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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>
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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	366.558	62.448	109.349	146.012	-	146.012	97.798	67.949	61.766	65.136	Continuing	Continuing
1412: <i>HAAWC</i>	8.516	3.851	6.754	1.008	-	1.008	0.202	3.101	3.501	5.700	Continuing	Continuing
2234: <i>Lightweight Hybrid Torpedo</i>	358.042	22.725	17.798	16.683	-	16.683	13.775	13.986	14.260	14.547	Continuing	Continuing
3418: <i>Advanced Anti-Submarine Lightweight Torpedo</i>	0.000	35.872	84.797	128.321	-	128.321	83.821	50.862	44.005	44.889	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Lightweight Torpedo (LWT) program designs, integrates and tests the LWT MK 54. The LWT development program provides performance improvements in shallow water and counter-measure environments. The High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) development and Low Rate Initial Production (LRIP) contract was awarded to Boeing on April 2013. The MK54 MOD 2 torpedo effort has completed an Analysis of Alternatives (AoA) and also completed and approved a Capability Development Document (CDD). The effort is currently in the system requirements and development phase for FY 2019/FY 2020 and in the process of awarding four Other Transaction Authority (OTA) agreements to industry partners for the design of the guidance and control, warhead, and stored chemical energy propulsion system afterbody sections, as well as the all up round.

Budget 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 re-architecture, and improvements to the array, warhead, propulsion, and APB software. Future APB software builds will utilize the 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.

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	63.147	148.349	145.421	-	145.421
Current President's Budget	62.448	109.349	146.012	-	146.012
Total Adjustments	-0.699	-39.000	0.591	-	0.591
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-39.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.699	0.000			
• Program Adjustments	0.000	0.000	1.000	-	1.000
• Rate/Misc Adjustments	0.000	0.000	-0.409	-	-0.409

Change Summary Explanation

FY21 Funding increases by \$1.0 M for development of a common HAAWC that can also be used on MK54 MOD 2. A decrease of \$.409 resulted from other rate and miscellaneous adjustments.

Proj: 1412 HAAWC - Funding for development of common HAAWC for MK54 MOD 2.

Proj: 2234 Lightweight Hybrid Torpedo - Decrease of \$1.115M from FY20 to FY21 based on a reduction in the number of in-water developmental test runs.

Proj: 3418 Advanced Anti-Submarine Lightweight Torpedo - Increase of \$43.524M for Other Transactional Authority (OTA) agreements for the development of an improved propulsion system, new warhead development, new Guidance & Control(G&C) Section, All up Round (AUR) integration, P-8A and Helo platform integration, New Fleet Exercise Section development, and New Test Set development in support of Advanced Lightweight Torpedo (MK54 MOD 2) development. Funding also supports fabrication and delivery of Proof-of-Design (POD) hardware.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>				Project (Number/Name) 1412 / HAAWC			
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
1412: HAAWC	8.516	3.851	6.754	1.008	-	1.008	0.202	3.101	3.501	5.700	Continuing	Continuing
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.

FY 2020 achievement of HAAWC IOC

The HAAWC ALA entering production is not compatible with the ALWT/MK54 MOD 2, funding in FY21 and follow is to perform assessments for common HAAWC redesign efforts.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: High Altitude Anti-Submarine Warfare Weapon Capability (HAAWC) Development	3.851	6.754	1.008	0.000	1.008
Articles:	-	-	-	-	-
FY 2020 Plans:					
Complete Operational Test (OT)					
Complete Cybersecurity reviews development closeout					
Conduct final Safety reviews					
Closeout Flight Simulator software and documentation					
Achieve IOC					
FY 2021 Base Plans:					
Closeout OT actions/deficiencies (HAAWC)					
Conduct Common HAAWC assessment and requirements review					
FY 2021 OCO Plans:					
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 1412 / HAAWC

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Decrease of (-\$5.746M) due to completion of HAAWC testing. program will continue development of a common HAAWC which can also be used with MK54 MOD 2.					
Accomplishments/Planned Programs Subtotals	3.851	6.754	1.008	0.000	1.008

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
• WPN/3215: <i>MK-54 Torpedo Mods</i>	83.825	103.860	110.286	-	110.286	109.360	137.337	168.575	171.464	0.000	2,070.574

Remarks

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 will be in FY 2020, upon successfully meeting Initial Operating Capability (IOC) requirements and conducting a Full Rate Production Decision Review.

