW) development will transition the current ONR design effort into					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
a program of record. The design will be matured to meet submarine qualification standards and develop a technical data package that can be completed for production. ***FY 2020 Plans:*** N/A ***FY 2021 Base Plans:*** - Start CRAW APB-1 software baseline - Baseline current CRAW design and establish TI-1 configuration - Start hardware design updates (TI-2 design) - Procure materials for TI-1 hardware - Assemble TI-1 CRAW for developmental and qualification testing - Advanced software development for Anti-Torpedo Torpedo Software - Plan and start developmental testing - Procure parts for TI-2 hardware prototype models - Transition warhead design from ONR - Conduct developmental testing of CRAW Warhead and Safe and Arm design - Develop all-up-round design - Standup a system safety program ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** CRAW development design begins in FY21.					
Title: Compact Rapid Attach Weapon (CRAW) Submarine Integration	0.000	0.000	5.536	0.000	5.536
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 2020 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A ***FY 2021 Base Plans:*** - Start updates to combat systems software - Start updates to countermeasure set, acoustic (CSA) - Update external countermeasure launch (ECL) design - Finalize concept of operation and employment - Develop TEMPALT package for ship class ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** CRAW Integration engineering and design efforts begin in FY21.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	49.508	0.000	49.508

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN/2210: *Submarine Acoustic Warfare System*	21.615	22.331	26.066	-	26.066	25.236	29.633	35.562	37.582	Continuing	Continuing
• WPN/3121: *Very Lightweight Topedo*	0.000	0.000	0.000	-	0.000	15.000	9.000	23.602	23.834	0.000	71.436

Remarks

D. Acquisition Strategy

CRAW Development Design

The Office of Naval Research (ONR) has funded Penn State University Advanced Research Lab (PSU/ARL) to design and test the initial configuration of CRAW to demonstrate capability and performance. The established program of record funding plans to use a Mid-Tier Acquisition Authority (MTA) starting in FY21 to stand-up the program of record (POR). The POR will build upon the technology developments established by ONR in the CRAW design and ONR FNC upgrades. This capability will then fulfill the Navy's requirement for a hard kill countermeasure as outlined in the Submarine Torpedo Defense System Capability Design Document dated in 2008. Development of a new annex to the SUBTDS CDD in FY20 will account for the CRAW requirements. Under the MTA guidelines, the rapid prototyping phase will begin in FY21 with baselining the CRAW design, procuring initial test assets with CRAW developmental and qualification testing in FY22-FY23. In FY24 - FY25 CRAW

installations on multiple submarine platforms will occur with integrated testing validating the end-to-end performance of the submarine launched CRAW as a multi-mission weapon. FY25 will complete the MTA rapid prototyping phase and then begin the MTA rapid fielding phase where CRAW will transition into full rate production.

A FY21 contract with PSU/ARL will award in Q2FY21 to finalize the CRAW hardware design, develop necessary software performance upgrades, and develop a Technical Data Package to transition to industry for production of CRAW. In FY21, PSU/ARL will baseline the existing CRAW design as Technical Insertion 1 (TI-1) baseline configuration and begin procuring and assembling TI-1 CRAW for performance and qualification testing in FY22-FY24. In FY21, PSU/ARL will also conduct the design work required to resolve obsolescence issues and establish the TI-2 configuration. PSU/ARL will then develop a level three technical data package (TDP) to compete for industry production starting in FY23. PSU / ARL will build upon their existing software to finalize the Anti-Torpedo Torpedo (ATT) software capability and anti-submarine warfare (ASW) software capability. The CRAW hardware with the ATT/ASW software will make this a multi-mission weapon.

PSU/ARL currently manufactures CRAW engineering development models (EDMs) for test and limited fielding. The POR will have PSU/ARL upgrade their current design to a production representative system, and the necessary systems to support system test and weapon qualifications for environmental and insensitive munitions. A five-year (FY23-FY27) competitive production contract request for proposal (RFP) will release in FY22 with the CRAW level three TDP. From FY23-FY24 the production line will be stood-up and certified for low-rate initial production with plans to begin full rate production starting in FY25.

The Warhead for the CRAW transitions from ONR as a part of the overall CRAW design. The Naval Surface Warfare Center (NSWC) Indian Head Explosive Ordinance Disposal (IHEOD) currently designs the warhead energetics and safe and arming (S&A) hardware. In FY21, they will finalize the warhead and S&A design to begin qualification testing in FY22. NSWC IEHOD will then be responsible for manufacturing the CRAW warhead for integration into the CRAW.

