Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy											Date: April 2022	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0101221N *I Strategic Sub & Wpns Sys Supt*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	1,491.972	121.171	186.998	284.502	-	284.502	327.597	323.801	538.813	657.580	Continuing	Continuing
0951: *Joint Warhead Fuze Sustainment Program*	694.477	16.332	6.733	3.087	-	3.087	0.000	0.000	0.000	0.000	0.000	720.629
2021: *Mk4B Shape Stable Nose Tip*	54.070	9.376	9.653	7.598	-	7.598	0.001	0.001	0.001	0.001	Continuing	Continuing
2228: *Technical Applications Programs*	663.063	51.659	73.507	173.344	-	173.344	191.031	113.226	115.176	116.960	Continuing	Continuing
3097: *W-93 / Mk 7*	49.032	30.263	61.695	97.089	-	97.089	133.424	207.384	420.386	537.312	Continuing	Continuing
3158: *Integrated Nuclear Weapons Security Sys Dev*	13.954	1.957	3.410	3.384	-	3.384	3.141	3.190	3.250	3.307	Continuing	Continuing
9999: *Congressional Adds*	17.376	11.584	32.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	60.960

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 178

A. Mission Description and Budget Item Justification

The Strategic Submarine & Weapon Systems Support program element directly supports the Navy's deterrence mission, specifically the Submarine Launched Ballistic Missile (SLBM). The SLBM, accounting for approximately 70 percent of the deployable nuclear inventory, is the most survivable leg of the triad and foundational to the nation's deterrence strategy. Nuclear deterrence underwrites every U.S. military operation and capability on the globe and serves as the backstop for both our national defense and the defense of our allies. The nation's nuclear triad serves as the bedrock of our ability to deter aggression, assure our allies and partners, achieve U.S. objectives should deterrence fail, and hedge against an uncertain future. This program element focuses on the modernization of the nuclear deterrent, and its role as trusted steward of the safety and security of these weapons.

Major projects included in the Strategic Submarine & Weapon Systems Support program include: 1) Joint Warhead Fuze Sustainment Program; 2) Mk4B Shape Stable Nose Tip; 3) Technical Applications Programs; 4) W93/Mk7 Reentry Program; and 5) Integrated Nuclear Weapons Security System Development.

The Joint Warhead Fuze Sustainment Program (0951) is an effort to develop advanced components to improve the reliability, safety, and security of Arming, Fuzing, and Firing (AF&F) systems for nuclear reentry systems. The current effort is focused on supporting the alteration of the AF&F system for the MK5/W88 system which will be five years beyond its design life at the scheduled deployment of the AF&F alteration. This effort also supports future utilization of the developed components by the US Air Force and United Kingdom.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101221N *I Strategic Sub & Wpns Sys Supt*

The Mk4B (formerly referred to as Mk4A) Shape Stable Nose Tip (SSNT) (2021) effort will convert reentry body (RB) forward shell assemblies (FSA's) from legacy carbon composite nose tips to SSNT's. This will require ground and flight testing of SSNT Reentry Body Assemblies, updates and modifications to RB documentation (Weapon Specifications, Interface Control Drawings, product drawings, etc.), updated Fire Control software for fleet implementation, conversion of war reserve RB's to FSA's with SSNT, procurement/conversion of surveillance and flight test units, Strategic Weapons Facility (SWF) logistics implementation planning and execution, review and update Mk4B surveillance planning and the DoD share of National Nuclear Security Administration (NNSA) Office of Secure Transportation (OST) for shipping.

The Technology Applications Program (2228) consists of three elements: D5 Life Extension 2 (D5LE2), Multi-Star Enhanced Pre-Launch (MEP), and Systems Engineering Modeling and Simulation.

The TRIDENT II modernization, D5 Life Extension 2 (D5LE2), modernizes and replaces the current TRIDENT II D5 Life Extension (D5LE) Strategic Weapons System (SWS). D5LE supports all OHIO Class submarines. At least 12 COLUMBIA Class SSBNs will replace today's 14 OHIO SSBNs beginning in FY2030, D5LE will also support initial missile load-outs on COLUMBIA through the 8th SSBN. Safety critical D5LE missile electronics begin to exceed their qualification period by FY2039. Several D5LE components are obsolete, out of production, and no longer supported by industry. D5LE2 is required to replace D5LE to support COLUMBIA Class missile inventory requirements starting in FY2039. While the D5LE program extended the lifetime of some missile components, D5LE2 will leverage technologies for both the missile and shipboard systems ensuring adaptability and survivability of the weapons system out to the 2080s. The D5LE2 program is a hybrid of pull-through cost-effective technology (e.g. solid rocket motors, ignitors) and redesign candidates (e.g., avionics, guidance, system architecture).

The Multi Star Enhanced Prelaunch (MEP) project delivers enhanced Strategic Weapon System (SWS) resiliency by 1) leveraging the capability of the D5 Life Extension Guidance (Mk6 Mod1) to sight two stars vice one allowing for improved in-flight error correction and 2) updating interfaces to the Fire Control and Navigation subsystems enabling enhanced use of Navigation Sonar System (NSS) data for weapon system error control during Prelaunch. This capability reduces SWS reliance on Global Positioning System (GPS) and Bathymetry data which enables operation in environments where GPS is denied and improves SSBN security during patrol. This capability also has potential for future relief to the strict tolerance requirements of the strategic navigator on the current OHIO Class Submarines and the COLUMBIA class program.

The Systems Engineering Modeling and Simulation capability will consist of three elements: Model Based Design, SWS Integrated Modeling and Simulation/Common Architecture & Framework, and SWS Enhancement Ground Test. This effort will provide the capability to comprehensively evaluate and test the integrated SWS within representative operational environments, providing unprecedented visibility across the SWS and system performance characterization equivalent to flight testing. This capability will enable trade space analysis to identify technical margin, subsystem interactions, and lifecycle affordability opportunities to include other services and be able to identify the benefits and risks of commonality to the individual programs, requirements and CONOPs modifications that could facilitate commonality, potential common acquisition strategies between the services, and total life cycle cost implications.

The W93/Mk7 warhead project (3097), formerly known as the Interoperable Warhead (IW), will design, develop, and test a future Navy warhead to include a new Navy Aeroshell for a SLBM. Early FYDP efforts will primarily consist of developing programmatic planning and structure to support the continuing study and future program along with further exploration and refinement of the concept studies that resulted from the FY 2019 Navy Feasibility Study.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101221N *I Strategic Sub & Wpns Sys Supt*

The Integrated Nuclear Weapons Security System (INWSS) (3158) efforts support the Nuclear Weapons Security program and SSBN Escort mission. The policies and requirements regarding the safeguard of nuclear weapons within the Department of Defense is established by DoD S5210.41M. Within the Department of the Navy, nuclear weapons are limited to TRIDENT Fleet Ballistic Missiles (FBM), either deployed aboard TRIDENT submarines or located landside at Naval Submarine Base, Kings Bay, or Naval Submarine Base, Bangor where missiles are assembled/disassembled, tested as well as repaired. This project supports efforts directed at improving the current technological baseline through a series of studies. These efforts aim to improve countermeasure technologies to address detection, delay and denial.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	124.990	177.098	0.000	-	0.000
Current President's Budget	121.171	186.998	284.502	-	284.502
Total Adjustments	-3.819	9.900	284.502	-	284.502
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-22.100			
• Congressional Rescissions	-	-			
• Congressional Adds	-	32.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.819	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	284.502	-	284.502

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 9999: *Congressional Adds*		
Congressional Add: *Next Generation Strategic Inertial Measurement Unit*	5.792	6.000
Congressional Add: *Scalable Very High Temperature Composite Manufacturing Technologies*	5.792	6.000
Congressional Add: *Autonomous fiber optic sensing network*	0.000	5.000
Congressional Add: *Strategic weapons systems shipboard navigation system modernization*	0.000	15.000
Congressional Add Subtotals for Project: 9999	11.584	32.000
Congressional Add Totals for all Projects	11.584	32.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101221N *I Strategic Sub & Wpns Sys Supt*

Change Summary Explanation

The FY 2021 funding was reduced by $3.819M for small business innovative research.

The increase in funding from FY 2022 to FY 2023 is due to the required growth for the D5LE2 (2228) and W93/Mk7 (3097) projects. D5LE2 Program's increase in funding will support three major efforts: System Studies and Architecture Development, SLBM technologies, and Strategic Guidance technologies. These efforts are crucial to a successful Systems Requirement Review (SRR) completion. W93/Mk7 Program's increase is attributed to the increased activities in Phase 2 (Feasibility Study and Design Options). In addition, there will be the critical investments necessary for the aeroshell development and industrial base recapitalization efforts.

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

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 0951 / *Joint Warhead Fuze Sustainment Program*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0951: *Joint Warhead Fuze Sustainment Program*	694.477	16.332	6.733	3.087	-	3.087	0.000	0.000	0.000	0.000	0.000	720.629
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 178

A. Mission Description and Budget Item Justification

The Joint Warhead Fuze Sustainment Program is an effort to develop advanced components to improve the reliability, safety, and security of AF&F systems for nuclear reentry systems. The current effort is focused on supporting the alteration of the AF&F system for the MK5/W88 system which will be five years beyond its design life at the scheduled deployment of the AF&F alteration. This effort also supports future utilization of the developed components by the U.S. Air Force and United Kingdom. FY2023 will be the last year of development for the Joint Warhead Fuze Sustainment Program.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: TRIDENT II	16.332	6.733	3.087	0.000	3.087
Articles:	-	-	-	-	-
Description: Identify, prioritize, develop, proof, and demonstrate advanced technologies that will be leveraged and incorporated into future AF&Fs.					
FY 2022 Plans: - Complete Weapon Realization Report appendix for the Mk5 Alt 370 - Complete Design Review and Acceptance Group (DRAAG) Review and recommendation for weapon acceptance to the Nuclear Weapons Council - Continue system vulnerability analysis - Support Flight Test integration and data analysis for a Commander Evaluation Test (CET) Development Joint Test Assembly Upper-S Band qualification body					
FY 2023 Base Plans: - Complete evaluation of CET-4 telemetry data in association with qualification of Upper S-Band Telemetry for all future flight tests.					
FY 2023 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 0951 / *Joint Warhead Fuze Sustainment Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The decrease from FY 2022 to FY 2023 is attributable to program transition to production and completion of the final qualification analysis for the Upper S-Band telemetry to support all future flight tests.					
Accomplishments/Planned Programs Subtotals	16.332	6.733	3.087	0.000	3.087

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTEN/3219: *SBSD Nuclear Technology Development*	80.085	60.142	56.707	-	56.707	54.230	44.121	38.899	35.511	Continuing	Continuing
• RDTEN/3220: *Advanced Submarine System Development*	308.433	296.231	268.996	-	268.996	183.095	118.912	155.749	89.808	Continuing	Continuing
• OPN/5358: *SWS Modernization Funds*	251.683	266.474	277.096	-	277.096	270.581	275.813	275.338	280.315	Continuing	Continuing
• WPN/1250: *TRIDENT II Mods*	1,155.600	1,144.446	1,125.164	-	1,125.164	1,230.301	1,613.423	2,429.699	2,884.836	Continuing	Continuing
• SCN/1045: *OHIO Replacement Submarine*	4,122.199	4,646.980	5,857.776	-	5,857.776	5,815.252	7,222.907	8,477.173	8,954.970	Continuing	Continuing
• OMN/1D2D: *Fleet Ballistic Missile*	1,408.355	1,476.247	1,664.076	-	1,664.076	1,745.037	1,840.905	1,867.972	1,911.348	0.000	11,913.940

