Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604610N *I Lightweight Torpedo Development*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	428.956	102.112	115.102	94.386	-	94.386	-	-	-	-	-	-
1412: *HAAWC*	12.367	6.536	1.004	0.200	-	0.200	-	-	-	-	-	-
2234: *Lightweight Hybrid Torpedo*	380.767	16.101	16.609	12.131	-	12.131	-	-	-	-	-	-
3418: *Advanced Anti-Submarine Lightweight Torpedo*	35.822	79.475	97.489	82.055	-	82.055	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Funding decreases from FY21 to FY22 in Project Units 1412, 2234, and 3418 for the following:
(1)PU 1412: Decrease due to completing OT and closing out the remaining tasking under the developmental contract in FY21. FY22 will focus on requirements updates by the USN for a Common HAAWC design that will be compatible with the MK 54 MOD 2 Advanced Lightweight Torpedo (ALWT).
(2)PU 2234: Decrease due to planned completion of Operational Testing (OT) phases and declaring Initial Operational Capability (IOC) of the MK 54 MOD 1 LWT Increment 1.
(3)PU 3418: Decrease due to the completion of MK 54 MOD 2 Advanced Anti-Submarine LWT preliminary design phase in FY21 and proceeding into finalizing the detailed design of the weapon. Long Lead Material Procurements for the MK 54 MOD 2 program were initiated in FY21 to reduce the schedule risk of the program and funding to the rotary and fixed wing platforms will also be provided to begin design and development of integration efforts with aircraft necessary to support the MK 54 MOD 2 ALWT. FY22 focus will be on in-water engineering testing of Proof of Design Hardware.

The Lightweight Torpedo (LWT) program designs, integrates and tests the MK 54 LWT and supports an incremental developmental acquisition approach combining hardware and Advanced Processor Build (APB) software upgrades to enable rapid fielding of improvements to the fleet. The program will focus on common LWT and Heavyweight Torpedo (HWT) hardware and software architecture enhancements that will provide improvements to the array, warhead, propulsion, and APB software to address capability gaps against challenging adversary submarines and environments. Future APB software builds will utilize common torpedo software to deliver capability and tactics improvements to the MK 54 LWT. The program will also support development of enhanced weapon delivery methods, including the high altitude launch of the MK 54 from the P-8A Maritime Patrol Reconnaissance Aircraft (MPRA) with the HAAWC Air Launch Accessary (ALA).

The High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) development program provides the P-8A MPRA with the ability to release LWTs from high altitude to prosecute enemy submarine threats. OT was conducted at the end of FY20, and the COMOPTEVFOR report was issued in FY21, recommending fielding. Follow-on T&E (FOT&E) will be conducted in FY22 with updated flight control software. The current HAAWC design was developed to deploy the MK 54 MOD 0/1. The MK 54 MOD 2 is not compatible with HAAWC due to having different mass properties and outer mold line from the MOD 0/1 LWT. A portion of the funding in FY21 and the funding in FY22 will be utilized to conduct requirements analysis and to determine if a common HAAWC solution is viable for potential solicitation in FY24.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604610N *I Lightweight Torpedo Development*

The MK 54 MOD 1 provides significant performance improvements compared to MK 54 MOD 0 for challenging littoral, shallow water environments and adversary countermeasures. The MOD 1 program is split into 2 increments: Increment 1 focusing on the updated sonar hardware and associated APB 5 common software to provide an improved LWT to the Fleet to replace the MK 54 MOD 0s; Increment 2 is a software only upgrade (APB 6) to fully take advantage of the improved sonar hardware developed under Increment 1, update the platform interface to reduce Fleet Operator workload, and provide new capabilities such as Salvo and terminal homing improvements.

The MK 54 MOD 2 improves the lethality and speed of the LWT by upgrading the Warhead and Propulsion system to counter challenging near-peer adversary submarines that are faster and deeper diving, leveraging the sonar hardware improvements developed under the MOD 1 program. The program awarded four Other Transaction Authority (OTA) agreements to industry partners in FY20 for the design of the Guidance and Control (G&C), Warhead, and Stored Chemical Energy Propulsion System (SCEPS) afterbody sections, as well as the All Up Round (AUR) system integrator. The industry partners are focused primarily on the development of torpedo hardware and support equipment while the USN maintains the responsibility of developing the software under the APB process and will develop specific software modules for the MK 54 MOD 2 variant. In FY22, the program will be complete the preliminary design and begin engineering testing of Proof of Design (POD) hardware, as well as refining the critical design in preparation for qualification and Developmental Testing (DT). Long lead material will be procured in advance of the Proof of Manufacture (POM) assembly.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	109.349	146.012	97.798	-	97.798
Current President's Budget	102.112	115.102	94.386	-	94.386
Total Adjustments	-7.237	-30.910	-3.412	-	-3.412
• Congressional General Reductions	-	-0.650			
• Congressional Directed Reductions	-	-30.260			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.000	0.000			
• SBIR/STTR Transfer	-4.237	0.000			
• Program Adjustments	0.000	0.000	-1.389	-	-1.389
• Rate/Misc Adjustments	0.000	0.000	-2.023	-	-2.023

Change Summary Explanation

Proj 1412 HAAWC: Decreased FY22 request based on completing OT and closing out the remaining tasking under the developmental contract in FY21. FY22 will focus on requirements updates by the USG for a Common HAAWC design that will be compatible with the MK 54 MOD 2 Advanced Lightweight torpedo.