CRAW Submarine Integration
The CRAW Design effort will provide a qualified weapon for submarine integration. This effort will follow the Submarine Federated and Warfare Tactical Systems (SWFTS) process to develop temporary alteration (TEMPALT) and permanent ship alteration (SHIPALT) to launch a CRAW from a submarine. In FY21, development of a tactical TEMPALT design will support integration with Technical Insertion 20 (TI-20) to support launch of a CRAW from a submarine in FY23. SHIPALT development will occur with the TI-24 SWFTS baseline. The major submarine systems requiring upgrade to launch the CRAW are the Countermeasure Acoustic Set (CSA) launcher, external countermeasure launcher (ECL) assembly, BYG-1 combat system, and common weapon launcher (CWL). The required design and prototyping work to upgrade the software and hardware of these system components begins in FY21 utilizing existing contracts with the CSA and BYG-1 developers. In addition, the TEMPALT and SHIPALT design package work will use an existing contract with General Dynamics Electric Boats for VA Class support. Modifications to these contracts will award in Q2FY21.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Hardware Design	C/CPAF	Applied Reseach Laboratory Penn State University : State College, PA	0.000	0.000		0.000		3.000	Jan 2021	-		3.000	Continuing	Continuing	Continuing
CRAW - Software Development	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		0.000		4.500	Jan 2021	-		4.500	Continuing	Continuing	Continuing
CRAW - Warhead Design/ Development	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		8.898	Jan 2021	-		8.898	Continuing	Continuing	Continuing
CRAW - Warhead Design Analysis	WR	NSWC : Carderock, MD	0.000	0.000		0.000		1.000	Jan 2021	-		1.000	Continuing	Continuing	Continuing
CRAW - Systems Engineering	WR	NUWC : Newport, RI	0.000	0.000		0.000		3.000	Jan 2021	-		3.000	Continuing	Continuing	Continuing
CRAW - Engineering Developmental Models (TI-1)	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		0.000		9.000	Jan 2021	-		9.000	Continuing	Continuing	Continuing
CRAW - Engineering Developmental Models (TI-2)	C/CPAF	Applied Research Laboratory Penn State University : State College, PA	0.000	0.000		0.000		8.000	Jan 2021	-		8.000	0.000	8.000	-
CRAW - Integrated Logistics	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.500	Jan 2021	-		0.500	Continuing	Continuing	Continuing
CRAW - Integrated Logistics	WR	NUWC : Keyport, WA	0.000	0.000		0.000		1.500	Jan 2021	-		1.500	Continuing	Continuing	Continuing
CRAW - ONR FNC Software	C/CPAF	Applied Research LaboratoryPenn State University : State College, PA	0.000	0.000		0.000		1.000	Jan 2021	-		1.000	Continuing	Continuing	Continuing
CRAW - ONR FNC System Engineering	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		2.000	Jan 2021	-		2.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Integration - Ship Alteration Design	WR	General Dynamics Electric Boat : Groton, CT	0.000	0.000		0.000		2.000	Jan 2021	-		2.000	Continuing	Continuing	Continuing
CRAW - Integration - Combat System Integration	C/CPAF	Progeny Systems : Chesapeake, VA	0.000	0.000		0.000		2.000	Jan 2021	-		2.000	Continuing	Continuing	Continuing
CRAW - Integration - Systems Engineering	WR	NUWC : Newport, RI	0.000	0.000		0.000		1.500	Jan 2021	-		1.500	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		47.898		-		47.898	Continuing	Continuing	N/A

Remarks

Begins development of AB-1 software baseline, TI-2 hardware design updates, all-up-round design and transition warhead design from ONR. ARL/Penn State will begin procurement of parts for TI-2 hardware Engineering Development models.
Start updates to combat systems software and countermeasure set, acoustic (CSA) and update external countermeasure launch (ECL) design.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Test Planning	WR	NUWC : Keyport, RI	0.000	0.000		0.000		0.500	Jan 2021	-		0.500	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		0.500		-		0.500	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRAW - Program Management Support	C/CPAF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.000		1.010	Jan 2021	-		1.010	Continuing	Continuing	Continuing
CRAW Travel	WR	NAVSEA : Washington, DC	0.000	0.000		0.000		0.100	Sep 2021	-		0.100	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		1.110		-		1.110	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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)*	

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		49.508		-		49.508	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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)*