Remarks

D. Acquisition Strategy

Contracts will continue to be awarded to those sources who were engaged in the Mk4LE Reentry Body development program and are currently engaged in the production and/or operational support of the deployed Mk4LE Reentry Body on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3, 4

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 0951 / *Joint Warhead Fuze Sustainment Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Warhead Fuze Sustainment DOE	MIPR	DOE : NM	564.250	8.161	Nov 2020	3.753	Nov 2021	3.087	Nov 2022	-		3.087	0.000	579.251	-
Joint Warhead Fuze Sustainment ITT	SS/CPFF	ITT : VA	27.023	0.000		0.000		0.000		-		0.000	0.000	27.023	-
Joint Warhead Fuze Sustainment LMMS	SS/CPFF	LMMS : CA	72.623	5.604	Nov 2020	2.100	Nov 2021	0.000		-		0.000	0.000	80.327	-
Joint Warhead Fuze Sustainment	WR	NSWC Dahlgren : VA	20.516	0.123	Mar 2021	0.000		0.000		-		0.000	0.000	20.639	-
Joint Warhead Fuze Sustainment	SS/CPFF	BAE : MD	1.889	0.000		0.000		0.000		-		0.000	0.000	1.889	-
Joint Warhead Fuze Sustainment	SS/CPIF	APL : MD	1.002	0.050	Dec 2020	0.000		0.000		-		0.000	0.000	1.052	-
Joint Warhead Fuze Sustainment	WR	CNSW : IN	1.079	1.000	Oct 2020	0.880	Dec 2021	0.000		-		0.000	0.000	2.959	-
Joint Warhead Fuze Sustainment	C/BA	PERATON : VA	4.207	0.851	Nov 2020	0.000		0.000		-		0.000	0.000	5.058	-
Joint Warhead Fuze Sustainment	C/BA	TOYON : VA	1.888	0.543	Oct 2020	0.000		0.000		-		0.000	0.000	2.431	-
		Subtotal	694.477	16.332		6.733		3.087		-		3.087	0.000	720.629	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	694.477	16.332		6.733		3.087		-		3.087	0.000	720.629	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 0951 / *Joint Warhead Fuze Sustainment Program*

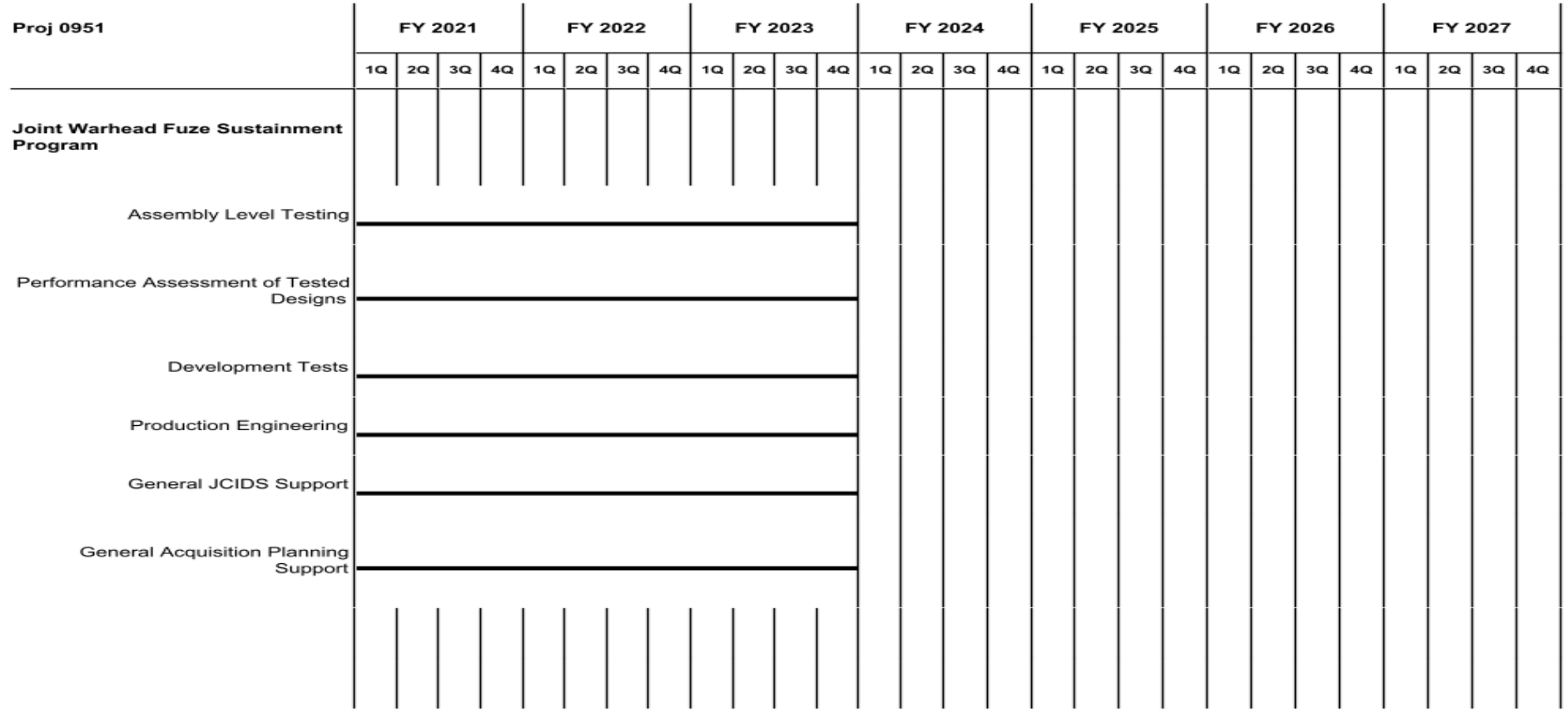

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 0951 / *Joint Warhead Fuze Sustainment Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0951				
Joint Warhead Fuze Sustainment Program: Assembly Level Testing:	1	2021	4	2023
Joint Warhead Fuze Sustainment Program: Performance Assessment of Tested Designs:	1	2021	4	2023
Joint Warhead Fuze Sustainment Program: Development Tests:	1	2021	4	2023
Joint Warhead Fuze Sustainment Program: Production Engineering:	1	2021	4	2023
Joint Warhead Fuze Sustainment Program: General JCIDS Support:	1	2021	4	2023
Joint Warhead Fuze Sustainment Program: General Acquisition Planning Support:	1	2021	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 2021 / *Mk4B Shape Stable Nose Tip*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
2021: *Mk4B Shape Stable Nose Tip*	54.070	9.376	9.653	7.598	-	7.598	0.001	0.001	0.001	0.001	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Mk4B (formerly referred to as Mk4A) Shape Stable Nose Tip (SSNT) effort will convert reentry body (RB) forward shell assemblies (FSAs) from legacy carbon composite nose tips to SSNTs. This will require ground and flight testing of SSNT RBs, updates and modifications to RB documentation (Weapon Specifications, Interface Control Drawings, product drawings, etc), updated Fire Control software for fleet implementation, conversion of war reserve RBs to FSAs with SSNT, procurement/conversion of surveillance and flight test units, Strategic Weapons Facility (SWF) logistics implementation planning and execution, and review and updates to both the Mk4B surveillance planning and the DoD share of National Nuclear Security Administration (NNSA) Office of Secure Transportation (OST) for shipping. FY2023 will be the last year of development for the Mk4B program.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Mk4B Shape Stable Nose Tip	9.376	9.653	7.598	0.000	7.598
Articles:	-	-	-	-	-
FY 2022 Plans: - Conduct Mk4A SSNT Enhanced Inert Head (EIH) and Mk4A SSNT ENTB flight test - Conduct Mk4B flight system Critical Design Review (CDR) - Complete reentry body cable testing - Conduct Aft-on Light Initiated High Explosive Test in support of system qualification - Begin system Dynamic Characterization test in support of system qualification - Conduct Strategic Weapon System (SWS) Mk4B Critical Design Review (CDR) - Finalize design documentation in support of Mk4B SSNT assembly PRR					
FY 2023 Base Plans: - Complete system and component level development testing at DoE and DoD facilities - Assess and update Mk4B aerodynamic model with new flight test data, complete analysis of component and system design in support of requirements verification					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2021 / *Mk4B Shape Stable Nose Tip*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
The FY 2022 to FY 2023 decrease is attributable to development activities ramping down as FY23 is the final year of development before this effort fully transitions to production as shown in Navy WPN budget line item 1250.					
Accomplishments/Planned Programs Subtotals	9.376	9.653	7.598	0.000	7.598

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• WPN/1250: *Trident II Mods*	1,155.600	1,144.446	1,125.164	-	1,125.164	1,230.301	1,613.423	2,429.699	2,884.836	2,176.384	24,536.438

Remarks

D. Acquisition Strategy

Contracts will continue to be awarded to those sources who were engaged in the Mk4LE Reentry Body development program and are currently engaged in the production and/or operational support of the deployed Mk4LE Reentry Body on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3, 4

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2021 / *Mk4B Shape Stable Nose Tip*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SSNT LMSS	SS/CPIF	LMSSC : CA	37.136	3.574	Nov 2020	4.076	Nov 2021	4.043	Oct 2022	-		4.043	Continuing	Continuing	Continuing
SSNT DOE/NNSA	MIPR	DOE/NNSA : NM	10.169	5.116	Oct 2020	4.355	Nov 2021	3.555	Nov 2022	-		3.555	0.000	23.195	-
SSNT JHU-APL	SS/CPFF	APL : MD	2.615	0.000		1.222	Nov 2021	0.000		-		0.000	0.000	3.837	-
SSNT PERATON	SS/CPFF	PERATON : VA	1.022	0.536	Oct 2020	0.000		0.000		-		0.000	0.000	1.558	-
SSNT NSWC	WR	NSWC : VA	1.436	0.150	Oct 2020	0.000		0.000		-		0.000	0.000	1.586	-
SSNT Toyon	SS/CPFF	TOYON : CA	1.042	0.000		0.000		0.000		-		0.000	0.000	1.042	-
SSNT SPA	SS/CPFF	SPA : VA	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-
SSNT Draper	SS/CPFF	Draper : MA	0.150	0.000		0.000		0.000		-		0.000	0.000	0.150	-
		Subtotal	54.070	9.376		9.653		7.598		-		7.598	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	54.070	9.376		9.653		7.598		-		7.598	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2021 / *Mk4B Shape Stable Nose Tip*