Proj 2234 Lightweight Hybrid Torpedo: Decrease FY22 funding request based on completion of in-water Operational Test runs. Funding was also decreased in the amount of $1.389M to account for the availability of prior year execution balances.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604610N *I Lightweight Torpedo Development*

Proj 3418 Advanced Anti-Submarine Lightweight Torpedo: Decrease FY22 request based on Major Preliminary Design and Development will be completed in FY21 and the shift will focus on completing the critical design and producing POD units for conducting in-water engineering testing in FY22.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 1412 / *HAAWC*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
1412: *HAAWC*	12.367	6.536	1.004	0.200	-	0.200	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The program will design, develop, and procure a High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Air Launch Accessory (ALA) for the MK 54 Lightweight Torpedo (LWT). This capability will allow employment of the MK 54 outside the current fixed wing launch envelope. This includes the ability to employ the MK 54 LWT at high altitude, with stand-off ranges, and with the ability for precision guidance to the intended water entry point (WEP) without affecting the in-water operation of the LWT. This ALA is intended for employment with the Navy's latest Maritime Patrol and Reconnaissance Aircraft (MPRA), the P-8A Poseidon.

The MK 54 MOD 2 is not compatible with HAAWC due to having different mass properties and outer mold line from the MOD 0/1 LWT. A portion of the funding in FY21 and the funding in FY22 will be utilized to conduct requirements analysis and to determine if a common HAAWC solution is viable for potential solicitation in FY24.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Development	6.536	1.004	0.200	0.000	0.200
Articles:	-	-	-	-	-
FY 2021 Plans: Closeout OT actions/deficiencies (HAAWC) Complete Operational Flight Program (OFP) 3.5 to address deficiencies from OT Coordinate Follow-on Test and Evaluation Event in 2QFY22 for OFP 3.5 Declare HAAWC Initial Operational Capability (IOC) Conduct FRP DR Conduct Common HAAWC assessment and requirements review					
FY 2022 Base Plans: Conduct FOT&E Event to evaluate OFP 3.5 Continue Common HAAWC assessment and requirements review Prepare Common HAAWC Acquisition					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 1412 / *HAAWC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Decrease of $.804M from FY21 to FY22 based on FY21 activities which are focused on completing OT reports and closing out the remaining tasking under the developmental contract.					
Accomplishments/Planned Programs Subtotals	6.536	1.004	0.200	0.000	0.200

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• WPN/3215: *MK-54 Torpedo Mods*	103.860	103.441	106.112	-	106.112	-	-	-	-	-	-

Remarks

LI 3215 FYDP funds MK54 MOD 0, MK54 MOD 1, MK54 MOD 2 and HAAWC procurements.

D. Acquisition Strategy

The Engineering and Manufacturing Development (EMD) contract held by Boeing Company supports an incremental approach to delivering full HAAWC capability, Air Launch Accessory (ALA) assets and equipment, as well as associated engineering services and support. The schedule for the completion of the EMD phase of the MK 54 HAAWC AUR development is closely linked to the P-8A Increment 2 design and integration schedule. The EMD contract was awarded in April 2013, with options for the procurement of LRIP units. A future full rate production contract was evaluated through market research and Request For Information (RFIs) for competitive award. The Navy has decided after in depth evaluation, it is in the best interest of the government to award a sole source contract to Boeing. Contract award planned for FY 2021, upon successfully meeting Initial Operating Capability (IOC) requirements and conducting a Full Rate Production Decision Review.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 1412 / *HAAWC*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Development - HAAWC	C/CPFF	Boeing : St. Louis, MO	5.585	0.600	Nov 2019	0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NSWC : Indian Head, MD	0.040	0.000		0.000		0.000		-		0.000	-	-	-
Systems Engineering - HAAWC	WR	NAWC : Pax River, MD	0.475	0.000		0.790	Nov 2020	0.000		-		0.000	-	-	-
Systems Engineering - HAAWC	WR	NAWC : China Lake, CA	0.740	0.000		0.000	Nov 2020	0.000		-		0.000	-	-	-
Systems Engineering - HAAWC	WR	Boeing : St. Louis, MO	0.663	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NSWC : Carderock, MD	0.015	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NUWC : Newport, RI	0.000	0.000		0.107	Nov 2020	0.200	Nov 2021	-		0.200	-	-	-
		Subtotal	7.518	0.600		0.897		0.200		-		0.200	-	-	N/A

Remarks

Decrease in the amount of 0.697M in Product Development is based on meeting IOC for HAAWC in FY21 and the startup of Common HAAWC in FY22.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support - HAAWC	WR	NUWC : Keyport	0.366	0.900	Nov 2019	0.107	Nov 2020	0.000		-		0.000	-	-	-
		Subtotal	0.366	0.900		0.107		0.000		-		0.000	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 1412 / *HAAWC*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test & Evaluation - HAAWC	C/CPFF	Boeing : St. Louis, MO	2.109	2.015	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	NUWC : Keyport, WA	0.774	0.284	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	C/BA	NUWC : Newport, RI	0.751	0.637	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	NAWC : China Lake, CA	0.025	0.400	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	NAWC : Pax River, MD	0.125	0.700	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	OPTEVFOR : Norfolk, VA	0.504	1.000	Nov 2019	0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
System Engineering - HAAWC	WR	NAVAIR : China Lake, CA	0.025	0.000		0.000		0.000		-		0.000	-	-	-
System Engineering - HAAWC	WR	NUWC : Newport, RI	0.100	0.000		0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	NSWC : Indian Head, MD	0.070	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	4.483	5.036		0.000		0.000		-		0.000	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.367	6.536		1.004		0.200		-		0.200	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 1412 / *HAAWC*