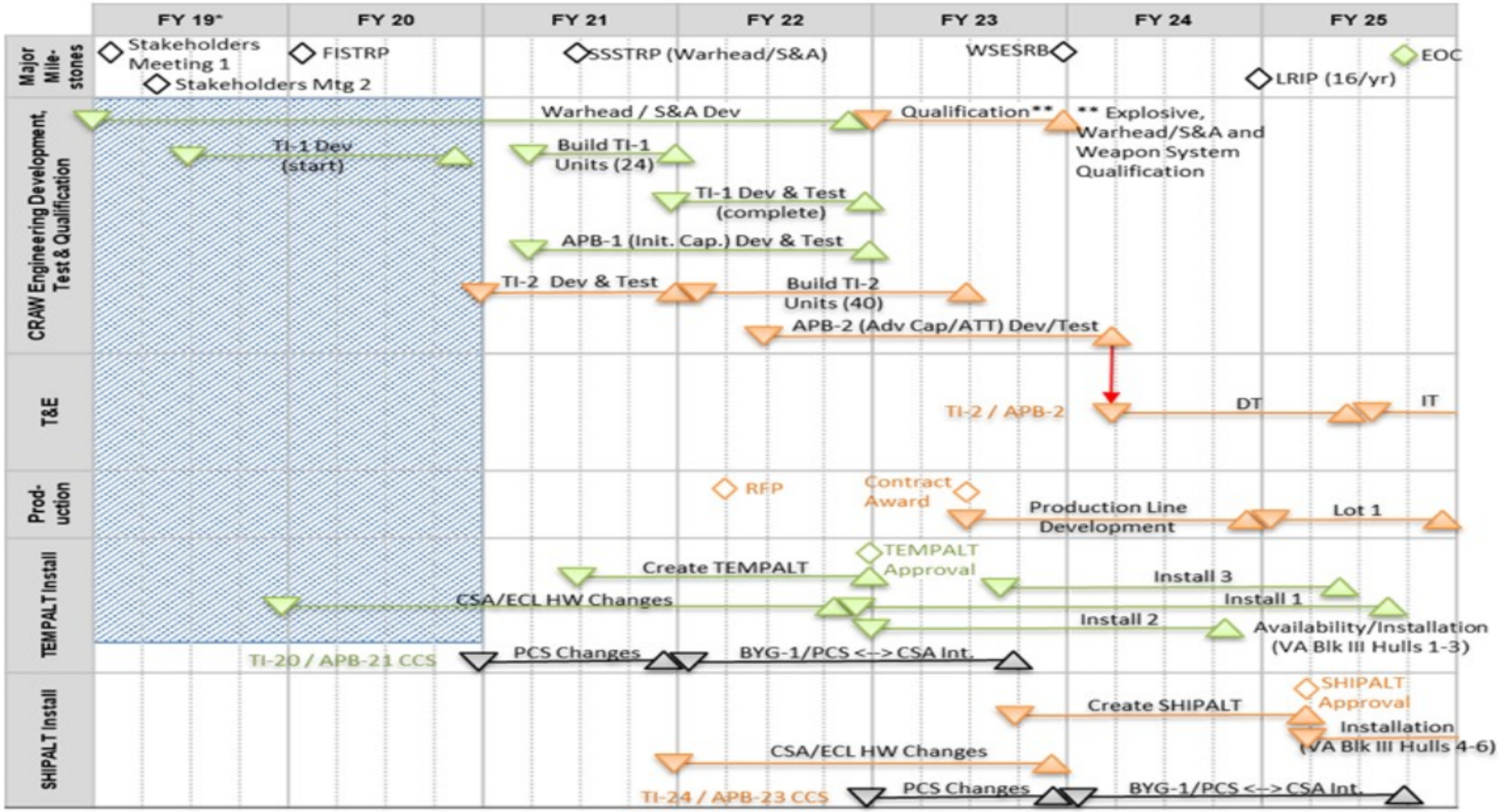

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1267 / *Compact Rapid Attack Weapon (CRAW)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1267				
Compact Rapid Attach Weapon (CRAW): Stakeholders Meeting 1	1	2019	1	2019
Compact Rapid Attach Weapon (CRAW): Stakeholders Meeting 2	2	2019	2	2019
Compact Rapid Attach Weapon (CRAW): FISTRP	1	2020	1	2020
Compact Rapid Attach Weapon (CRAW): SSSTRP (Warhead / S&A)	1	2021	2	2021
Compact Rapid Attach Weapon (CRAW): WSESRB	4	2023	4	2023
Compact Rapid Attach Weapon (CRAW): LRIP (16/yr)	4	2024	4	2024
Compact Rapid Attach Weapon (CRAW): EOC	3	2025	3	2025
Compact Rapid Attach Weapon (CRAW): ONR Pre FNC	1	2019	4	2019
Compact Rapid Attach Weapon (CRAW): ONR Initial Capability Development & Test	1	2020	1	2021
Compact Rapid Attach Weapon (CRAW): TEMPALT Approval	4	2021	4	2021
Compact Rapid Attach Weapon (CRAW): Demo Development & Test	4	2019	4	2022
Compact Rapid Attach Weapon (CRAW): Advanced Capability Development & Test	4	2019	2	2022
Compact Rapid Attach Weapon (CRAW): Warhead / S&A Development	1	2019	4	2022
Compact Rapid Attach Weapon (CRAW): Explosive Warhead / S&A and Weapons System	4	2022	4	2023
Compact Rapid Attach Weapon (CRAW): TI-1 Development (Start)	2	2019	4	2020
Compact Rapid Attach Weapon (CRAW): Build TI-1 Units (24	1	2021	1	2021
Compact Rapid Attach Weapon (CRAW): TI-1 Development & Test (Complete)	4	2021	4	2022
Compact Rapid Attach Weapon (CRAW): APB-1 (Initial Capability) Development & Test	1	2021	4	2022
Compact Rapid Attach Weapon (CRAW): TI-2 Development & Test	4	2020	4	2020
Compact Rapid Attach Weapon (CRAW): Build TI-2 Units (40)	1	2022	2	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
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**