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

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 1412 / HAAWC
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hardware Development - HAAWC	C/CPFF	Boeing : St. Louis, MO	5.585	0.000	Dec 2018	0.600	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Hardware Development - HAAWC	WR	NSWC : Indian Head, MD	0.040	0.000	Nov 2018	0.000		0.000		-		0.000	0.000	0.040	-
Systems Engineering - HAAWC	WR	NAWC : Pax River, MD	0.475	0.000	Nov 2018	0.000		0.700	Nov 2020	-		0.700	0.000	1.175	-
Systems Engineering - HAAWC	WR	NAWC : China Lake, CA	0.740	0.000	Nov 2018	0.000		0.200	Nov 2020	-		0.200	0.000	0.940	-
Systems Engineering - HAAWC	WR	Boeing : St. Louis, MO	0.000	0.663	Nov 2018	0.000		0.000		-		0.000	0.000	0.663	-
Hardware Development - HAAWC	WR	NSWC : Carderock, MD	0.000	0.015	Nov 2018	0.000		0.000		-		0.000	0.000	0.015	-
Hardware Development - HAAWC	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.108	Nov 2020	-		0.108	0.000	0.108	-
Subtotal			6.840	0.678		0.600		1.008		-		1.008	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Support - HAAWC	WR	NUWC : Keyport	0.000	0.366	Nov 2018	0.900	Nov 2019	0.000		-		0.000	0.000	1.266	-
Subtotal			0.000	0.366		0.900		0.000		-		0.000	0.000	1.266	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Test & Evaluation - HAAWC	C/CPFF	Boeing : St. Louis, MO	0.000	2.109	Dec 2018	2.233	Nov 2019	0.000		-		0.000	0.000	4.342	-

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 1412 / HAAWC
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Test & Evaluation - HAAWC	WR	NUWC : Keyport, WA	0.525	0.249	Nov 2018	0.284	Nov 2019	0.000		-		0.000	0.000	1.058	-
System Test & Evaluation - HAAWC	C/BA	NUWC : Newport, RI	0.751	0.000	Dec 2018	0.637	Nov 2019	0.000		-		0.000	0.000	1.388	-
System Test & Evaluation - HAAWC	WR	NAWC : China Lake, CA	0.000	0.025	Nov 2018	0.400	Nov 2019	0.000		-		0.000	0.000	0.425	-
System Test & Evaluation - HAAWC	WR	NAWC : Pax River, MD	0.000	0.125	Nov 2018	0.700	Nov 2019	0.000		-		0.000	0.000	0.825	-
System Test & Evaluation - HAAWC	WR	OPTEVFOR : Norfolk, VA	0.400	0.104	Dec 2018	1.000	Nov 2019	0.000		-		0.000	0.000	1.504	-
Hardware Development - HAAWC	WR	NSWC : Indian Head, MD	0.000	0.000	Nov 2018	0.000		0.000		-		0.000	0.000	0.000	-
System Engineering - HAAWC	WR	NAVAIR : China Lake, CA	0.000	0.025	Nov 2018	0.000		0.000		-		0.000	0.000	0.025	-
System Engineering - HAAWC	WR	NUWC : Newport, RI	0.000	0.100	Nov 2018	0.000		0.000		-		0.000	0.000	0.100	-
System Test & Evaluation - HAAWC	WR	NSWC : Indian Head, MD	0.000	0.070	Nov 2018	0.000		0.000		-		0.000	0.000	0.070	-
Subtotal			1.676	2.807		5.254		0.000		-		0.000	0.000	9.737	N/A

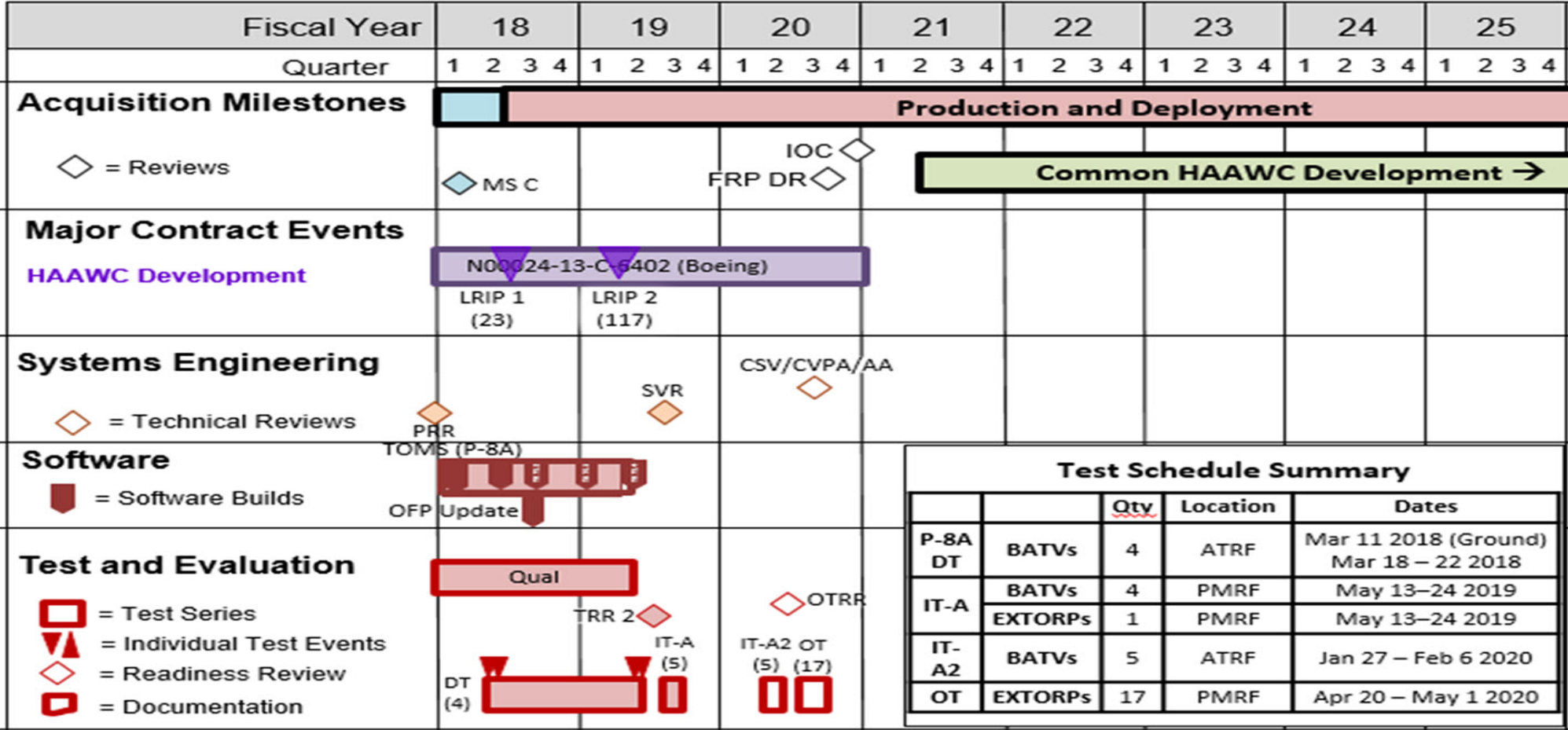
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.516	3.851	6.754	1.008	-	1.008	Continuing	Continuing	N/A