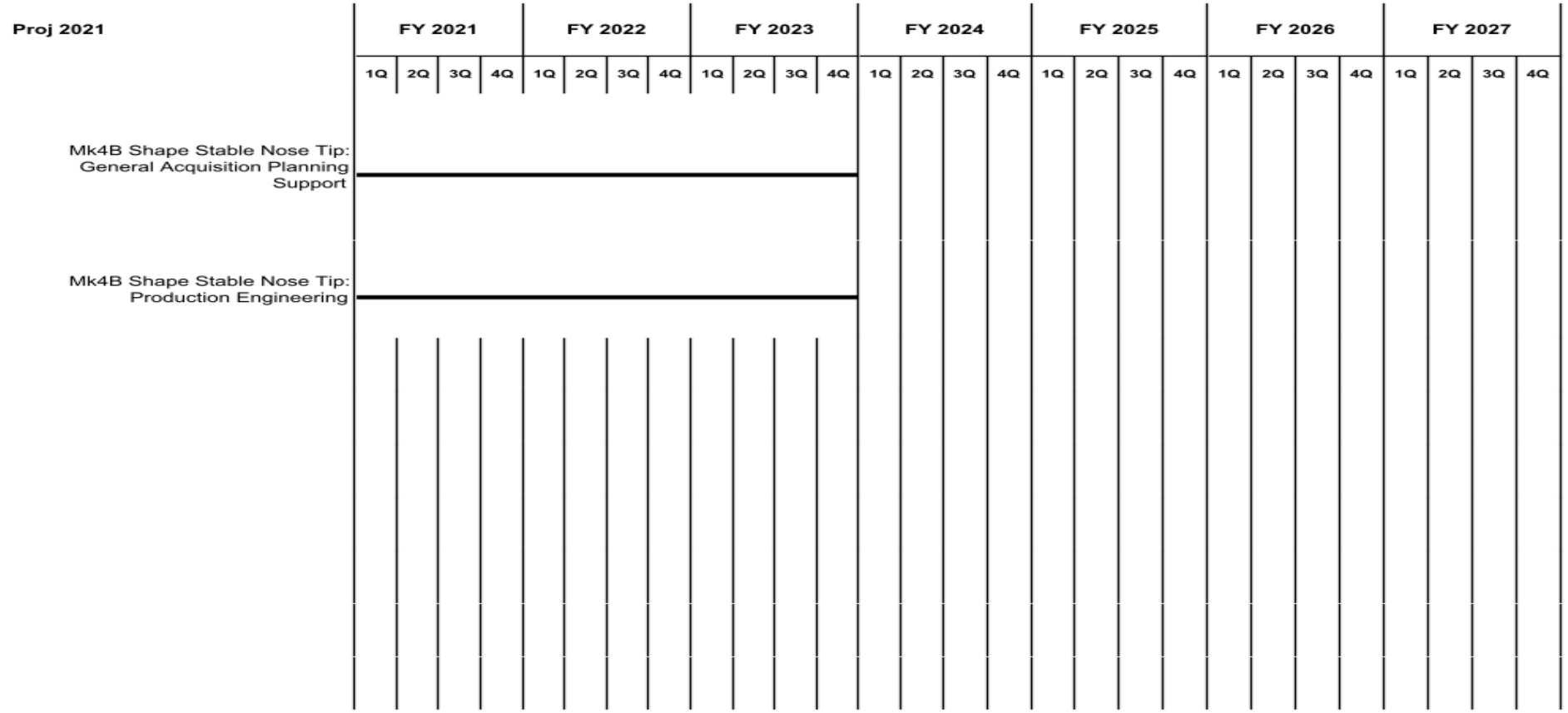

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2021 / *Mk4B Shape Stable Nose Tip*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2021				
Mk4B Shape Stable Nose Tip: General Acquisition Planning Support:	1	2021	4	2023
Mk4B Shape Stable Nose Tip: Production Engineering:	1	2021	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy											Date: April 2022	
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COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
2228: *Technical Applications Programs*	663.063	51.659	73.507	173.344	-	173.344	191.031	113.226	115.176	116.960	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 2228 consists of three elements: D5 Life Extension 2 (D5LE2), Multi-Start Enhanced Pre-Launch (MEP), and Systems Engineering Modeling and Simulation.

Trident II D5 Modernization (D5LE2):
The Submarine Launched Ballistic Missile (SLBM) is the most survivable leg of the triad and foundational to the nation's deterrence strategy. The heart of the SLBM capability is the D5LE Strategic Weapon System (SWS) currently hosted aboard the OHIO platform throughout its remaining service life. D5LE is also planned to be the initial SWS on the COLUMBIA platform but cannot support the platform throughout its predicted service life (through 2084) due to age, attrition, and obsolescence of critical components within the system. Aging components (such as flight electronics and guidance) fall below requirements as early as the late 2030s and non-aging components are reduced by flight tests and spares consumption and fall below requirements shortly thereafter. As the D5LE missile inventory cannot be extended further, the D5LE SWS will require a significant modernization - D5LE2 - which is required to support COLUMBIA missile inventory and loadouts.

The nation's Strategic Systems must be more adaptable and resilient in the face of adversaries who are increasingly showing the ability to quickly deploy capabilities that threaten the effectiveness of the existing strategic deterrent. Adaptability and resiliency will be required for the D5LE2 system in order to meet established STRATCOM requirements for the life of the COLUMBIA Class. The D5LE2 weapon system modernization and these attributes will not only address the COLUMBIA service life requirement by delivering the range and accuracy of the current system, but will also address the threat of near peer adversaries' improved defensive capabilities by maintaining a credible and survivable strategic deterrent.

Meeting these new and evolving challenges will require that the D5LE2 architecture be designed so that it can address evolving threats and defensive capabilities in a timely manner. Being able to adapt at the speed of relevance will require an architecture based on modular interfaces that maximize margin unlocked via critical technologies.

D5LE2's schedule is directly analogous to the previous life extension's (D5LE) executed schedule which began concept studies in the late 1990s, began design in 2004, completed design in 2011, and deployed in 2017. D5LE2 encompasses significantly more scope than D5LE on a similar timeline. Funding is required in the pre-SPALT (Strategic Systems Programs Alterations) development phase of the program to mature enabling technologies for D5LE2 in anticipation of long lead material procurements starting in 2030; therefore, significant technology investments must be continued in 2023 to support execution of the program of record. To ensure that key technologies have reached appropriate maturation and been tested in a relevant environment prior to the Preliminary Design Review (PDR) in FY 2028, funding to improve Technology and Manufacturing Readiness Levels (TRL/MRL) by commodity is phased according to complexity and need.

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D5LE2 is focused on maturation of critical technologies required to modernize the Navy's SWS. The technology investments are architecture agnostic (i.e. they must be developed regardless of the design of the architecture) and represent the fundamental building blocks for the SWS. The ability to rapidly mature these technologies represents the single greatest risk mitigation to the program. D5LE2 strategic modernization efforts will focus on critical technologies such as:

- Post Boost Control System (PBCS) Technologies utilizing high refractory metal
- Next Generation Low - Size Weight and Power (SWaP) Guidance Inertial Instruments and Components
- Strategic Radiation Hardened Electronics
- Modernized Structural Components (e.g. Nose Fairing and Equipment Section)

D5LE2 Technology Development targets replacements for legacy D5 and D5LE technologies now obsolete with manufacturing lines shutdown that are required regardless of architecture chosen (e.g. radiation hardened parts) and/or have long lead maturity and development timelines. Technology advancements and improved system architecture concepts will unlock existing system capability, and add adaptability, manufacturability, SWS operations, and sustainability - while at the same time reconstituting an industrial base that has not performed SLBM development, in some cases, for decades.

In order to support STRATCOM requirements without gapping capability, SSP began critical architecture agnostic technology maturation efforts on key strategic technologies and studies to explore potential modern System Level Architectures. Efforts have focused on filling requirements voids in the areas of threat effectiveness, cyber vulnerabilities, evaluating the SWS contribution to platform survivability, and developing the military utility curves by which concepts will be evaluated. Efforts also focused on limited technology development on certain key technologies. FY 2021 concluded with preliminary architecture concepts that enabled key architecture decisions in FY 2022, which will be followed by performance allocations to requirements in FY 2023. The program also funded efforts for advanced technology development and maturation of critical SWS D5LE2 components in the areas of high refractory metal PBCS Valve Assemblies, alternative batteries, nuclear safe out-of-line blocking elements, large Missile Structures, and RADHARD parts & shielding. Additionally, efforts funded included Strategic Guidance activities to include the development of technologies and components for strategic sensors to support the next generation of inertial sensors, instruments, rotary components and high performance processing electronics to address the need for advanced sensor data processing and low SWaP modular solutions.

The FY 2022 accomplishments included preliminary functional and physical system architecture concept (to include lifecycle concepts and performance evaluation), evaluation and prototyping of materials and critical components for technology maturation, fabrication and evaluation of SLBM and strategic guidance subsystem parts for advanced development and to support prototyping and radiation testing.

-FY 2022 System Studies and Architecture Development efforts focused on refining previous studies, key architecture defining decisions, development of mission effectiveness and threat mitigation boundaries, refinement of digital engineering, CONOPS development activities associated with system operations that potentially lead to opportunities for affordability improvements, and activities to define core SWS architecture elements.

-FY 2022 SLBM technologies concentrated on advanced technology development and maturation of critical SWS D5LE2 components in the areas of high refractory metal PBCS and Valve Assemblies, batteries, large Missile Structures. Efforts focused on continuation of activities critical to establishing the supply chain.

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-FY 2022 Strategic Guidance efforts included the development of technologies and components to support the next generation of inertial sensors, , rotary mechanical components and rad-hard electronics to address the need for high performing low SWaP modular solutions.

The FY 2023 plans continue critical D5LE2 efforts in the area of Systems Studies for Performance Allocations, Requirements and Architecture, and SLBM technologies and Strategic Guidance efforts - all of which are based on historical timelines and execution for developing new technologies in this challenging environment to support the proposed D5LE2 and COLUMBIA schedules. FY 2023 efforts include continuing and completing prior year studies and architecture decisions, SLBM technology investment (to include Common Parts ID, Battery Small Scale Tests, Radiation Hardened Testing start, Data Bus CONOPS, Additive Manufacturing Surveys, PBCS Thruster Valve cold gas tests, Nose Fairing Element level tests) and Strategic Guidance efforts (Algorithm simulation, fabrication and prototyping). These key efforts are phased to support an iterative update to the D5LE2 concept baseline to conduct a System Studies Concept Review (SCR) in FY 2024 and culminating in sufficiently refined system architecture and requirements to support an SRR in FY 2025. The FY 2025 SRR supports developing modernized commodities, requalifying pull-through commodities, iterative model maturation, integration, and ground testing with the first flight test in FY 2033. Completion of first flight test will lead to early production to support the loadout of an entire boat with qualified missiles in FY 2039.

Multi Star Enhanced Pre-Launch:
The Multi Star Enhanced Prelaunch (MEP) project delivers enhanced SWS resiliency by 1) leveraging the capability of the D5 Life Extension Guidance (Mk6 Mod1) to sight two stars vice one allowing for improved in-flight error correction and 2) updating interfaces to the Fire Control and Navigation subsystems enabling enhanced use of Navigation Sonar System (NSS) data for weapon system error control during Prelaunch. This capability reduces SWS reliance on Global Positioning System (GPS) and Bathymetry data which enables operation in environments where GPS is denied and improves SSBN security during patrol. This capability also has potential for future relief to the strict tolerance requirements of the strategic navigator on the current OHIO Class Submarines and the COLUMBIA class program. FY2023 is the final year of development for the MEP project.