Compact Rapid Attach Weapon (CRAW): APB-2 (Advanced Capability / ATT) Development & Test	2	2022	1	2024
Compact Rapid Attach Weapon (CRAW): TI-2 / APB-2 DT	1	2024	2	2025
Compact Rapid Attach Weapon (CRAW): TI-2 / APB-2 IT	3	2025	3	2025
Compact Rapid Attach Weapon (CRAW): Request for Proposal (RFP)	1	2022	1	2022
Compact Rapid Attach Weapon (CRAW): Contract Award	2	2023	2	2023
Compact Rapid Attach Weapon (CRAW): Production Line Development	2	2023	2	2024
Compact Rapid Attach Weapon (CRAW): Lot 1	1	2025	4	2025
Compact Rapid Attach Weapon (CRAW): CSA / ECL HW Changes	4	2019	4	2022
Compact Rapid Attach Weapon (CRAW): Create TEMPALT	2	2021	4	2022
Compact Rapid Attach Weapon (CRAW): TEMPALT Approval 2	4	2022	4	2022
Compact Rapid Attach Weapon (CRAW): Install 1	2	2022	3	2025
Compact Rapid Attach Weapon (CRAW): Install 2	4	2022	1	2025
Compact Rapid Attach Weapon (CRAW): Install 3	3	2023	2	2025
Compact Rapid Attach Weapon (CRAW): TI-20 / APB-21 CCS PCS Changes	4	2020	4	2021
Compact Rapid Attach Weapon (CRAW): TI-20 / APB-21 CCS BYG-1 / PCS <--> CSA Integration	1	2022	3	2023
Compact Rapid Attach Weapon (CRAW): Create SHIPALT	3	2023	1	2025
Compact Rapid Attach Weapon (CRAW): SHIPALT Approval	1	2025	1	2025
Compact Rapid Attach Weapon (CRAW): Installation (VA Blk II Hulls 4-6)	1	2025	1	2025
Compact Rapid Attach Weapon (CRAW): CSA / ECL HW Changes 2	4	2021	4	2023
Compact Rapid Attach Weapon (CRAW): TI-24 / APB-23 CCS PCS Changes	4	2022	4	2023
Compact Rapid Attach Weapon (CRAW): TI-24 / APB-23 BYG-1 / PCS <--> CSA Integration	1	2024	3	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
1268: *Non-Traditional Acoustic Communications (NTAC)*	0.000	0.000	0.000	3.340	-	3.340	3.041	2.548	0.000	0.000	0.000	8.929
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

Project 1268 is a new start project for FY21.