Remarks

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



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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 1412 / HAAWC

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 1412				
HAAWC Design/Development/Qualification: HAAWC IT / OT	2	2019	3	2020
HAAWC Design/Development/Qualification: HAAWC IOC	4	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>				Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>			
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
2234: <i>Lightweight Hybrid Torpedo</i>	358.042	22.725	17.798	16.683	-	16.683	13.775	13.986	14.260	14.547	Continuing	Continuing
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 to two increments: 1) Advanced Processor Build (APB) 5/Tech Insertion 1 (TI1) and 2) 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.

FY 2021 achievement of MK 54 MOD 1 IOC

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: MK54 Pre-Planned Product Improvement	22.725	17.798	16.683	0.000	16.683
Articles:	-	-	-	-	-
FY 2020 Plans:					
Conduct MK54 MOD 1 Operational Testing (OT)					
Continue Countermeasure Procurement					
Continue Fleet Exercise Section (FES) Development					
Continue Environmentally Centric Weapons Facility (EC WAF) Integration					
Continue APB 6 (INC 2) software development					
FY 2021 Base Plans:					
Complete 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					
FY 2021 OCO Plans:					
N/A					
-					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Proj: 2234 Lightweight Hybrid Torpedo - Decrease of \$.974M from FY20 to FY21 based on a reduction in the number of in-water operational test runs.					
Accomplishments/Planned Programs Subtotals	22.725	17.798	16.683	0.000	16.683

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• WPN/3215: <i>MK-54 Torpedo Mods</i>	83.825	103.860	110.286	-	110.286	109.360	137.337	168.575	171.464	0.000	2,070.574

Remarks

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.

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

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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hardware Development - PRIOR YEAR	WR	NUWC : Newport/ Keyport	47.640	0.000		0.000		0.000		-		0.000	0.000	47.640	-
Hardware Development - MK 54 MOD 1	WR	NUWC : Newport	2.066	1.421	Nov 2018	1.282	Nov 2019	1.080	Nov 2020	-		1.080	0.000	5.849	-
Hardware Development - MK 54 MOD 1	SS/FP	Progeny Systems : Not Specified	24.394	0.000		0.000		0.000		-		0.000	0.000	24.394	-
Hardware Development - HAAWC	WR	NSWCCD : Carderock, MD	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-
Hardware Development - HAAWC	C/CPAF	Boeing : St. Louis, MO	98.216	0.000		0.000		0.000		-		0.000	0.000	98.216	-
Hardware Development - HAAWC	WR	NSWCDD : Dahlgren, VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Hardware Development - HAAWC	WR	NSWC : Indian Head	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Hardware Development - INSENSITIVE MUNITIONS	WR	NUWC : Newport	0.530	0.210	Jan 2019	0.210	Nov 2019	0.210	Nov 2020	-		0.210	Continuing	Continuing	Continuing
Hardware Development - INSENSITIVE MUNITIONS	WR	NSWC : Indian Head, MD	0.630	0.091	Jan 2019	0.150	Nov 2019	0.150	Nov 2020	-		0.150	Continuing	Continuing	Continuing
Hardware Development - INSENSITIVE MUNITIONS	WR	NUWC : Keyport	0.122	0.214	Jan 2019	0.101	Nov 2019	0.221	Nov 2020	-		0.221	Continuing	Continuing	Continuing
Hardware Development - MK54 MOD 1	WR	NSWC : Indian Head, MD	6.950	0.000		0.000		0.000		-		0.000	0.000	6.950	-
Hardware Development - MK54 MOD 1	MIPR	DMEA : McClellan, CA	0.000	0.520	Dec 2018	0.000		0.000		-		0.000	0.000	0.520	-
Software Development - PRIOR YEAR	WR	NUWC : Newport/ Keyport	20.454	0.000		0.000		0.000		-		0.000	0.000	20.454	-
Software Development - MK 54 MOD 1	WR	NUWC : Newport	0.010	0.000		0.580	Nov 2019	0.000		-		0.000	0.000	0.590	-
Software Development - MK 54 MOD 1	MIPR	MIT : Boston, MA	1.358	0.000		0.000		0.000		-		0.000	0.000	1.358	-