Systems Engineering Modeling and Simulation:
The Systems Engineering Modeling and Simulation capability will consist of three elements: Model Based Design, SWS Integrated Modeling and Simulation/Common Architecture & Framework, and SWS Enhancement Ground Test. This effort will provide the capability to comprehensively evaluate and test the integrated SWS within representative operational environments, providing unprecedented visibility across the SWS and system performance characterization equivalent to flight testing. This capability will enable trade space analysis to identify technical margin, subsystem interactions, and lifecycle affordability opportunities to include other services and be able to identify the benefits and risks of commonality to the individual programs, requirements and CONOPs modifications that could facilitate commonality, potential common acquisition strategies between the services, and total life cycle cost implications.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: D5LE2	37.701	58.016	156.974	0.000	156.974
Articles:	-	-	-	-	-
FY 2022 Plans: System Studies:					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
FY 2022 activities built upon the FY 2021 activities. Key architecture decisions made in FY 2021 enabled definition of preliminary system architecture concept in FY 2022. Continued and Expanded: - Lifecycle concepts (Cyber Response Concept Development, Missile Handling and Recertification) - Performance Allocations (Methods to Reduce Contribution to Engagement Timeline, Launch interval, Interface, Ship to Missile Interface to include flexible payload interface) Initiated: - Preliminary functional/physical architecture concept for the following: - Missile to Missile Selection - Shipboard Computing Architecture - Timing Architecture Technology Investments: FY 2022 technology investments efforts continued and included a significant increase of major missile and guidance technologies to evaluate multiple materials, concepts, and design strategies in advance of down selecting and prototyping scale design concepts slated to begin in FY 2023 to support SRR in FY 2025. Continued and Expanded: - Radiation Hardened Parts Concepts design and Evaluation - PBCS Technologies Manufacturing Concepts and Evaluation - Battery Concepts and Evaluations including additive manufacturing local shield and enclosure shield and batteries - Nose Fairing and Equipment Section Materials evaluation - Connectors/Cables Concepts and evaluation - Guidance Concepts and Sensors including accelerometer and Gyroscope high fidelity lab/simulation testing Initiated: - Radiation Hardened Parts Concepts and Evaluation for radiation hard EFI and EFI firing unit					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Guidance Concepts and Sensors including Prototype Radiation testing and Mechanical Manufacturing evaluation					
FY 2023 Base Plans: System Studies: FY 2023 activities build upon the FY 2022 completion of the system requirements specification. Specifically, efforts focus on the System Architecture Concept Refinement and Allocated Systems Requirement Specification, which divides the architecture agnostic systems' requirements to the subsystems and is required prior to both the system and subsystem SRRs. FY23 System Studies include ones of significantly increased complexity from those performed in FY20-22. Continued and Expanded: - Lifecycle concepts - Cyber Response Concept Development - Missile Handling and Recertification - Performance Allocations - Reliability Allocation - Reconfiguration Time Initiated: - Allocated capability requirements - Allocated performance requirements - System Navigation Solution - Inter-subsystem data requirements - Allocated environments specification - Identification of induced survivability environments - Allocated safety and surety architecture and design guidelines - Reconfiguration time performance allocations - Accuracy Allocations to subsystems - Electronics and Guidance interfaces - Flexible payload interfaces Technology Investments:					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
FY 2023 technology investments efforts continued and included a significant increase the scope of both the expanded and initiated major missile and guidance technologies to inform potential down selection and prototyping of scale design concepts. Continued and Expanded: - Radiation Hardened Parts Concepts Evaluation to include candidate vendor allocations and technology down select fabrication - Radiation hardened Survivable Field Programmable Gate Array Evaluation - PBCS Technologies (proportional valve) Concepts and Evaluation, detailed studies - Battery Concepts and Evaluations including additive manufacturing local shield and enclosure shield and batteries - Nose Fairing and Equipment Section Materials evaluation - Connectors/Cables Concepts and evaluation - Guidance Concepts and Sensors including accelerometers, gyroscopes, stellar components, high fidelity lab/ simulation testing, and mechanical packaging studies Initiated: - Radiation Hardened Parts Solid State Switch (RHSSS) for safety/surety - Radiation Hardened Addressable Electric Foil Initiator Firing unit feasibility evaluation - Additive Manufacturing Shielding studies - PBCS proportional valve material candidates and test - PBCS Technologies Thruster valve cold gas testing and analysis following cold gas hardware fabrication - PBCS alternative manufacturing planning and evaluation - Batteries small scale tests following battery cell-level tests - Nose Fairing alternate materials evaluation - Equipment Section materials studies, candidate evaluation, and test - Missile Health monitoring concepts - Missile Common Parts Identification process initiation - Data Bus CONOPS - Additive Manufacturing technology surveys - Connectors/fiber/Cables testing - Avionics testbed development in support of Hardware in the Loop and enhanced ground testing - Guidance accelerometer and gyroscope lab characterization testing and critical component testing					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Low Space Weight and Power solid state inertial sensor prototyping - Advanced imaging prototyping - Inertial Measurement Unit electro-mechanical component prototyping - Inertial Measurement Unit single axis testbed development					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: The D5LE2 Program's FY 2022 to FY 2023 increase in funding supports three major efforts: System Studies and Architecture Development, SLBM technologies, and Strategic Guidance technologies. These efforts are ramped and phased to, just-in-time, deliver a System Requirements Review in FY25 and ensure that architecture agnostic technologies that will support the modernized portions of the TRIDENT II system are of sufficient maturity to support the transfer to redesign and engineering for D5LE2 in the mid-2020s. FY 2023 System Studies and Architecture Development efforts focus heavily on System Architecture Concept Refinement, Allocated Systems Requirement Specification and Performance Allocations (to include conclusion of Performance Allocations, Crew & Facility System Interactions, Flexible Interfaces, Avionics and System Infrastructure Elements Architecture Analysis). FY 2023 SLBM technologies concentrate on advanced technology development and maturation of critical SWS D5LE2 components in the areas of high refractory metal PBCS and Valve Assemblies, Hardened Data-bus and Health monitoring, long stand time batteries, nuclear safe out-of-line blocking elements, large Missile Structures, additive manufacturing processes and RADHARD parts & shielding. FY 2023 Strategic Guidance efforts include the testing and prototyping of technologies and components for strategic sensors to support the next generation of inertial sensors, optical and electro-mechanical components and rad-hard electronics to address the need for high performing low SWaP modular solutions. FY 2023 efforts across these areas are critical to continue and complete development activities that will foster TRL					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
maturation, enable successful completion of the Systems Requirement Review (SRR) in FY 2025, and secure the uninterrupted sustainment of the Trident SWS while meeting requirements for adaptability and survivability.					
Title: Multi-Star Enhanced Prelaunch (MEP) ***Articles:*** ***FY 2022 Plans:*** - Complete trade studies and risk reduction activities for deployed configuration. - Finalize EP configuration, Multi-Star selection algorithms, and CONOPS deployment method for SWS flexibility and MEP capability use cases. - Update missile performance models to support revisions to fire-control targeting software. - Complete draft and final versions of IFI tech baseline. - Develop Systems Engineering Plan (algorithms SEP). - Conduct System Concept Review to define MEP IFI system of interest (SOI) concept and design-ready solution. ***FY 2023 Base Plans:*** N/A ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Funding decrease due to completion of demonstration and conclusion of MEP RDT&E efforts.	5.933 -	4.563 -	0.000 -	0.000 -	0.000 -
Title: System Engineering Modeling and Simulation ***Articles:*** ***FY 2022 Plans:*** - Draft System Engineering (SE) Governance Process and Documentation including (but not limited to) System Modeling Ontology, System Modeling Profiles, and Configuration Management Plan for the Digital Engineering Environment. - Expand the secure computing infrastructure at the Secret level. In FY22 there are 10 locations selected for connectivity including both Strategic Weapon Facilities and a Program Management Office. - Begin the secure computing infrastructure at the Top Secret level. Create Top Secret isolated networks for use in program management, weapon system design, weapon system testing, and program protection. - Continue development of physical model based tools/virtual reality for training and planning.	8.025 -	10.928 -	16.370 -	0.000 -	16.370 -

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Complete development of model based design integration plan. ***FY 2023 Base Plans:*** - Continue development of physical model based tools/virtual reality for training and planning. - Complete the expansion of initially planned sites for the secure computing infrastructure at the Secret level. - Expand the secure computing infrastructure at the Top Secret level. In FY23 there are 3 locations selected for connectivity: NSWC Crane, NSWC Dahlgren, and Waterton. - Continue developing SE Governance Process and Documentation including (but not limited to) System Modeling Ontology, System Modeling Profiles, and Configuration Management Plan for the Digital Engineering Environment. - Draft the Tailored Object Oriented Systems Engineering Modeling Approach. - Update the following documents: Integrate Modeling and Simulation: Simulation Standards & Guidelines for Model Development and Software Coding & Real-Time Hardware-in-the Loop. - Select and purchase Digital Engineering tools and licenses for the initial baseline of the secure computing infrastructure Government Reference Architecture (GRA). ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY 2022 to FY 2023 increase is due to the selection and purchase of Digital Engineering Software tools that will make up the baseline government reference architecture, the purchase and expansion of the secure computing architecture at the Secret and Top Secret level, the completion of SE Governance documents for proper management and oversight of SE principles, and the authoring of SE Governance documents and SE Methodologies to provide proper management and oversight of SE principles. All activities must be complete by the end of FY23 in order to support a successful SRR.					
Accomplishments/Planned Programs Subtotals	51.659	73.507	173.344	0.000	173.344

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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D. Acquisition Strategy

D5LE2 will modernize D5LE under the TRIDENT II D5 existing acquisition program and remain an ACAT IC Major Defense Acquisition Program (MDAP). The Assistant Secretary of the Navy, for Research Development & Acquisition (ASN RDA) will continue as the Milestone Decision Authority (MDA) maintaining effective oversight for the proven, highly successful TRIDENT II D5 program to continue achieving desired cost, schedule, and performance outcomes. This acquisition approach minimizes technical and programmatic risk, ensuring on-time delivery of the performance needed to sustain the nation's sea-based strategic deterrent.