HAAWC Development Schedule

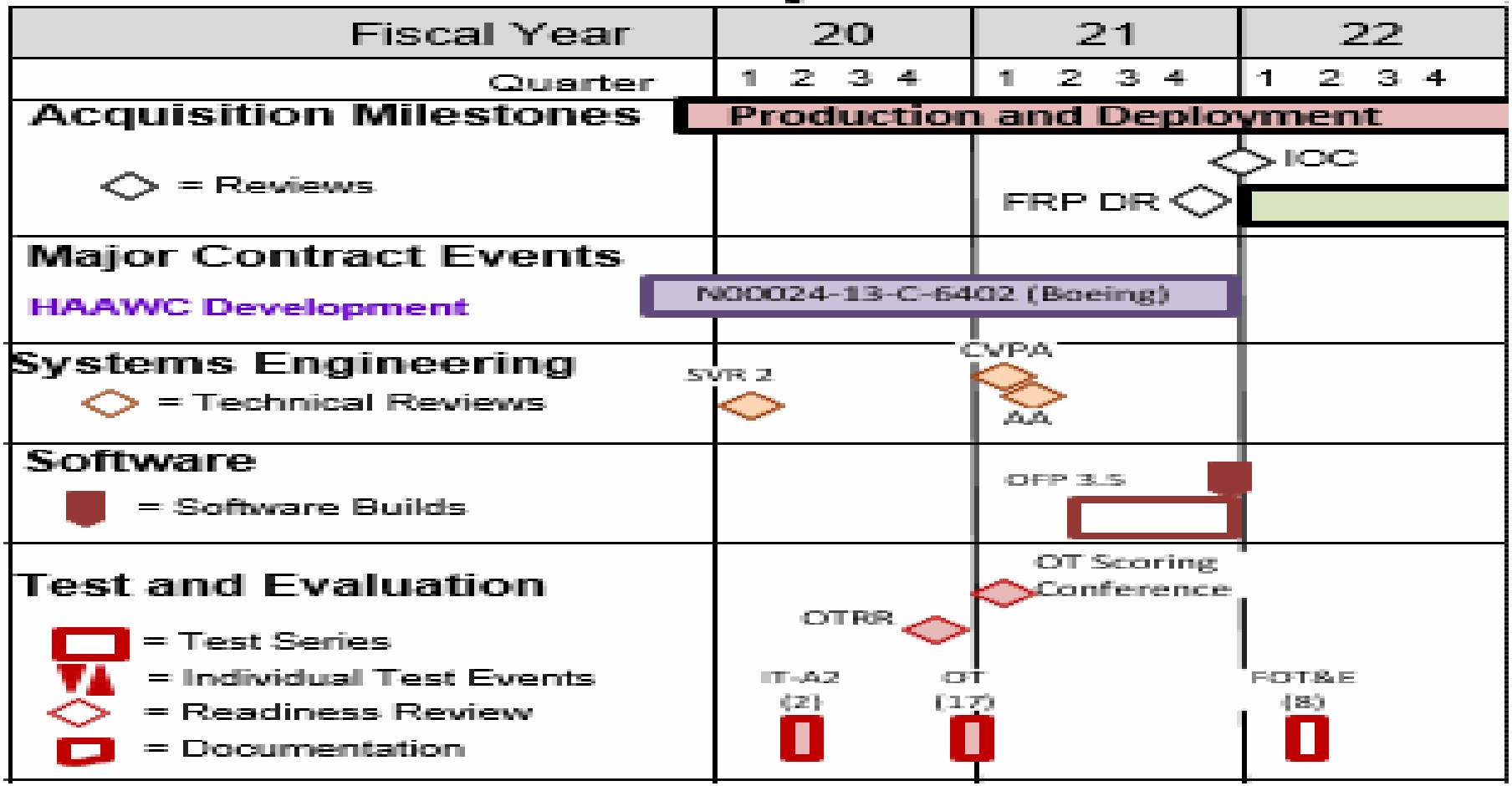

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 1412 / *HAAWC*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1412				
HAAWC Design/Development/Qualification: HAAWC IT / OT	2	2020	1	2021
HAAWC Design/Development/Qualification: HAAWC IOC	4	2021	4	2021
HAAWC Design/Development/Qualification: HAAWC FOT&E	2	2022	2	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 2234 / *Lightweight Hybrid Torpedo*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
2234: *Lightweight Hybrid Torpedo*	380.767	16.101	16.609	12.131	-	12.131	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The program designs, integrates and tests the LWT MK54. The LWT provides performance improvements in shallow water, counter-measure environments. The MK 54 MOD 1 program consists of two increments: (1) Increment 1 consisting of Advanced Processor Build (APB) 5/Tech Insertion 1 (TI-1); and (2) Increment 2, consisting of APB-6 software upgrade. The MK 54 MOD 1 entered Operational Testing (OT) at the beginning of FY20 after successful completion of an OT Readiness Review (OTRR) in October 2019; first two OT events were cancelled due to submarine target unavailability and COVID-19 travel restrictions, however, a combined MOD 1/ HAAWC OT event was conducted in late FY20.