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Development - MK 54 MOD 1	C/BA	ARL/PSU : State College, PA	1.441	0.000		0.000		0.000		-		0.000	0.000	1.441	-
Systems Engineering - VLA	SS/FP	Lockheed Martin: VLA : Akron, OH	7.606	0.000		0.000		0.000		-		0.000	0.000	7.606	-
Systems Engineering - HAAWC	WR	NSWC PMA 290 : Patuxent, MD	9.582	0.000		0.000		0.000		-		0.000	0.000	9.582	-
Systems Engineering - HAAWC	WR	NAWCWD : China Lake	6.606	0.000		0.000		0.000		-		0.000	0.000	6.606	-
Systems Engineering - HAAWC	C/CPFF	John Hopkins University : Baltimore, MD	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-
System Test & Evaluation - HAAWC	WR	NUWC : Newport/ Keyport	21.931	0.000		0.000		0.000		-		0.000	0.000	21.931	-
Hardware Development - ADV LWT	WR	NUWC : Newport	1.218	0.000		0.000		0.000		-		0.000	0.000	1.218	-
Hardware Development - ADV LWT	WR	NUWC : Keyport	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-
Hardware Development - ADV LWT	WR	NSWC : Indian Head, MD	0.270	0.000		0.000		0.000		-		0.000	0.000	0.270	-
Hardware Development - ADV LWT	WR	NAVSEA : Washington, DC	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	-
Hardware Development - ADV LWT	WR	NAVAIR : Pax River, MD	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	-
Software Development - APB 6	WR	NUWC : Newport	0.000	1.269	Dec 2018	0.403	Nov 2019	1.676	Nov 2020	-		1.676	0.000	3.348	-
Software Development - APB 6	C/CPFF	Sonolyst : Waterford, CT	0.000	0.410	Dec 2018	0.000		0.750	Nov 2020	-		0.750	0.000	1.160	-
Software Development - FCT program	C/BA	NUWC : Newport/ Keyport	1.150	0.000		0.000		0.000		-		0.000	0.000	1.150	-
Subtotal			253.024	4.135		2.726		4.087		-		4.087	Continuing	Continuing	N/A

Remarks
Increased product development funding required in FY21 based on requirements for APB 6.

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

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hardware Development	WR	NUWC : Newport/ Keyport	5.532	0.000		0.000		0.000		-		0.000	0.000	5.532	-
Program Management Support	WR	NUWC : Newport/ Keyport	9.273	0.375	Nov 2018	1.193	Nov 2019	0.310	Nov 2020	-		0.310	0.000	11.151	-
Program Management Support	C/BA	ARL/PSU : State College, PA	0.441	0.000		0.000		0.000		-		0.000	0.000	0.441	-
Program Management Support	Various	NAVSEA : Not Specified	0.168	0.000		0.000		0.000		-		0.000	0.000	0.168	-
Systems Engineering	WR	NUWC : Newport/ Keyport	0.120	0.000	Nov 2018	0.000		0.000		-		0.000	0.000	0.120	-
System Test and Evaluation	WR	NUWC : Newport/ Keyport	30.293	0.588	Nov 2018	0.428	Nov 2019	0.366	Nov 2020	-		0.366	0.000	31.675	-
System Test and Evaluation	WR	NSWC : Carderock, MD	0.000	0.008	Nov 2018	0.000		0.000		-		0.000	0.000	0.008	-
System Test and Evaluation	WR	NSWC : Dahlgren, VA	0.000	0.069	Nov 2018	0.000		0.000		-		0.000	0.000	0.069	-
System Test and Evaluation	WR	NAVFAC LANT : Washington, DC	0.000	0.056	Nov 2018	0.000		0.000		-		0.000	0.000	0.056	-
Subtotal			45.827	1.096		1.621		0.676		-		0.676	0.000	49.220	N/A

Remarks
Decreased support funding required in FY21 based on reduced number of in-water operational test runs.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering - MK 54 MOD 1	WR	NSWC : Carderock	1.259	0.000		0.000		0.000		-		0.000	0.000	1.259	-
System Test and Evaluation - PRIOR YEAR	WR	NUWC : Newport/ Keyport	32.191	0.000		0.000		0.000		-		0.000	0.000	32.191	-