D5LE2 will be procured as a Strategic Systems Programs (SSP) Alteration (SPALT). SPALTs are an SSP process to insert new technologies into, extend the life of, or otherwise alter components of the Strategic Weapons System. SSP has performed many SPALTs over decades, from minor modifications to major component modernization (e.g. the first D5 Life Extension). SPALTs are executed under the TRIDENT II program to allow for seamless execution while maintaining the intent and rigor of acquisition oversight

Contracts will continue to be awarded to those sources who were engaged in program and are currently engaged in the production and/or operational support on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3, 4

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

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Applications LMSS	SS/CPIF	LMSS : CA	175.516	19.167	Nov 2020	23.412	Oct 2021	69.969	Oct 2022	-		69.969	Continuing	Continuing	Continuing
Technical Applications DRAPER	SS/CPFF	Draper : MA	356.050	13.250	Nov 2020	18.548	Nov 2021	52.262	Oct 2022	-		52.262	Continuing	Continuing	Continuing
Technical Applications APL	SS/CPFF	APL : MD	6.286	7.100	Oct 2020	9.999	Nov 2021	15.539	Oct 2022	-		15.539	Continuing	Continuing	Continuing
Technical Applications VAR	Various	Various : Various	25.381	4.196	Nov 2020	2.870	Nov 2021	1.142	Oct 2022	-		1.142	Continuing	Continuing	Continuing
Technical Applications CRANE	SS/CPFF	NSWC Crane : IN	0.000	2.908	Nov 2020	9.261	Oct 2021	17.654	Oct 2022	-		17.654	Continuing	Continuing	Continuing
Technical Applications Dahlgren	WR	Dahlgren : VA	98.077	1.265	Nov 2020	2.188	Nov 2021	2.195	Oct 2022	-		2.195	Continuing	Continuing	Continuing
Technical Applications GDMS	SS/CPFF	GDMS : MA	1.753	1.557	Oct 2020	2.758	Feb 2022	4.366	Dec 2022	-		4.366	Continuing	Continuing	Continuing
Technical Applications NGMS	SS/CPFF	NGMS : CA	0.000	0.000		0.000		0.802	Oct 2022	-		0.802	Continuing	Continuing	Continuing
Technical Applications PSU ARL	SS/CPFF	ARL : PA	0.000	1.000	Nov 2020	0.000		0.860	Dec 2022	-		0.860	Continuing	Continuing	Continuing
Technical Applications SPA	SS/CPFF	SPA : VA	0.000	0.303	Dec 2020	1.003	Nov 2021	1.843	Oct 2022	-		1.843	Continuing	Continuing	Continuing
Technical Applications BAE	SS/CPFF	BAE : VA	0.000	0.913	Nov 2020	2.254	Nov 2021	4.339	Oct 2022	-		4.339	Continuing	Continuing	Continuing
Technical Applications LMRMS	SS/CPIF	LMRMS : NY	0.000	0.000		0.580	Nov 2021	0.634	Oct 2022	-		0.634	Continuing	Continuing	Continuing
Technical Applications China Lake	WR	China Lake : CA	0.000	0.000		0.634	Nov 2021	0.093	Oct 2022	-		0.093	Continuing	Continuing	Continuing
Technical Applications Carderock	WR	Carderock : MD	0.000	0.000		0.000		0.087	Oct 2022	-		0.087	Continuing	Continuing	Continuing
Technical Applications Peraton	SS/CPFF	Peraton : VA	0.000	0.000		0.000		0.792	Nov 2022	-		0.792	Continuing	Continuing	Continuing
Technical Applications Battelle	SS/CPFF	Battelle : OH	0.000	0.000		0.000		0.530	Nov 2022	-		0.530	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technical Applications EMCUBE	SS/CPFF	EMCUBE : VA	0.000	0.000		0.000		0.122	Nov 2022	-		0.122	Continuing	Continuing	Continuing
Technical Applications MARC	SS/CPFF	MARC : VA	0.000	0.000		0.000		0.115	Nov 2022	-		0.115	Continuing	Continuing	Continuing
		Subtotal	663.063	51.659		73.507		173.344		-		173.344	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	663.063	51.659		73.507		173.344		-		173.344	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
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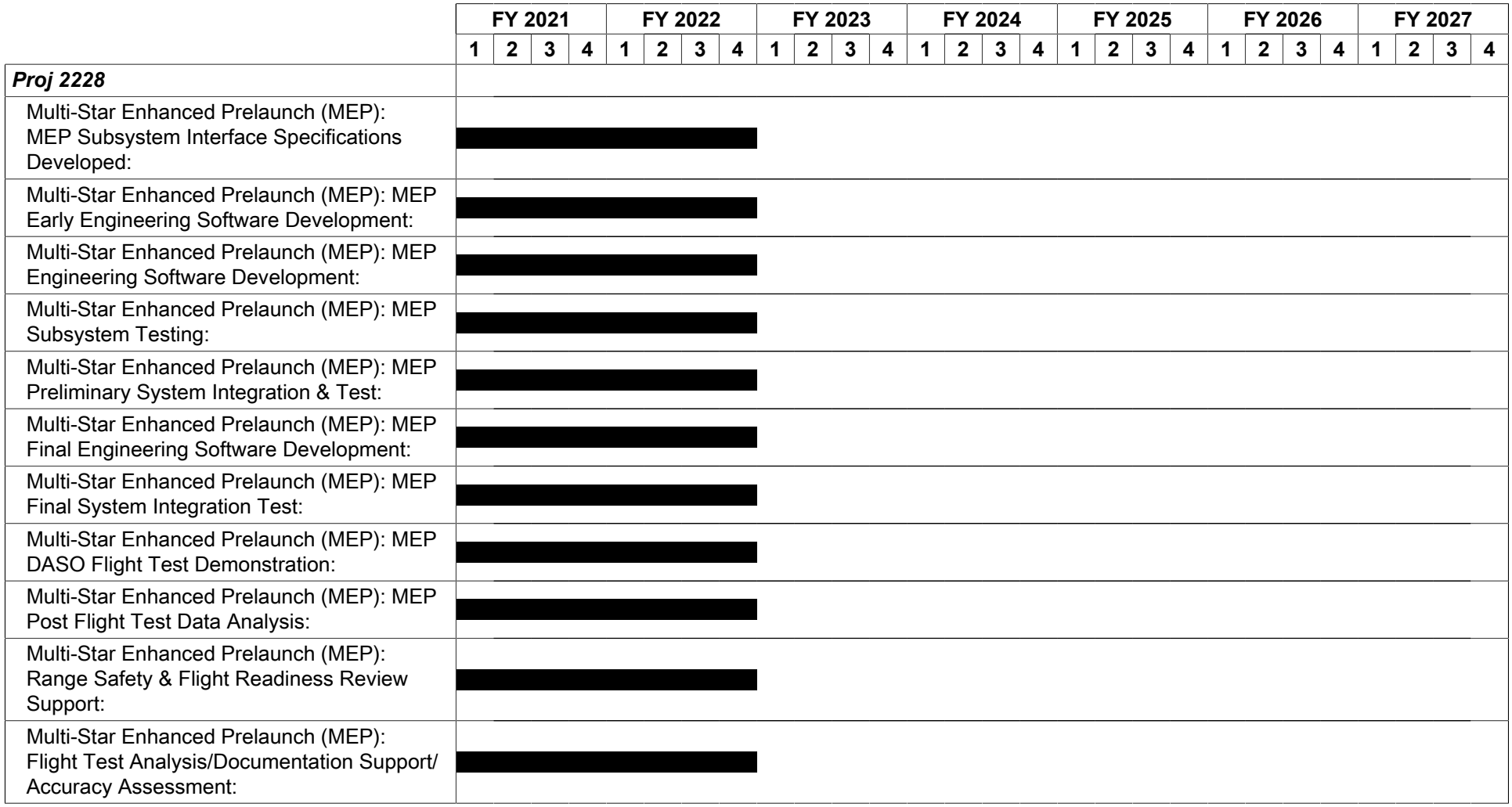

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
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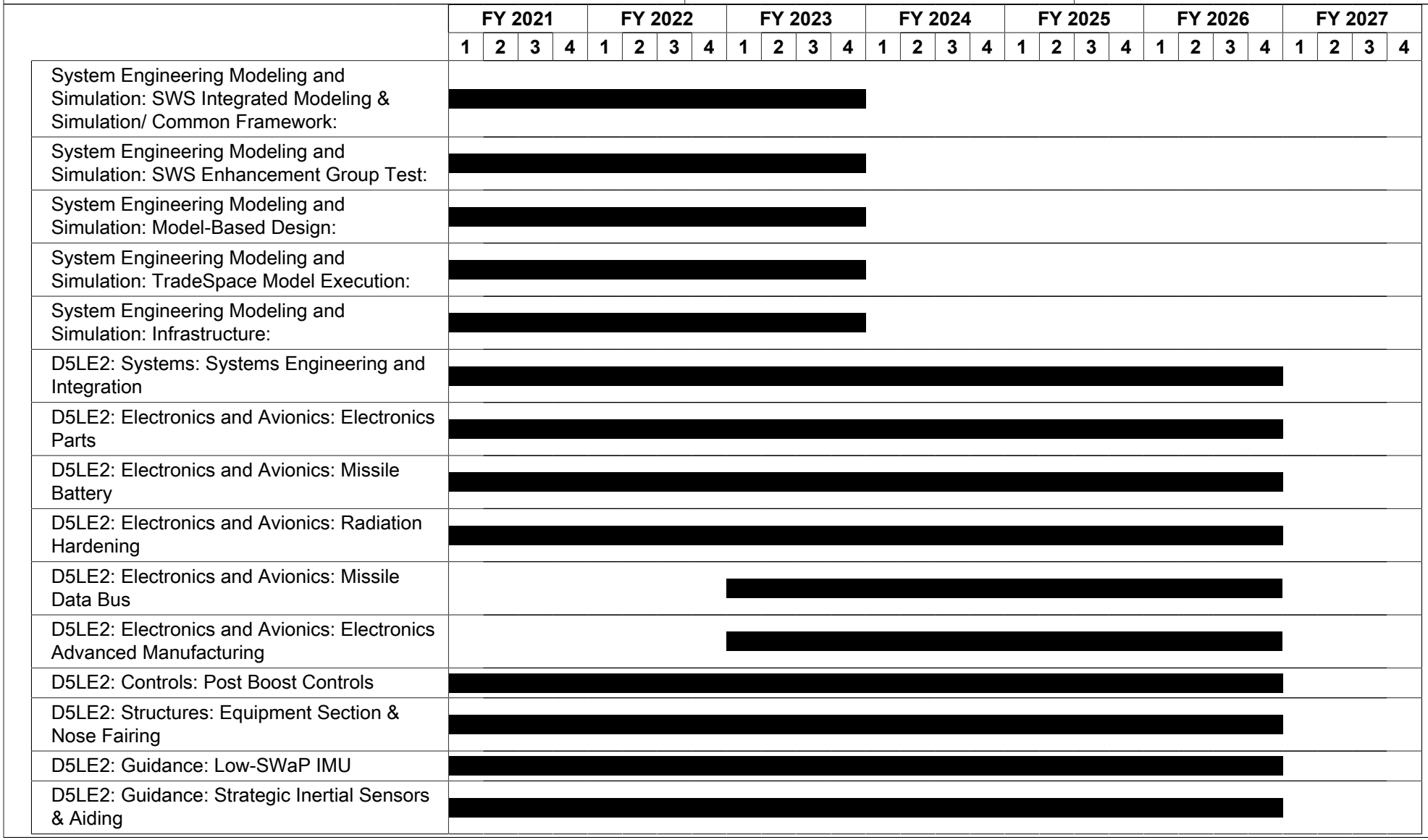

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2228 / *Technical Applications Programs*