The program plans to conduct additional make up OT events are being conducted in FY21 to maintain FY21 Fleet introduction through an Early Operational Capability (EOC) decision. OT events are dependent upon the availability of submarine targets. Additional OT events are planned in FY22 to complete the requirements of the MK 54 MOD 1 Test and Evaluation Master Plan (TEMP).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: MK54 Pre-Planned Product Improvement	16.101	16.609	12.131	0.000	12.131
Articles:	-	-	-	-	-
FY 2021 Plans:					
Conduct MK 54 MOD 1 Operational Testing (OT)					
Declare MOD 1 INC 1 Initial Operational Capability (IOC)					
Continue Countermeasure Procurement					
Continue Fleet Exercise Section (FES) Development					
Continue Environmentally Centric Weapons Facility (EC WAF) Integration					
Continue APB 6 (INC 2) software development					
Continue APB 6 (INC 2) software development					
FY 2022 Base Plans:					
Complete MK 54 MOD 1 OT					
Declare IOC					
Continue Fleet Exercise Section (FES) Development					
Continue Environmentally Centric Weapons Facility (EC WAF) Integration					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 2234 / *Lightweight Hybrid Torpedo*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue APB 6 (INC 2) software development Conduct Engineering In Water Testing for APB 6 (INC 2) ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $4.478M in FY22 due to reduced funding required to conduct MK 54 MOD 1 OT planning and in-water test events.					
Accomplishments/Planned Programs Subtotals	16.101	16.609	12.131	0.000	12.131

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• WPN/3215: *MK-54 Torpedo Mods*	103.860	103.441	106.112	-	106.112	-	-	-	-	-	-

Remarks

LI 3215 FYDP funds MK54 MOD 0, MK54 MOD 1, MK54 MOD 2 and HAAWC procurements.

D. Acquisition Strategy

Leveraging a Phase III SBIR, a MK 54 MOD 1 LRIP contract was awarded to Progeny in 2016, for the delivery of MOD 1 assets to support Operational Testing (OT) leading to a planned IOC in 2021. Continuing on with the SBIR contractor, a second LRIP contract was awarded to Progeny for MOD 1 kits in 2018, with an option for Full Rate Production in 2021. In conjunction with these MK 54 MOD 1 hardware procurements, APB software upgrades will provide significant torpedo performance improvements. APB 5 and APB 6 software development and testing is performed by NUWC Division Newport.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 2234 / *Lightweight Hybrid Torpedo*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Development - PRIOR YEAR	WR	NUWC : Newport/ Keyport	47.640	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - MK 54 MOD 1	WR	NUWC : Newport	3.487	1.282	Nov 2019	2.700	Nov 2020	0.000		-		0.000	-	-	-
Hardware Development - MK 54 MOD 1	SS/FP	Progeny Systems : Not Specified	24.394	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NSWCCD : Carderock, MD	0.050	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	C/CPAF	Boeing : St. Louis, MO	98.216	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - HAAWC	WR	NSWCDD : Dahlgren, VA	0.400	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - INSENSITIVE MUNITIONS	WR	NUWC : Newport	0.740	0.210	Nov 2019	0.000		0.000		-		0.000	-	-	-
Hardware Development - INSENSITIVE MUNITIONS	WR	NSWC : Indian Head, MD	0.721	0.150	Nov 2019	0.100	Nov 2020	0.150	Nov 2021	-		0.150	-	-	-
Hardware Development - INSENSITIVE MUNITIONS	WR	NUWC : Keyport	0.336	0.101	Nov 2019	0.033	Nov 2020	0.749	Nov 2021	-		0.749	-	-	-
Hardware Development - MK54 MOD 1	WR	NSWC : Indian Head, MD	6.950	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - MK54 MOD 1	MIPR	DMEA : McClellan, CA	0.520	0.000		0.000		0.000		-		0.000	-	-	-
Software Development - PRIOR YEAR	WR	NUWC : Newport/ Keyport	20.454	0.000		0.000		0.000		-		0.000	-	-	-
Software Development - MK 54 MOD 1	WR	NUWC : Newport	0.010	0.580	Nov 2019	2.563	Nov 2020	2.757	Nov 2021	-		2.757	-	-	-
Software Development - MK 54 MOD 1	MIPR	MIT : Boston, MA	1.358	0.000		0.000		0.000		-		0.000	-	-	-
Software Development - MK 54 MOD 1	C/BA	ARL/PSU : State College, PA	1.441	0.000		0.000		0.814	Jan 2022	-		0.814	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 2234 / *Lightweight Hybrid Torpedo*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - VLA	SS/FP	Lockheed Martin: VLA : Akron, OH	7.606	0.000		0.000		0.000		-		0.000	-	-	-
Systems Engineering - HAAWC	WR	NSWC PMA 290 : Patuxent, MD	9.582	0.000		0.000		0.000		-		0.000	-	-	-
Systems Engineering - HAAWC	WR	NAWCWD : China Lake	6.606	0.000		0.000		0.000		-		0.000	-	-	-
Systems Enginnering - HAAWC	C/CPFF	John Hopkins University : Baltimore, MD	0.050	0.000		0.000		0.000		-		0.000	-	-	-
System Test & Evaluation - HAAWC	WR	NUWC : Newport/ Keyport	21.931	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - ADV LWT	WR	NUWC : Newport	1.218	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - ADV LWT	WR	NUWC : Keyport	0.300	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - ADV LWT	WR	NSWC : Indian Head, MD	0.270	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - ADV LWT	WR	NAVSEA : Washington, DC	0.025	0.000		0.000		0.000		-		0.000	-	-	-
Hardware Development - ADV LWT	WR	NAVAIR : Pax River, MD	0.025	0.000		0.000		0.000		-		0.000	-	-	-
Software Development - APB 6	WR	NUWC : Newport	1.269	0.403	Nov 2019	1.743	Nov 2020	2.222	Nov 2021	-		2.222	-	-	-
Software Development - APB 6	C/CPFF	Sonalyst : Waterford, CT	0.410	0.000		0.294	Nov 2020	0.000		-		0.000	-	-	-
Software Development - FCT program	C/BA	NUWC : Newport/ Keyport	1.150	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	257.159	2.726		7.433		6.692		-		6.692	-	-	N/A