A. Mission Description and Budget Item Justification

Non-Traditional Acoustic Communications (NTAC) is an advanced acoustic communication capability which exact details are classified. Additional details are available at the classified level.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Non-Traditional Acoustic Communications (NTAC)	0.000	0.000	3.340	0.000	3.340
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 2020 Plans: N/A					
FY 2021 Base Plans: - Develop combat control software upgrade to integrate into SWFTS APB-23 baseline - Analyze data from tactical exercises to improve capability reliability and performance - Develop improvements for secure communications - Conduct advanced capabilities study.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
NTAC begins in FY21.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	3.340	0.000	3.340

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. The NTAC software application transitions into the Production baseline as part of the SWFTS APB / TI business model.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
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 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTAC - Systems Engineering	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.250	Jan 2021	-		0.250	0.515	0.765	-
NTAC - Software Development	WR	NUWC : Newport, RI	0.000	0.000		0.000		2.040	Jan 2021	-		2.040	3.561	5.601	-
NTAC - Fleet Data Analysis	TBD	TBD : TBD	0.000	0.000		0.000		0.750	Jan 2021	-		0.750	0.899	1.649	-
		Subtotal	0.000	0.000		0.000		3.040		-		3.040	4.975	8.015	N/A

Remarks

NUWC Newport begins software development to enhance the baseline NTAC capability.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTAC - Program Management Support	C/CPAF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.000		0.250	Jan 2021	-		0.250	0.515	0.765	-
NTAC - Travel	WR	NAVSEA : Washington, DC	0.000	0.000		0.000		0.050	Sep 2021	-		0.050	0.103	0.153	-
		Subtotal	0.000	0.000		0.000		0.300		-		0.300	0.618	0.918	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		3.340		-		3.340	5.593	8.933	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
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)*

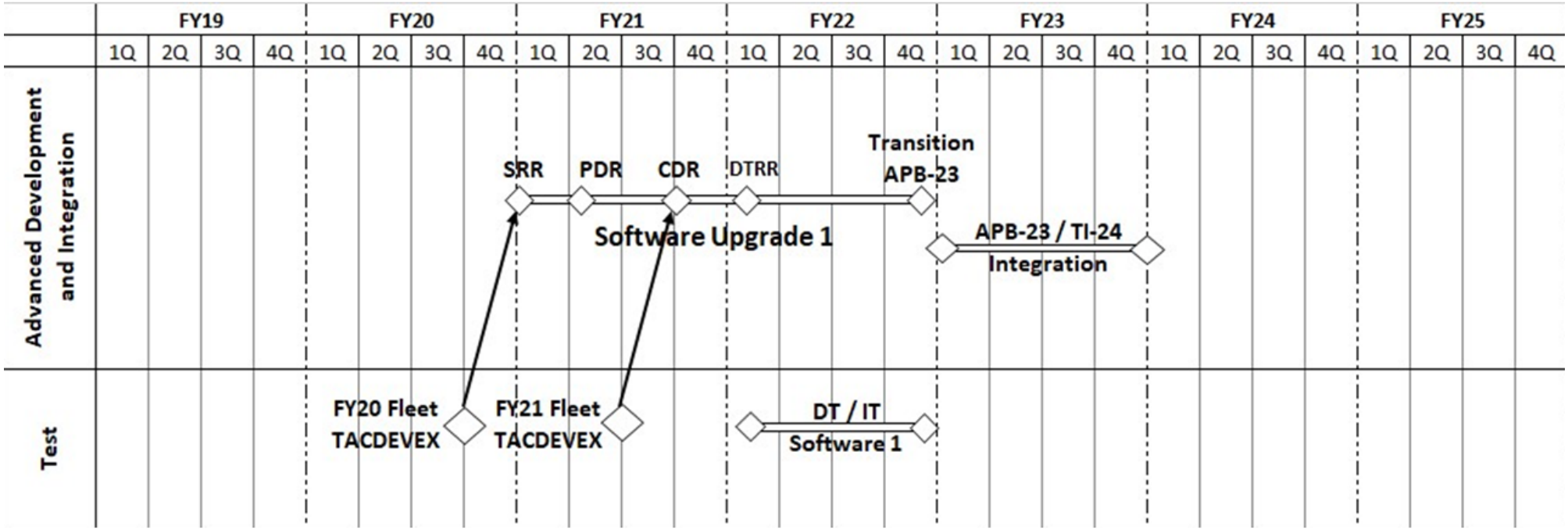

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101226N / *Submarine Acoustic War Dev*	**Project (Number/Name)** 1268 / *Non-Traditional Acoustic Communications (NTAC)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1268				
SRR for Software Upgrade 1	1	2021	1	2021
PDR for Software Upgrade 1	2	2021	2	2021
CDR for Software Upgrade 1	4	2021	4	2021
DTRR for Software Upgrade 1	1	2022	1	2022
Transition for APB 23 / TI-24 Integration	1	2023	1	2024
FY20 Fleet TACDEVEX	4	2020	4	2020
FY21 Fleet TACDEVEX	3	2021	3	2021
DT / IT for Software 1	1	2022	4	2025