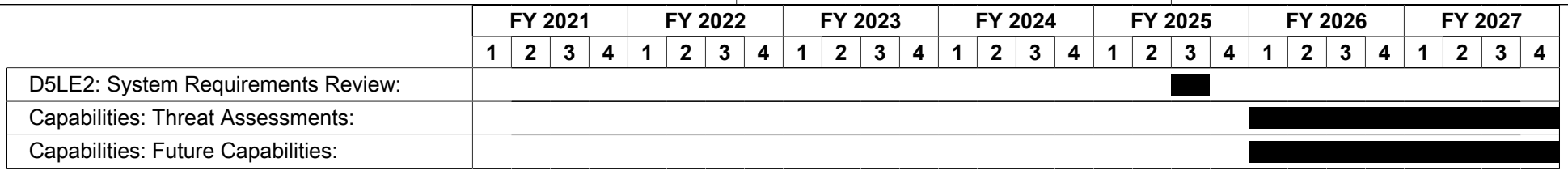

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2228 / *Technical Applications Programs*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2228				
Multi-Star Enhanced Prelaunch (MEP): MEP Subsystem Interface Specifications Developed:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Early Engineering Software Development:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Engineering Software Development:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Subsystem Testing:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Preliminary System Integration & Test:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Final Engineering Software Development:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Final System Integration Test:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP DASO Flight Test Demonstration:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): MEP Post Flight Test Data Analysis:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): Range Safety & Flight Readiness Review Support:	1	2021	4	2022
Multi-Star Enhanced Prelaunch (MEP): Flight Test Analysis/Documentation Support/ Accuracy Assessment:	1	2021	4	2022
System Engineering Modeling and Simulation: SWS Integrated Modeling & Simulation/ Common Framework:	1	2021	4	2023
System Engineering Modeling and Simulation: SWS Enhancement Group Test:	1	2021	4	2023
System Engineering Modeling and Simulation: Model-Based Design:	1	2021	4	2023
System Engineering Modeling and Simulation: TradeSpace Model Execution:	1	2021	4	2023
System Engineering Modeling and Simulation: Infrastructure:	1	2021	4	2023
D5LE2: Systems: Systems Engineering and Integration	1	2021	4	2026
D5LE2: Electronics and Avionics: Electronics Parts	1	2021	4	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 2228 / *Technical Applications Programs*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
D5LE2: Electronics and Avionics: Missile Battery	1	2021	4	2026
D5LE2: Electronics and Avionics: Radiation Hardening	1	2021	4	2026
D5LE2: Electronics and Avionics: Missile Data Bus	1	2023	4	2026
D5LE2: Electronics and Avionics: Electronics Advanced Manufacturing	1	2023	4	2026
D5LE2: Controls: Post Boost Controls	1	2021	4	2026
D5LE2: Structures: Equipment Section & Nose Fairing	1	2021	4	2026
D5LE2: Guidance: Low-SWaP IMU	1	2021	4	2026
D5LE2: Guidance: Strategic Inertial Sensors & Aiding	1	2021	4	2026
D5LE2: System Requirements Review:	3	2025	3	2025
Capabilities: Threat Assessments:	1	2026	4	2027
Capabilities: Future Capabilities:	1	2026	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 3097 / *W-93 / Mk 7*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
3097: *W-93 / Mk 7*	49.032	30.263	61.695	97.089	-	97.089	133.424	207.384	420.386	537.312	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 3097 RDTEN project has been designated as the W93/Mk7 warhead, a third variant for the TRIDENT. This project was formerly known as the Interoperative Warhead (IW); the name change to W93/Mk7 is reflected herein. This project will design, develop, and test a future warhead to include a new Navy Aeroshell for a Submarine Launched Ballistic Missile (SLBM). W93/Mk7 will mitigate risk from aging or technical failure by balancing the sea-leg warhead strategic force.

The U.S. has not delivered an integrated ballistic reentry system since the 1980s. Critical early investments are required for development of critical skills and recapitalization of the atrophied industrial base. The program will align to the President's priority of strengthening our Nation's manufacturing and defense industrial base while improving supply chain resiliency and reducing reliance on foreign countries by making critical investments in the aeroshell industrial base. In order to maintain a credible sea-based deterrent capable of the flexibility and adaptability necessary to meet future adversarial threats, the Department of Defense (DoD) and Department of Energy (DOE) / National Nuclear Security Administration (NNSA) have initiated a joint DoD-DOE/NNSA Nuclear Weapons Life-Cycle Process.

Progress and activity (Phase 1 - 2/2A):

- Early efforts primarily consist of developing programmatic planning and structure to support the future program along with further exploration and refinement of the concept studies that resulted from the Feasibility Management Team Study, which was directed in the 2018 Nuclear Posture Review (NPR). Following the results of the Feasibility Management Team Study, refinement of the concept study will be accomplished through system trade studies and drafting initial high level requirements documents in order to support the program entering a Phase 2 (Feasibility Study and Design Options) / 2A (Design Definition and Cost Study).
- As part of the Phase 1 analysis, U.S. Navy Strategic Systems Programs and the NNSA have identified ways to reduce overall burden on the Nation's weapons complex and nuclear enterprise facilities through innovative design and logistics planning. These changes to legacy planning factors will result in significant cost reduction to the program's sustainment and lifecycle costs.
- Development and submission of Executive Report to Nuclear Weapons Council (NWC) outlines analysis and findings from Phase 1 which will serve as the baseline for further analysis of refined and matured concept designs in Phase 2.
- Identify necessary investments and align OSD stakeholders on planned investments within the nuclear enterprise.
- Develop draft military characteristics, stockpile to target sequence and identified interdependencies between requirement drivers of DoD and DOE.
- Develop initial nuclear enterprise assurance and supply chain protection considerations.
- Draft threat and vulnerability assessments as well as safety, security, and use control architectures.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: W93 / Mk7	30.263	61.695	97.089	0.000	97.089

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3097 / *W-93 / Mk 7*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Articles:	-	-	-	-	-
FY 2022 Plans: - Continue exploration and refinement of the concept studies. - Analyze range of design options, to include preliminary cost, technological risk, and schedule. - Continue requirements definition and preparation for Systems Requirements Review (SRR). - Conduct Strategic Weapons System SRR. - Continue systems architecture development. - Begin initial data analysis for fire control software support for W93. - Begin aeroshell material development and conduct ground testing. Following entry to Phase 2, a Project Officer's Group (POG) will be established to develop and execute a joint integrated Phase 2 study plan, outlining approach, scope, cost, and schedule for the Phase 2 analysis activities.					
FY 2023 Base Plans: - Conduct Flight Systems System Requirements Review. - Analyze ability to meet system requirements, including notional surveillance and logistics components overbuilds. - Begin in-depth analysis of each design option. - Begin an in-depth review of planned support equipment and technical publications. - Update requirements documents (Military Characteristics, Stockpile-to-Target Sequence, and Interface Control Drawings). - Review/update readiness levels for technologies and manufacturing (TRLs and MRLs) and associated risk analysis and constraints. - Purchase of capital equipment to support aeroshell industrial base recapitalization effort; creates efficiency and reduces operational/maintenance risk. - Analyze research and development (R&D) and production requirements and capabilities, including identifying long-lead items and production constraints. - Begin development of qualification and certification requirements. - Analyze research and development, production, life-cycle maintenance, and logistics scope. - Identify and certify manufacturing processes and supply chains for new-builds of substrates, heatshield material from new rayon source, antenna windows, and other non-nuclear components critical to the thermal protection system.					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3097 / *W-93 / Mk 7*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Development of instrumentation for thermomechanical and aerothermal testing to certify components for flight test and system qualification. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The increase from FY 2022 to FY 2023 is attributable to increase in Phase 2 (Feasibility Study and Design Options) work, which requires significantly more effort than the prior phase. FY 2023 activities include continuing development of design options, execution of analysis of alternatives to evaluate feasibility based on cost, schedule, and technical maturity, preliminary tests and demonstrations, preliminary safety studies, assessment of qualification and certification requirements, and producibility assessments. These efforts are needed to complete the Phase 2 study report, which will include a summary of all proposed program options considered, the associated analyses, and a summary of results from the DoD evaluation of design options. Major capital equipment for aeroshell development and production must be purchased in order to certify the manufacturing process and supply chain, train a critical skills workforce, and provide just-in-time support for flight test and production schedules. This equipment will start to recapitalize the atrophied industrial base and develop a domestic production capability for building critical thermal protection system components for Navy nuclear modernization programs. These aeroshell investments will also allow for material characterization, qualification, and validation testing of existing and proposed future materials to support W93/Mk7 design development and maturation.					
Accomplishments/Planned Programs Subtotals	30.263	61.695	97.089	0.000	97.089

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Contracts will be awarded to those sources who were engaged in the ALT 370 program and are currently engaged in the production and/or operational support of the deployed W78/88-1 Systems on the basis of Other Than Full and Open Competition pursuant to the authority of 10 U.S.C. 2304 (c) (1) and (3) implemented by FAR 6.302.-1, 3, 4

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3097 / *W-93 / Mk 7*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
W93/Mk7	SS/CPIF	LMS : PA	33.098	14.001	Nov 2020	33.391	Nov 2021	42.000	Nov 2022	-		42.000	Continuing	Continuing	Continuing
W93/Mk7	MIPR	DOE : NM	9.000	5.367	Oct 2020	9.252	Nov 2021	26.127	Nov 2022	-		26.127	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	PERATON : VA	4.594	1.594	Oct 2020	1.914	Jan 2022	7.000	Nov 2022	-		7.000	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	APL : MD	1.495	6.743	Oct 2020	6.703	Nov 2021	6.000	Nov 2022	-		6.000	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	Various : Various	0.845	1.098	Nov 2020	1.050	Nov 2021	0.590	Nov 2022	-		0.590	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	BAE : MD	0.000	0.000		0.500	Nov 2021	1.000	Dec 2022	-		1.000	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	NSWC RSO : MD	0.000	0.273	Jan 2021	6.064	Nov 2021	10.462	Nov 2022	-		10.462	Continuing	Continuing	Continuing
W93/Mk7	SS/CPAF	SPA : VA	0.000	0.054	Aug 2021	0.500	Jan 2022	0.510	Jan 2023	-		0.510	Continuing	Continuing	Continuing
W93/Mk7	SS/CPFF	TOYON : CA	0.000	1.133	Oct 2021	1.321	Nov 2021	1.400	Nov 2022	-		1.400	Continuing	Continuing	Continuing
W93/Mk7	WR	CNSW : IN	0.000	0.000		1.000	Mar 2022	2.000	Nov 2022	-		2.000	0.000	3.000	-
		Subtotal	49.032	30.263		61.695		97.089		-		97.089	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.032	30.263		61.695		97.089		-		97.089	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3097 / *W-93 / Mk 7*