Remarks

Decrease of $.742M in Product Development from FY21 to FY22 due to completion of MOD 1 OT events.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 2234 / *Lightweight Hybrid Torpedo*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Development	WR	NUWC : Newport/ Keyport	5.532	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support	WR	NUWC : Newport/ Keyport	9.648	1.193	Nov 2019	1.151	Nov 2020	1.302	Nov 2021	-		1.302	-	-	-
Program Management Support	C/BA	ARL/PSU : State College, PA	0.441	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support	Various	NAVSEA : Not Specified	0.168	0.000		0.000		0.000		-		0.000	-	-	-
Systems Engineering	WR	NUWC : Newport/ Keyport	0.120	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation	WR	NUWC : Newport/ Keyport	30.881	0.428	Nov 2019	0.997	Nov 2020	1.834	Nov 2021	-		1.834	-	-	-
System Test and Evaluation	WR	NSWC : Carderock, MD	0.008	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation	WR	NSWC : Dahlgren, VA	0.069	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation	WR	NAVFAC LANT : Washington, DC	0.056	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	46.923	1.621		2.148		3.136		-		3.136	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - MK 54 MOD 1	WR	NSWC : Carderock	1.259	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - PRIOR YEAR	WR	NUWC : Newport/ Keyport	32.191	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evalution - MK 54 MOD 1	WR	NUWC : Keyport	9.714	4.351	Nov 2019	4.043	Nov 2020	1.763	Nov 2021	-		1.763	-	-	-
System Test and Evaluation - MK 54 MOD 1	WR	NUWC : Newport	14.942	5.281	Nov 2019	2.794	Nov 2020	0.211	Nov 2021	-		0.211	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 2234 / *Lightweight Hybrid Torpedo*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation - MK 54 MOD 1	WR	NSWC : Indian Head, MD	1.576	0.100	Nov 2019	0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - MK 54 MOD 1	C/CPIF	ARL/PSU : State College, PA	1.741	0.288	Nov 2019	0.000	Nov 2020	0.000	Dec 2021	-		0.000	-	-	-
System Test and Evaluation - MK 54 MOD 1	WR	Aberdeen Test Center : Aberdeen, MD	0.731	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - MK 54 MOD 1	WR	OPTEVFOR : Norfolk, VA	3.024	1.235	Nov 2019	0.163	Dec 2020	0.039	Nov 2021	-		0.039	-	-	-
System Test and Evaluation - PRIOR YEAR	WR	OPTEVFOR : Norfolk, VA	3.490	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - HAAWC	WR	OPTEVFOR : Norfolk, VA	0.750	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - HAAWC	WR	NSWC : Dalgren, VA	0.091	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - HAAWC	WR	NUWC : Keyport	0.618	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - HAAWC	WR	NUWC : Newport	0.000	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - WEAPON TRANSPORT	WR	NUWC : Keyport	0.081	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - ADV LWT	WR	NUWC : Newport	0.000	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evalution - ADV LWT	WR	NUWC : Keyport	0.000	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evaluation - ADV LWT	WR	NSWC : Indian Head, MD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
System Test and Evalution - MK54 MOD 1	WR	NAVSEA : Washington, DC	0.039	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	70.247	11.255		7.000		2.013		-		2.013	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 2234 / *Lightweight Hybrid Torpedo*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Decrease of $5M in Test and Evaluation from FY21 to FY22 due to completion of Increment 1 MK 54 MOD 1 OT and MK 54 Mod 1 OT Test Planning in FY21. Remaining Test & Evaluation funds in FY22 are for Increment 2 Engineering and Development in water testing.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	WR	NAVSEA : Washington, DC	0.535	0.028	Nov 2019	0.028	Nov 2020	0.028	Nov 2021	-		0.028	-	-	-
Program Management Support	C/FPIF	EWCSS : Washington, DC	4.996	0.471	Nov 2019	0.000	Nov 2020	0.262	Nov 2021	-		0.262	-	-	-
Program Management Support	C/CPFF	ARL/PSU : Philadephia, PA	0.588	0.000		0.000		0.000		-		0.000	-	-	-
Program Management Support	Various	NAVSEA : Washington, DC	0.093	0.000		0.000		0.000		-		0.000	-	-	-
Acquisition Workforce Fund	Various	Not Specified : Not Specified	0.226	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	6.438	0.499		0.028		0.290		-		0.290	-	-	N/A

Remarks

Increase in EWCSS costs by $.2M due to sharing of costs in FY22 across MK54 MOD 1 and MK 54 MOD 2 Programs.

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	380.767	16.101		16.609		12.131		-		12.131	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 2234 / *Lightweight Hybrid Torpedo*