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

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Test and Evaluation - MK 54 MOD 1	WR	NUWC : Keyport	3.317	6.397	Jan 2019	4.351	Nov 2019	4.147	Nov 2020	-		4.147	0.000	18.212	-
System Test and Evaluation - MK 54 MOD 1	WR	NUWC : Newport	7.141	7.801	Nov 2018	6.978	Nov 2019	5.207	Nov 2020	-		5.207	0.000	27.127	-
System Test and Evaluation - MK 54 MOD 1	WR	NSWC : Indian Head, MD	1.576	0.000	Nov 2018	0.100	Nov 2019	0.000		-		0.000	0.000	1.676	-
System Test and Evaluation - MK 54 MOD 1	C/CPIF	ARL/PSU : State College, PA	0.068	1.673	Nov 2018	0.288	Nov 2019	0.603	Nov 2020	-		0.603	0.000	2.632	-
System Test and Evaluation - MK 54 MOD 1	WR	Aberdeen Test Center : Aberdeen, MD	0.731	0.000		0.000		0.000		-		0.000	0.000	0.731	-
System Test and Evaluation - MK 54 MOD 1	WR	OPTEVFOR : Norfolk, VA	1.629	1.395	Nov 2018	1.235	Nov 2019	1.473	Dec 2020	-		1.473	0.000	5.732	-
System Test and Evaluation - PRIOR YEAR	WR	OPTEVFOR : Norfolk, VA	3.490	0.000		0.000		0.000		-		0.000	0.000	3.490	-
System Test and Evaluation - HAAWC	WR	OPTEVFOR : Norfolk, VA	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
System Test and Evaluation - HAAWC	WR	NSWC : Dalgren, VA	0.091	0.000		0.000		0.000		-		0.000	0.000	0.091	-
System Test and Evaluation - HAAWC	WR	NUWC : Keyport	0.618	0.000		0.000		0.000		-		0.000	0.000	0.618	-
System Test and Evaluation - HAAWC	WR	NUWC : Newport	0.000	0.000		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	0.000	0.081	-
System Test and Evaluation - ADV LWT	WR	NUWC : Newport	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
System Test and Evaluation - ADV LWT	WR	NUWC : Keyport	0.000	0.000		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	0.000	0.000	-

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

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Test and Evaluation - MK54 MOD 1	WR	NAVSEA : Washington, DC	0.039	0.000		0.000		0.000		-		0.000	0.000	0.039	-
Subtotal			52.981	17.266		12.952		11.430		-		11.430	0.000	94.629	N/A

Remarks
Decreased T&E funding required in FY21 based on reduced number of in-water operational test runs.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Travel	WR	NAVSEA : Washington, DC	0.507	0.028	Feb 2019	0.028	Nov 2019	0.028	Nov 2020	-		0.028	Continuing	Continuing	Continuing
Program Management Support	C/FPIF	EWCSS : Washington, DC	4.796	0.200	Feb 2019	0.471	Nov 2019	0.462	Nov 2020	-		0.462	0.000	5.929	-
Program Management Support	C/CPFF	ARL/PSU : Philadelphia, PA	0.588	0.000		0.000		0.000		-		0.000	0.000	0.588	-
Program Management Support	Various	NAVSEA : Washington, DC	0.093	0.000		0.000		0.000		-		0.000	0.000	0.093	-
Acquisition Workforce Fund	Various	Not Specified : Not Specified	0.226	0.000		0.000		0.000		-		0.000	0.000	0.226	-
Subtotal			6.210	0.228		0.499		0.490		-		0.490	Continuing	Continuing	N/A

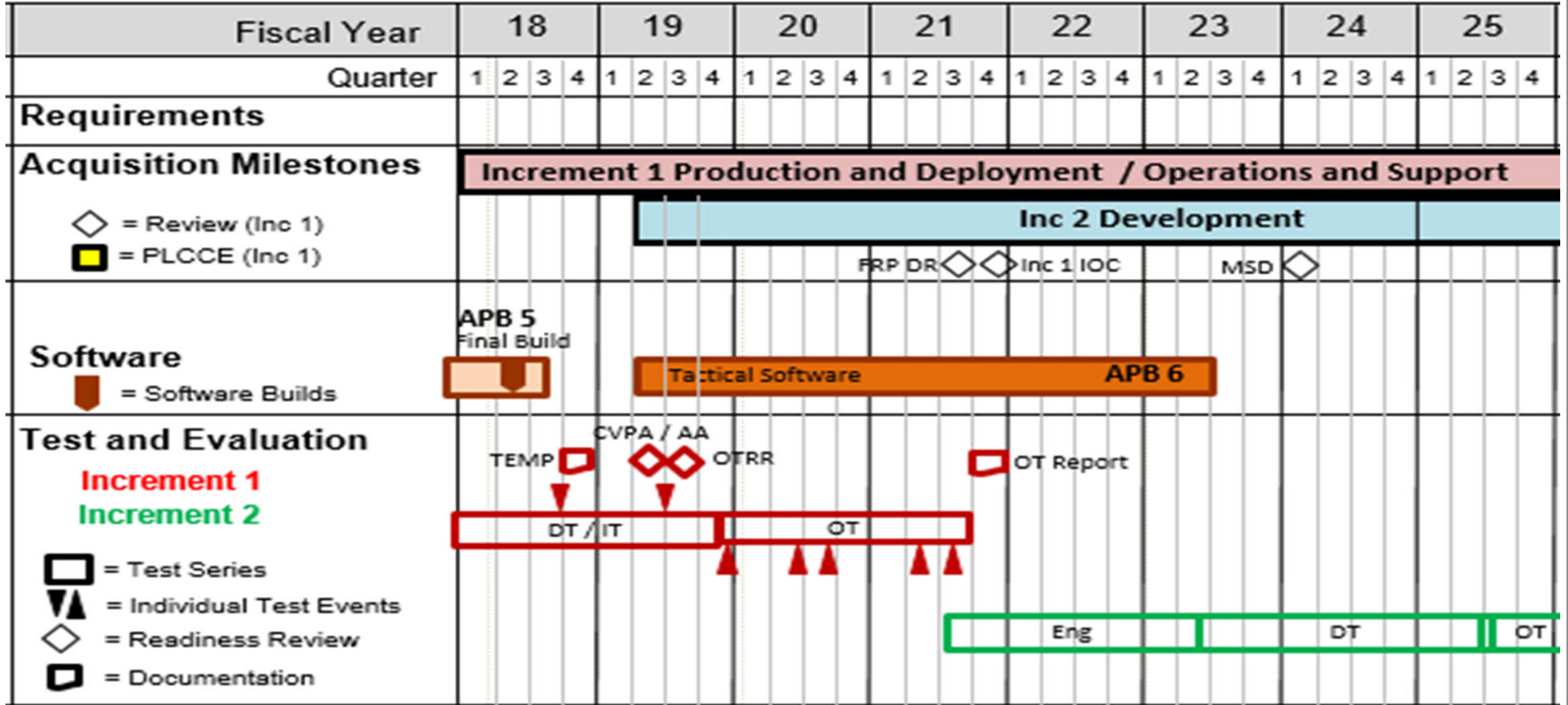
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		358.042	22.725	17.798	16.683	16.683	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>