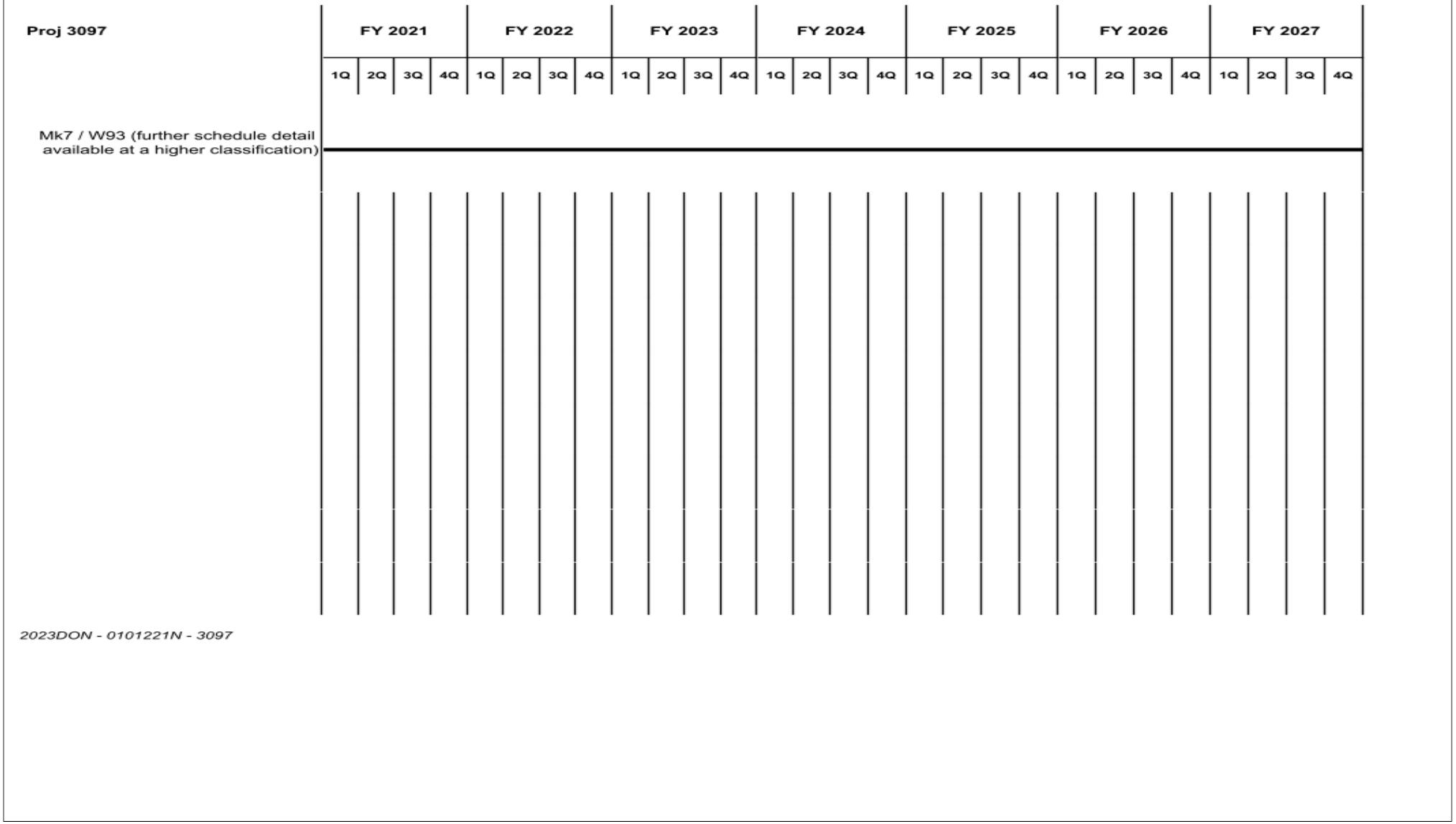

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3097 / *W-93 / Mk 7*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3097				
W93 / Mk7 (further schedule detail available at a higher classification):	1	2021	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 3158 / *Integrated Nuclear Weapons Security Sys Dev*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
3158: *Integrated Nuclear Weapons Security Sys Dev*	13.954	1.957	3.410	3.384	-	3.384	3.141	3.190	3.250	3.307	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Enhanced Special Weapons effort supports the Nuclear Weapons Security (NWS) program and SSBN Escort mission. The policies and requirements regarding the safeguard of nuclear weapons within the Department of Defense is established by DoD S5210.41M. Within the Department of the Navy, nuclear weapons are limited to TRIDENT Fleet Ballistic Missiles (FBM), either deployed aboard TRIDENT submarines or located landside at Naval Submarine Base, Kings Bay or Naval Submarine Base, Bangor where missiles are assembled/disassembled, tested as well as repaired. The CNO has assigned SSP, the FBM program manager, with mission responsibility for the safeguard of FBM nuclear assets. More specifically, the mission includes landside and pier operations as well as transits to and from the dive point, each of which present challenges to personnel as well as existing technologies. This budget supports efforts directed at improving the current security technological baseline through a series of technology developments, tests, and studies focusing on land and in transit security requirements. Collectively, these efforts will improve countermeasure technologies addressing detection, delay, denial, and defeat.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Integrated Nuclear Weapons Security Sys Dev	1.957	3.410	3.384	0.000	3.384
Articles:	-	-	-	-	-
FY 2022 Plans: Identify, develop, and test technologies needed for aerial and underwater surveillance, for detection and defeat (passive and active) of unmanned aircraft systems and unmanned underwater vehicles. Investment into technologies that aide in mitigating risks posed by cyber-security threats, assess susceptibility and vulnerability to malicious activities, and to strengthen against unauthorized access to electronic security systems.					
FY 2023 Base Plans: Continue to identify, develop, and test technologies needed for aerial and underwater surveillance, for detection and defeat (passive and active) of unmanned aircraft systems and unmanned underwater vehicles. Continue investing in technologies that aide in mitigating risks posed by cyber-security threats, assess susceptibility and vulnerability to malicious activities, and strengthen against unauthorized access to electronic security systems.					
FY 2023 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3158 / *Integrated Nuclear Weapons Security Sys Dev*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The FY 2022 to FY 2023 decrease is due to various miscellaneous rate adjustments.					
Accomplishments/Planned Programs Subtotals	1.957	3.410	3.384	0.000	3.384

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• OPN/Various-2: *OPN (Nuclear Weapons Security)*	37.619	33.970	39.837	-	39.837	37.749	38.460	39.335	40.086	Continuing	Continuing
• OMN/11D2D-3: *Fleet Ballistic Missile (Nuclear Weapons Security)*	95.038	103.772	103.468	-	103.468	108.503	103.126	105.359	107.302	Continuing	Continuing
• OMN/11D2D-5: *Fleet Ballistic Missile (Transit/Escort)*	104.169	104.888	117.906	-	117.906	119.321	120.924	123.251	125.736	Continuing	Continuing

Remarks

D. Acquisition Strategy

Procurements are being executed through a combination of private contractors (large and small business), government Centers of Excellence (COEs), other government agencies and the Naval Submarine Bases, Kitsap and Kings Bay. Contract awards are based upon "best value" determinations, and where practical will be performance based or include incentive provisions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 3158 / *Integrated Nuclear Weapons Security Sys Dev*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Nuclear Weapons Security Sys Dev	SS/CPFF	APL : MD	4.369	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys Dev	SS/CPFF	JRC : VA	3.872	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys Dev	C/BA	DRAPER : MA	0.556	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys Dev	WR	CNWS : ID	2.745	0.338	Nov 2020	1.954	Oct 2021	1.608	Nov 2022	-		1.608	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	C/CPFF	GDMS : MA	1.436	0.401	Nov 2020	0.416	Nov 2021	0.550	Nov 2022	-		0.550	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	C/CPFF	ARL : TX	0.000	0.000		0.000		0.814	Oct 2022	-		0.814	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	C/CPFF	SPA : VA	0.425	0.120	Mar 2021	0.475	Nov 2021	0.302	Nov 2022	-		0.302	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	C/CPFF	EMCUBE : VA	0.158	0.223	Mar 2021	0.000		0.110	Dec 2022	-		0.110	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	C/CPFF	ASC : CA	0.000	0.800	Mar 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	WR	DAHLGREN : VA	0.000	0.075	Mar 2021	0.250	Apr 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	WR	KEYPORT : VA	0.000	0.000		0.315	Feb 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Nuclear Weapons Security Sys	Various	various : various	0.393	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	13.954	1.957		3.410		3.384		-		3.384	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 3158 / *Integrated Nuclear Weapons Security Sys Dev*	

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	13.954	1.957		3.410		3.384		-		3.384	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3158 / *Integrated Nuclear Weapons Security Sys Dev*

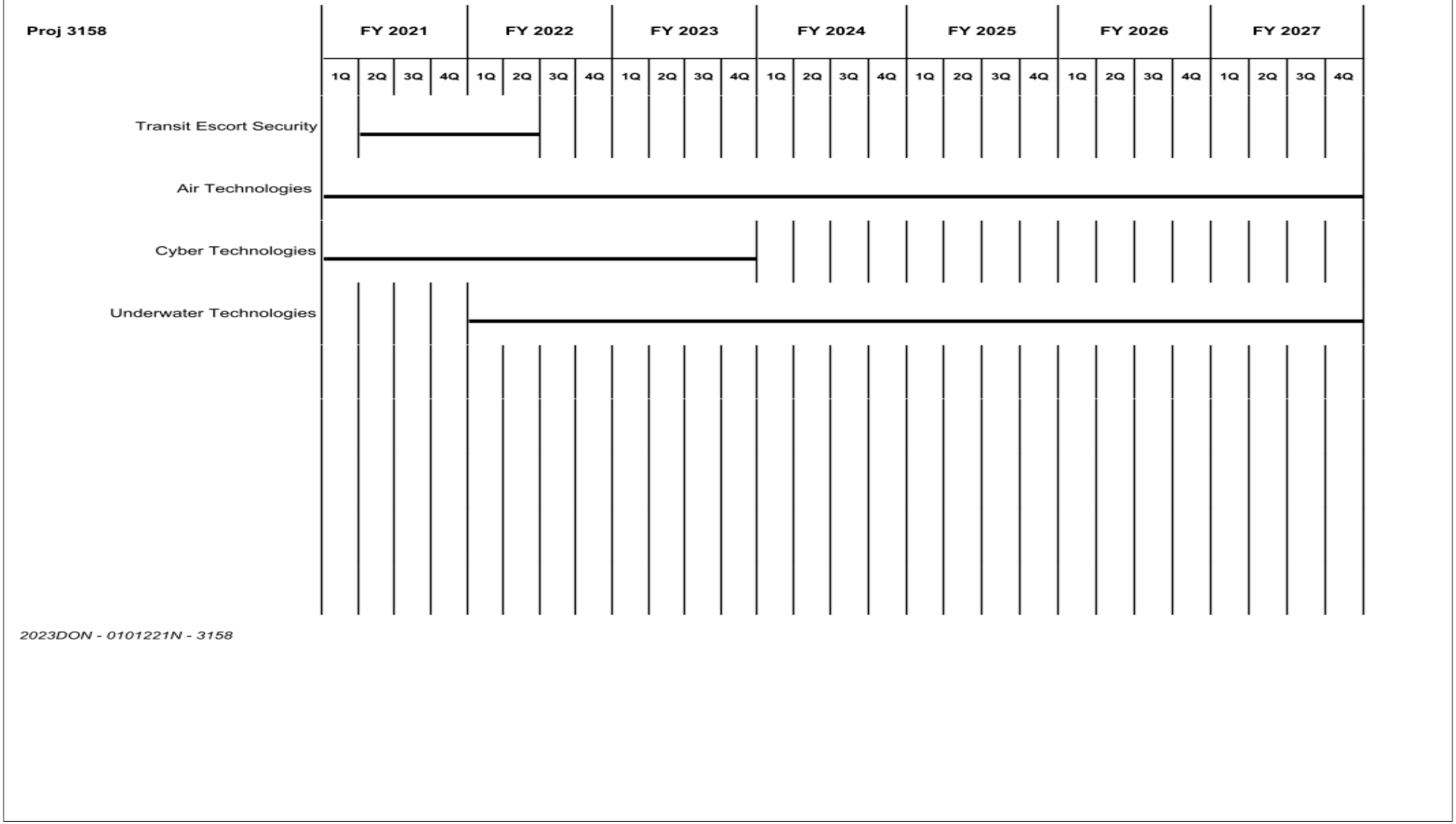

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 3158 / *Integrated Nuclear Weapons Security Sys Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3158				
Transit Escort Security:	2	2021	2	2022
Air Technologies:	1	2021	4	2027
Cyber Technologies:	1	2021	4	2023
Underwater Technologies:	1	2022	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0101221N / *Strategic Sub & Wpns Sys Supt*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
9999: *Congressional Adds*	17.376	11.584	32.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	60.960
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional adds to support:

- Next Generation Strategic Inertial Measurement Unit will research, develop and demonstrate radiation-hardened navigation technologies for reentry specific applications, strategic grade inertial instruments, software, electromechanical components and algorithms that exercise strategic skills and are applicable to the long-term viability of the nation's strategic grade guidance systems.