MK 54 MOD 1 Acquisition Schedule

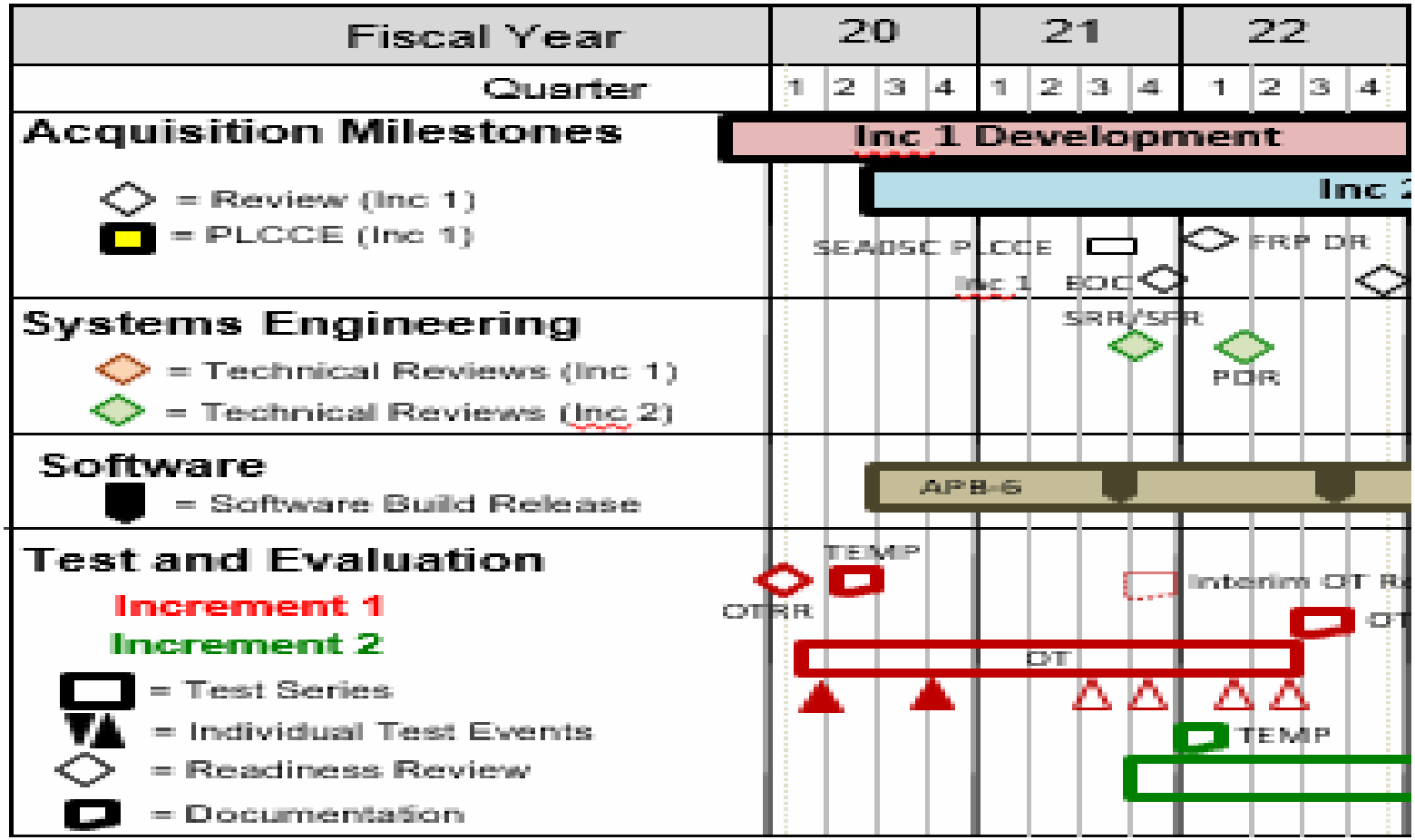

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 2234 / *Lightweight Hybrid Torpedo*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2234				
MK54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 OT	1	2020	2	2022
MK54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 EOC	4	2021	4	2021
MK54 MOD 1 Inc 1: APB 5 / TI-1 Inc 1 IOC	4	2022	4	2022
MK54 MOD 1 Inc 2: APB 6 Tactical Software Development Start	2	2020	2	2020

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 3418 / *Advanced Anti-Submarine Lightweight Torpedo*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3418: *Advanced Anti-Submarine Lightweight Torpedo*	35.822	79.475	97.489	82.055	-	82.055	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The MK 54 MOD 2 (ALWT) is developing capability to improve the lethality and speed of the LWT by upgrading the Warhead and Propulsion system to counter challenging near-peer adversary submarines that are faster and deeper diving, leveraging the sonar hardware improvements developed under the MOD 1 program. The Analysis of Alternatives (AoA) and Capability Development Document (CDD) have been completed and approved. The program is leveraging UARCs and Government Agencies for requirements definition and early development, and the use of Other Transactional Authority (OTA)s for system and subsystem detailed design.