MK 54 MOD 1 Acquisition Schedule



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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 2234 / <i>Lightweight Hybrid Torpedo</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 2234</i>				
Inc 1 APB 5 /TI-1: APB 5 / TI-1 Inc 1 OT	4	2019	3	2021
Inc 1 APB 5 /TI-1: APB 5 / TI-1 Inc 1 IOC	4	2021	4	2021
Inc 2: APB 6 Tactical Software Development	2	2019	3	2023
Inc 2: APB 6 Development Testing (DT)	2	2023	2	2025
Inc 2: Start APB 6 Operational Test (OT)	3	2025	3	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>				Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>			
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
3418: <i>Advanced Anti-Submarine Lightweight Torpedo</i>	0.000	35.872	84.797	128.321	-	128.321	83.821	50.862	44.005	44.889	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Developing an Advanced Lightweight Torpedo (ALWT)(MK54 MOD 2) capable of prosecuting challenging adversary submarine targets. The effort has completed an Analysis of Alternatives (AoA) and also, completed and approved a Capability Development Document (CDD). The program will leverage UARCs and Government Agencies for requirements definition and early development, and the use of Other Transactional Authority (OTA)s for system and subsystem detailed strategies.

The program will conduct additional testing and platform integration (surface and air) to further support initial system design work. Funds will be distributed on OTAs 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 build and test for major subsystems is the biggest cost driver for early development with system integration hardware builds and testing being the driver for the balance of the development phase. In addition, aircraft (P-8A and MH-60R) and surface ship integration are activities/tasks requiring significant funding.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: ALWT Development	35.872	84.797	128.321	0.000	128.321
Articles:	-	-	-	-	-
FY 2020 Plans:					
-Award OTAs for subsystem and system level design					
-Continue MOD 2 APB Software Development (requirements and architecture analysis)					
-Continue Fleet Exercise Section (FES) Development					
-Continue Test Set (Warhead/Engine/All up Round/G&C) 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 Prototype Build and Testing					
-Guidance and Control (G&C) Section Prototype Build and Testing					
-Warhead Section Prototype Build and Testing					
-Continue System Test Bed Development					
-Begin MH-60R/P-8A Integration Interface Design (requirements/analysis/software)					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy				Date: February 2020	
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> -Begin Air Launch Accessory (ALA) Requirements and Initial System Design -Initial Software/Hardware (SW/HW) Integration -Conduct Milestone B preparation documentation reviews -Conduct Systems Requirement Review/System Functional Review (SRR/SFR) <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> -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 Ship Integration Interface Design -Continue Hardware Development for Warhead Section, Guidance & Control Section, and Propulsion -Continue EC WAF Modeling and Simulation Accreditation -Propulsion Section Prototype Build and Testing -Guidance and Control (G&C) Section Prototype Build and Testing -Warhead Section Prototype Build and Testing -Continue System Test Bed Development -Continue MH-60R/P-8A Integration Interface Design (requirements/analysis/software) -Continue Air Launch Accessory (ALA) Requirements and Initial System Design -Continue Software/Hardware (SW/HW) Integration -Conduct Milestone B <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase of \$43.524M for Other Transactional Authority (OTA) agreements for the development of an improved propulsion system, new warhead development, new Guidance & Control(G&C) Section, All up Round (AUR) integration, P-8A and Helo platform integration, New Fleet Exercise Section development, and New Test Set development in support of Advanced Lightweight Torpedo (MK54 MOD 2) development. Funding also supports fabrication and delivery of Proof-of-Design (POD) hardware.</p>					
Accomplishments/Planned Programs Subtotals					
	35.872	84.797	128.321	0.000	128.321