The program will conduct additional testing and platform integration (surface and air) to further support initial system design work. OTAs are being utilized for development of Guidance and Control (G&C) subsystems, warhead modifications, modified Air Launch Accessories (ALA), improved propulsion system, modified Fleet Exercise System (FES), and system design test sets. Subsystem prototype assembly and test is a significant focus for early development. The remainder of the development phase will be system integration and hardware testing. In addition, aircraft (P-8A and MH-60R) and surface ship integration activities/tasks are planned to align with platform updates to maximize efficiency.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: ALWT Development	79.475	97.489	82.055	0.000	82.055
Articles:	-	-	-	-	-
FY 2021 Plans: -Conduct Preliminary Design Review (PDR). -Continue MOD 2 APB Software Development -Continue Fleet Exercise Section (FES) Development -Continue Test Set (Warhead/Engine/All up Round) Development -Continue Hardware Development for Warhead Section, Guidance & Control Section, and Propulsion -Continue EC WAF Modeling and Simulation Accreditation -Propulsion Section Prototype Build -Guidance and Control (G&C) Section Prototype Build -Conduct Procurement of Long Lead Materials -Warhead Section Prototype Build -Continue System Test Bed Development					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 3418 / *Advanced Anti-Submarine Lightweight Torpedo*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
-Continue MH-60R/P-8A Integration Interface Design (requirements/analysis/software) -Begin MH-60R/P-8A Integration Interface Design (hardware updates and interface software development) -Award P-8A integration efforts to Boeing -Continue Air Launch Accessory (ALA) Requirements and Initial System Design -Continue Software/Hardware (SW/HW) Integration ***FY 2022 Base Plans:*** -Conduct MS B -Conduct Subsystem Critical Design Reviews (CDRs) -Continue MOD 2 APB Software Development -Continue Fleet Exercise Section (FES) Development -Continue Test Set (Warhead/Engine/All up Round) Development -Continue Ship Integration Interface Design -Continue Hardware Development for Warhead Section, Guidance & Control Section, and Propulsion -Continue EC WAF Modeling and Simulation Accreditation -Propulsion Section Proof of Design Build and Testing -Guidance and Control (G&C) Section Proof of Design Build and Testing -Warhead Section Proof of Design Build and Testing -Continue System Test Bed Development -Continue MH-60R/P-8A Integration Interface Design (hardware updates and interface software development) -Continue Air Launch Accessory (ALA) Initial System Design -Conduct Integrated Logistics Assessment (ILA) -Continue to Procure Long Lead Material supporting Phase II Proof of Manufacture Design -Conduct AUR Phase II Solicitation for completing design and development ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $15.4M from FY21 to FY22 due to completion of major Preliminary Design and Development in FY21.FY22 will focus on completing the critical design and producing POD units for conducting in-water engineering testing.					
Accomplishments/Planned Programs Subtotals	79.475	97.489	82.055	0.000	82.055

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 3418 / *Advanced Anti-Submarine Lightweight Torpedo*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• WPN/3215: *MK-54 Torpedo Mods*	103.860	110.286	109.360	-	109.360	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The Acquisition Strategy is to use University Affiliated Research Centers (UARCs), Warfare Centers, and competitive Other Transactional Authority (OTA) agreements with industry to prototype a new Advanced Lightweight Torpedo. The program will then pursue accelerated acquisition LRIP opportunities while preparing for full and open FRP competition. This accelerated approach requires full initial funding to ensure all prototyping efforts deliver a fully integrated and production-ready weapon. Scope of effort includes weapon, launch platform integration, and all associated subsystems and supporting capabilities.

Four OTAs awarded and executing Proof of Design (POD) phase:
(1) Northrop Grumman - Warhead Section
(2) Aerojet - Afterbody Section
(3) Progeny - G&C Section
(4) Raytheon - All-Up-Round (AUR), Test Sets, Test Shapes, Air Launch Accessories, and Fleet Exercise Sections (FES)
Proof of Manufacturing (POM) phase competitive OTA contract will be awarded to a single prime and LRIP sole-source contract will be awarded award to the POM phase prime contractor.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 3418 / *Advanced Anti-Submarine Lightweight Torpedo*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NUWC NPT : Newport, RI	0.000	1.282	Nov 2019	6.354	Nov 2020	7.131	Nov 2021	-		7.131	-	-	-
Hardware Development	WR	NUWC NPT : Newport, RI	4.445	3.260	Nov 2019	2.143	Nov 2020	2.846	Nov 2021	-		2.846	-	-	-
Hardware Development	WR	NUWC KPT : Keyport, WA	2.443	4.387	Nov 2019	3.216	Nov 2020	5.005	Nov 2021	-		5.005	-	-	-
Hardware Development	WR	NSWC, IH : Indian Head, MD	0.900	1.751	Nov 2019	2.052	Nov 2020	0.625	Nov 2021	-		0.625	-	-	-
Hardware Development - AUR	C/CPFF	ARL/PSU : State College, PA	7.750	13.442	Nov 2019	15.712	Nov 2020	3.076	Nov 2021	-		3.076	-	-	-
Hardware Development	WR	PEO-IWS : Washington, DC	2.360	0.253	Nov 2019	0.256	Dec 2020	0.250	Nov 2021	-		0.250	-	-	-
Hardware Development - Platform Integration	WR	NAVAIR : Pax River, MD	0.250	3.006	Nov 2019	8.990	Nov 2020	9.659	Nov 2021	-		9.659	-	-	-
Hardware Development - G&C	C/CPIF	OTA - Progeny : Manassas, VA	1.800	4.064	Feb 2020	0.000	Jan 2021	7.600	Dec 2021	-		7.600	-	-	-
Hardware Development - New engine	C/CPIF	OTA - Aerojet Rocketdyne : Huntsville, AL	4.900	27.434	Jan 2020	24.807	Jan 2021	18.071	Jan 2022	-		18.071	-	-	-
Hardware Development - Warhead	C/CPIF	OTA - Northrop Grumman Innovation Systems : Plymouth, MN	6.967	7.682	Jan 2020	13.500	Jan 2021	8.504	Jan 2022	-		8.504	-	-	-
Hardware Development - AUR	C/CPIF	OTA - Raytheon : Portsmouth, RI	3.500	7.748	Jan 2020	17.759	Jan 2021	16.858	Jan 2022	-		16.858	-	-	-
		Subtotal	35.315	74.309		94.789		79.625		-		79.625	-	-	N/A

Remarks

Decrease of $14.5M in Product Development funding in FY22 is due to completion of major Preliminary Design and Development. A majority of long lead material in support of POM hardware is procured in FY21. FY22 will focus on completing the critical design and producing POD units for conducting in-water engineering testing in FY22.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / *Lightweight Torpedo Development*	Project (Number/Name) 3418 / *Advanced Anti-Submarine Lightweight Torpedo*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NUWC NPT : Newport, RI	0.100	1.080	Nov 2019	1.247	Nov 2020	0.960	Nov 2021	-		0.960	-	-	-
		Subtotal	0.100	1.080		1.247		0.960		-		0.960	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	WR	NUWC NPT : Newport, RI	0.100	3.624	Nov 2019	0.553	Nov 2020	0.570	Nov 2021	-		0.570	-	-	-
		Subtotal	0.100	3.624		0.553		0.570		-		0.570	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/FPIF	EWCSS : Washington, DC	0.307	0.462	Jan 2020	0.900	Jan 2021	0.900	Nov 2021	-		0.900	-	-	-
		Subtotal	0.307	0.462		0.900		0.900		-		0.900	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	35.822	79.475		97.489		82.055		-		82.055	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 3418 / *Advanced Anti-Submarine Lightweight Torpedo*

MK 54 MOD 2 Development Schedule

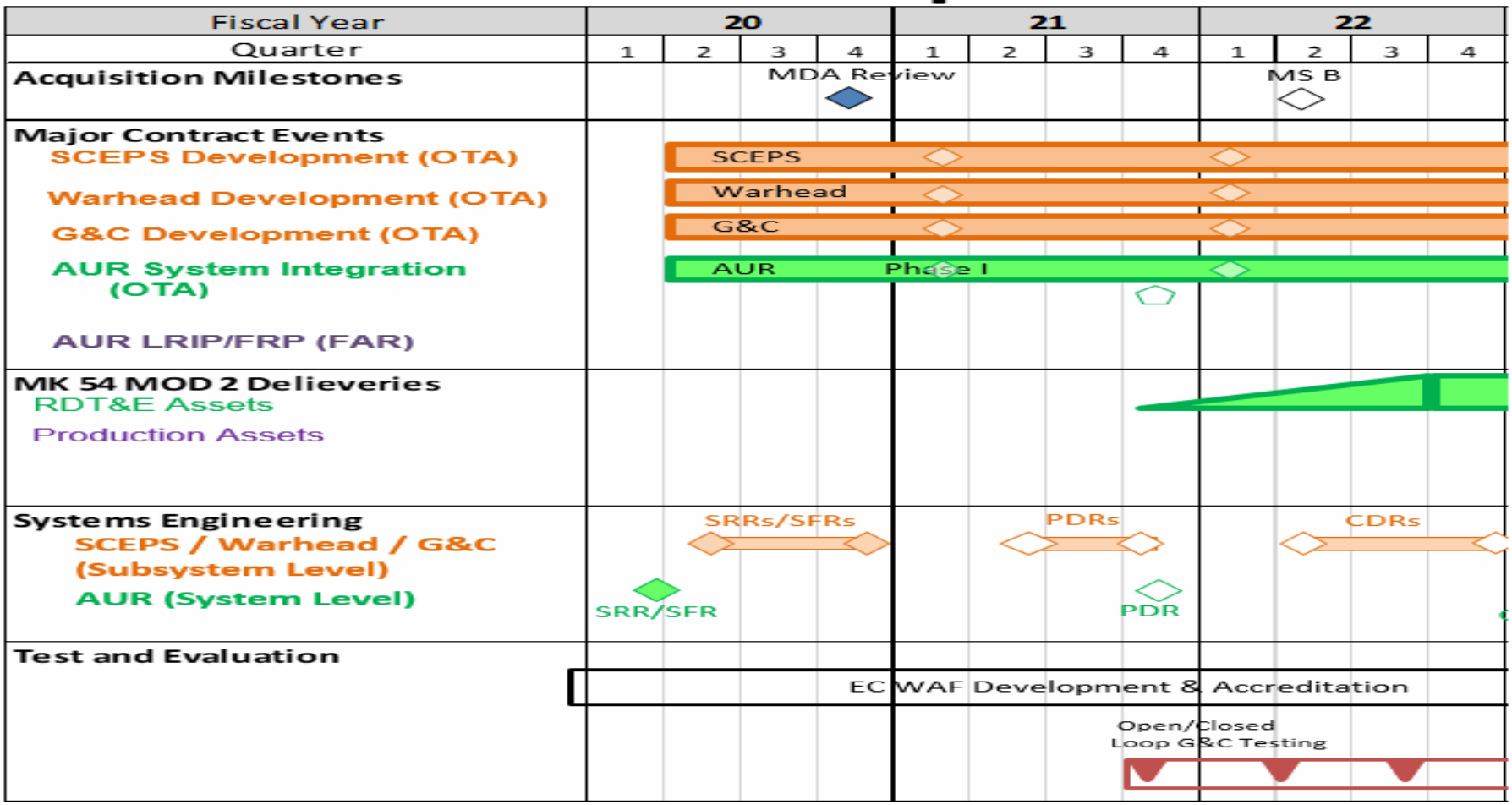

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604610N / *Lightweight Torpedo Development*	**Project (Number/Name)** 3418 / *Advanced Anti-Submarine Lightweight Torpedo*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3418				
Advanced Lightweight Torpedo (ALWT): ALWT MS-B	2	2022	2	2022
Advanced Lightweight Torpedo (ALWT): ALWT SCEPS Development	2	2020	4	2022
Advanced Lightweight Torpedo (ALWT): ALWT Warhead Development	2	2020	4	2022
Advanced Lightweight Torpedo (ALWT): ALWT G&C Hardware / Software Development	2	2020	4	2022
Advanced Lightweight Torpedo (ALWT): ALWT AUR Development Integration	2	2020	4	2022
Advanced Lightweight Torpedo (ALWT): ALWT Engineering Testing	4	2021	4	2022