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• WPN/3215: <i>MK-54 Torpedo Mods</i>	83.825	103.860	110.286	-	110.286	109.360	137.337	168.575	171.464	0.000	2,070.574

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 that will be production ready in FY23. 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy												Date: February 2020			
Appropriation/Budget Activity 1319 / 5				R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>				Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NUWC NPT : Newport, RI	0.000	0.000	Dec 2018	3.126	Nov 2019	5.590	Nov 2020	-		5.590	0.000	8.716	-
Hardware Development	WR	NUWC NPT : Newport, RI	0.000	4.445	Dec 2018	1.296	Nov 2019	1.191	Nov 2020	-		1.191	Continuing	Continuing	Continuing
Hardware Development	WR	NUWC KPT : Keyport, WA	0.000	2.443	Dec 2018	5.673	Nov 2019	1.500	Nov 2020	-		1.500	0.000	9.616	-
Hardware Development	WR	NSWC, IH : Indian Head, MD	0.000	0.900	Dec 2018	1.751	Nov 2019	1.200	Nov 2020	-		1.200	0.000	3.851	-
Hardware Development - AUR	C/CPFF	ARL/PSU : State College, PA	0.000	7.750	Jan 2019	11.340	Nov 2019	7.734	Nov 2020	-		7.734	0.000	26.824	-
Hardware Development	WR	PEO-IWS : Washington, DC	0.000	2.360	May 2019	0.253	Nov 2019	0.000		-		0.000	0.000	2.613	-
Hardware Development - Platform Integration	WR	NAVAIR : Pax River, MD	0.000	0.250	Dec 2018	2.370	Nov 2019	32.650	Nov 2020	-		32.650	0.000	35.270	-
Hardware Development - G&C	C/CPIF	OTA - Progeny : Manassas, VA	0.000	1.800	Jul 2019	5.107	Feb 2020	5.000	Jan 2021	-		5.000	0.000	11.907	-
Hardware Development - New engine	C/CPIF	OTA - Aerojet Rocketdyne : Huntsville, AL	0.000	4.900	Sep 2019	21.751	Jan 2020	25.000	Jan 2021	-		25.000	0.000	51.651	-
Hardware Development - Warhead	C/CPIF	OTA - Northrop Grumman Innovation Systems : Plymouth, MN	0.000	6.967	Sep 2019	12.801	Jan 2020	16.894	Jan 2021	-		16.894	0.000	36.662	-
Hardware Development - AUR	C/CPIF	OTA - Raytheon : Portsmouth, RI	0.000	3.500	Sep 2019	3.423	Jan 2020	13.500	Jan 2021	-		13.500	0.000	20.423	-
Hardware Development - FES Development	C/CPIF	OTA - Raytheon : Portsmouth, RI	0.000	0.000	Sep 2019	5.000	Jan 2020	4.000	Nov 2020	-		4.000	0.000	9.000	-
Hardware Development - AUR Test Set Development	C/CPIF	OTA - Raytheon : Portsmouth, RI	0.000	0.000	Sep 2019	5.104	Jan 2020	4.000	Nov 2020	-		4.000	0.000	9.104	-
Hardware Development	WR	NSWC Philadelphia : Philadelphia, PA	0.000	0.050	Nov 2019	0.166	Jan 2020	0.000		-		0.000	0.000	0.216	-

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

Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Hardware Development	WR	NSWC PHS&T : Picatinney Arsenal, NJ	0.000	0.000		0.206	Jan 2020	0.000		-		0.000	0.000	0.206	-
Hardware Development	WR	NSWC Carderock : Bethesda, MD	0.000	0.000		0.264	Jan 2020	0.000		-		0.000	0.000	0.264	-
Subtotal			0.000	35.365		79.631		118.259		-		118.259	Continuing	Continuing	N/A

Remarks
 - Increase from FY20 to FY21 required for Other Transactional Agreements (OTA) for development of Stored Chemical Energy Propulsion System (SCEPS), new warhead development, new Guidance & Control (G&C) Section, and All up Round integration in support of Advanced Lightweight Torpedo development. Funding also supports fabrication and delivery of Proof-of-Design (POD) hardware.
 - NAVAIR increase from FY20 to FY21 required for MK54 MOD 2 P-8A and Helo platform integration.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering	WR	NUWC NPT : Newport, RI	0.000	0.100	Nov 2018	1.080	Nov 2019	2.000	Nov 2020	-		2.000	0.000	3.180	-
Systems Engineering	WR	NUWC KPT : Keyport, WA	0.000	0.000	Nov 2018	0.000	Nov 2019	3.000	Nov 2020	-		3.000	0.000	3.000	-
Subtotal			0.000	0.100		1.080		5.000		-		5.000	0.000	6.180	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
System Test and Evaluation	WR	NUWC NPT : Newport, RI	0.000	0.100	Mar 2019	3.317	Nov 2019	2.000	Nov 2020	-		2.000	0.000	5.417	-
System Test and Evaluation	WR	NSWC IH : Indian Head, MD	0.000	0.000	Mar 2019	0.000	Nov 2019	0.500	Nov 2020	-		0.500	0.000	0.500	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy

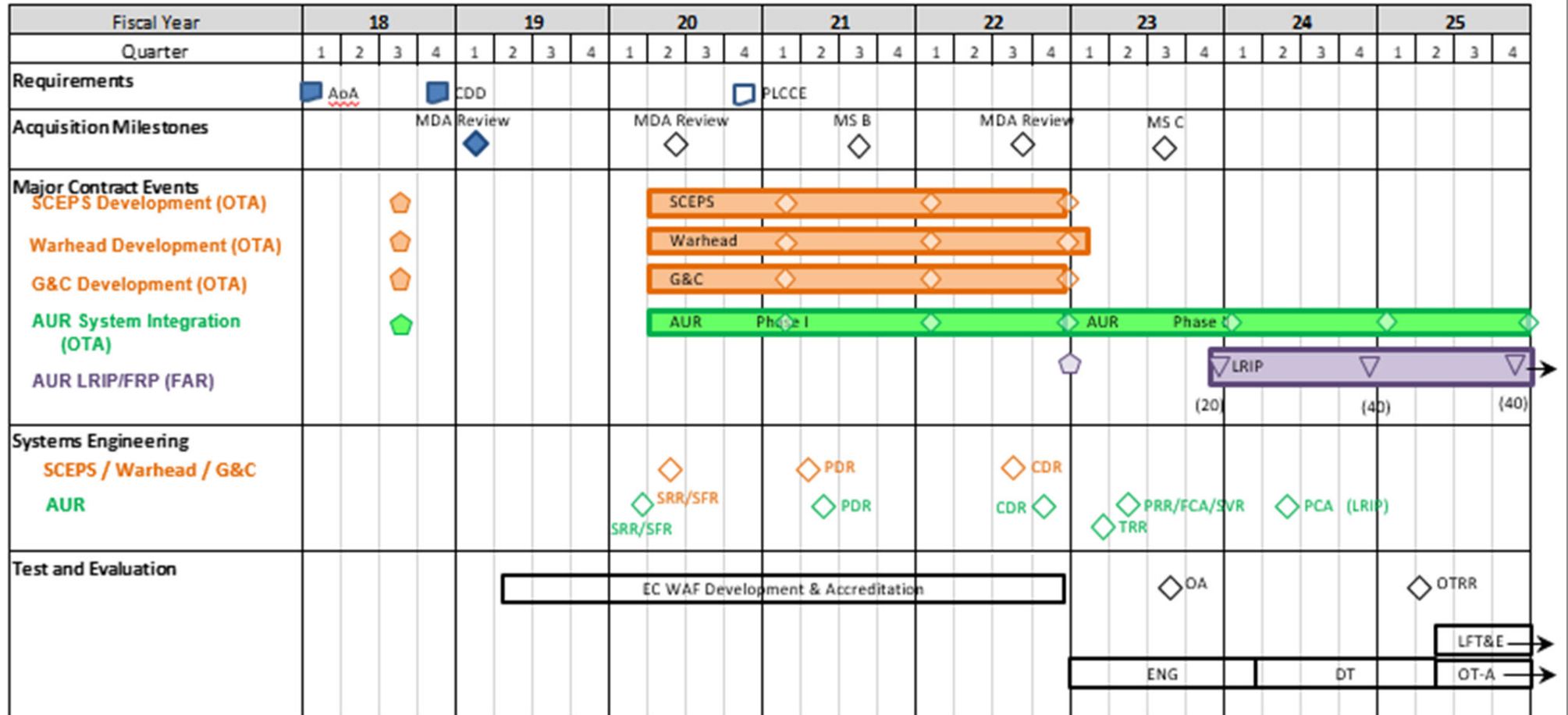
Date: February 2020

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 Acquisition Schedule



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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604610N / <i>Lightweight Torpedo Development</i>	Project (Number/Name) 3418 / <i>Advanced Anti-Submarine Lightweight Torpedo</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3418				
Advanced Lightweight Torpedo (ALWT): ALWT MS-B	3	2021	3	2021
Advanced Lightweight Torpedo (ALWT): ALWT MS C	3	2023	3	2023
Advanced Lightweight Torpedo (ALWT): ALWT SCEPS Development	1	2020	1	2023
Advanced Lightweight Torpedo (ALWT): ALWT Warhead Development	1	2020	2	2023
Advanced Lightweight Torpedo (ALWT): ALWT G&C Hardware / Software Development	1	2020	1	2023
Advanced Lightweight Torpedo (ALWT): ALWT AUR Development Integration	1	2020	4	2025
Advanced Lightweight Torpedo (ALWT): ALWT Engineering Testing	1	2023	2	2024
Advanced Lightweight Torpedo (ALWT): Developmental Testing (DT)	2	2024	2	2025
Advanced Lightweight Torpedo (ALWT): OTRR	2	2025	2	2025