- Scalable Very High Temperature Composite Manufacturing Technologies supports development and production effort for three dimensionally reinforced carbon/carbon SSNTs and further high temperature composite material in support of SSNT and future Navy reentry systems.

- Autonomous fiber optic sensing network will develop advanced sensor systems for counterterrorism and antiterrorism operations to meet rigorous performance metrics necessary for nuclear facility, material, and weapons protection.

- Strategic weapons systems shipboard navigation system modernization will conduct improvement backlog assessment, estimation, and prioritization; evaluation on the sustainability of all Navigation Subsystem Auxiliary Systems and incorporate cyber resilient methods and strategies into the build and production process for targeted Navigation Software Configuration Items (SWCIs).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: Next Generation Strategic Inertial Measurement Unit	5.792	6.000
FY 2021 Accomplishments: Research and develop new and alternate Guidance, Navigation, and Control (GN&C) technologies and concepts to support Strategic Systems Programs (SSP) Missions. FY21 planned scope includes: - Research, develop and demonstrate radiation-hardened navigation technologies for reentry specific applications, strategic grade inertial instruments, software, electromechanical components and algorithms - Perform technical trade studies to deliver a navigation solution that optimizes the system for size, weight, and power while maintaining the flight test accuracy requirements Develop and deliver an IMU specification defining all system level requirements necessary for deployment on Navy flight test systems - Analyze, design, deliver, and test iterations of a small navigation grade IMU and other non-inertial navigation aids.		

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
- Develop requirement definitions and program planning - Conduct trade study/cost-benefit analysis to determine the best value hardware solution for processing and input/output hardware design. - Perform System and Component Engineering of Navigation and avionics systems - Demonstrate navigation system capability and development progress by conducting design reviews. - Conduct Test and Evaluation (T&E) activities to include test development, procedure review, conducting tests, review and analysis of test data, and documentation of test results. - Monitor and assess maintaining accuracy of the existing hypersonic flight systems through analysis, simulation and test of design options. - Assess guidance options including improved/alternate correlation algorithms for reference generation and validation of selected sensors while considering impact on current components.		
FY 2022 Plans: Research and develop new and alternate Guidance, Navigation, and Control (GN&C) technologies and concepts to support Strategic Systems Programs (SSP) Missions. FY22 planned scope includes: - Research, develop and demonstrate radiation-hardened navigation technologies for reentry specific applications, strategic grade inertial instruments, software, electromechanical components and algorithms - Perform technical trade studies to deliver a navigation solution that optimizes the system for size, weight, and power while maintaining the flight test accuracy requirements Develop and deliver an IMU specification defining all system level requirements necessary for deployment on Navy flight test systems - Analyze, design, deliver, and test iterations of a small navigation grade IMU and other non-inertial navigation aids. - Develop requirement definitions and program planning - Conduct trade study/cost-benefit analysis to determine the best value hardware solution for processing and input/output hardware design. - Perform System and Component Engineering of Navigation and avionics systems - Demonstrate navigation system capability and development progress by conducting design reviews. - Conduct Test and Evaluation (T&E) activities to include test development, procedure review, conducting tests, review and analysis of test data, and documentation of test results. - Monitor and assess maintaining accuracy of the existing hypersonic flight systems through analysis, simulation and test of design options.		

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
- Assess guidance options including improved/alternate correlation algorithms for reference generation and validation of selected sensors while considering impact on current components.		
Congressional Add: Scalable Very High Temperature Composite Manufacturing Technologies ***FY 2021 Accomplishments:*** Funds provided support heatshield material testing and future capability development. Funds also support recapitalization of US manufacturing capabilities. Specific activities include ground testing and development of machining procedures. ***FY 2022 Plans:*** Funds continued to support heatshield material testing and future capability development. Funds also support recapitalization of US manufacturing capabilities. Specific activities include ground testing and development of machining procedures.	5.792	6.000
Congressional Add: Autonomous fiber optic sensing network ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Develop a fiber optic acoustic sensor system that will detect, track, and classify unmanned underwater vehicles. It will be installed and developed with a focus on reduction of technical and integration risks in an operational environment. This effort will enable a future transition into the Waterside Security System as part of the Electronic Harbor Security System.	0.000	5.000
Congressional Add: Strategic weapons systems shipboard navigation system modernization ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** - Provide support for and collaboration with the SWS Shipboard Modernization Program Working Groups. - Provide support for and collaboration with Shipboard partners to include development of Navigation Modernization concepts, technologies, and designs compatible with Shipboard Architecture Modernization Objectives, establishment of a Navigation Development Roadmap integrated with the Shipboard Modernization Program, and execution of trade studies in support of Program Increment Objectives. - Provide support for and collaboration with Navigation Future Capabilities Working Groups. - Conduct Navigation improvement backlog assessment, estimation, and prioritization. - Conduct evaluation on the sustainability of all Navigation Subsystem Auxiliary Systems, to include the estimated remaining life cycle of each auxiliary system, and provide recommendations for upgrading, replacing, consolidation, and/or retirement of these auxiliary systems. - Conduct pilot projects for incorporation of cyber resilient methods and strategies into the build and	0.000	15.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
production process for targeted Navigation Software Configuration Items (SWCIs).		
Congressional Adds Subtotals	11.584	32.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Congressional Adds shall be competitively awarded, or provided to programs that have received competitive awards in the past.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next Generation SIMU	SS/CPFF	Draper Labs* : Cambridge, MA	5.792	5.792	Apr 2021	6.000	Jun 2022	0.000		-		0.000	0.000	17.584	-
High Temperature Composite Expansion	SS/CPFF	FMI/Intermat : Biddeford, ME	11.584	0.000		0.000		0.000		-		0.000	0.000	11.584	-
High Temperature Composite Expansion	C/BA	NSWC Crane : Bloomington, IN	0.000	5.792	Nov 2021	6.000	Sep 2022	0.000		-		0.000	0.000	11.792	-
Autonomous Fiber Optic Sensing Network	TBD	Digital Force Technologies : Bangor, WA	0.000	0.000		5.000	Sep 2022	0.000		-		0.000	0.000	5.000	-
SWS Shipboard Navigation System Modernization	TBD	LMRMS : Uniondale, NY	0.000	0.000		15.000	Jun 2022	0.000		-		0.000	0.000	15.000	-
		Subtotal	17.376	11.584		32.000		0.000		-		0.000	0.000	60.960	N/A

Remarks

*Significant sub-contractor is Moog Inc in East Aurora, NY.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	17.376	11.584		32.000		0.000		-		0.000	0.000	60.960	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

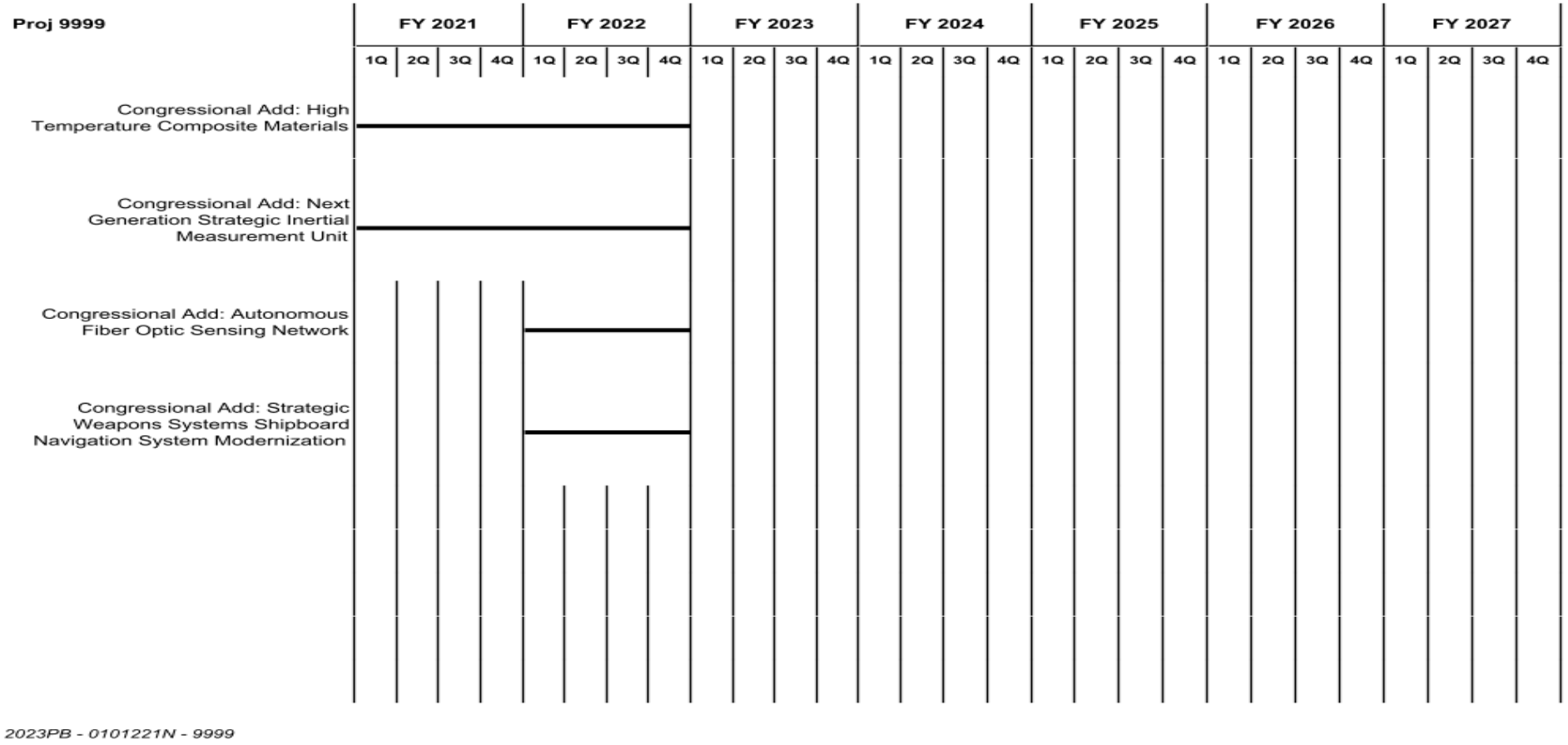

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0101221N / *Strategic Sub & Wpns Sys Supt*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Congressional Add: High Temperature Composite Materials: High Temperature Composite Materials	1	2021	4	2022
Congressional Add: Next Generation Strategic Inertial Measurement Unit: Next Generation Strategic Inertial Measurement Unit	1	2021	4	2022
Congressional Add: Autonomous Fiber Optic Sensing Network: Autonomous Fiber Optic Sensing Network	1	2022	4	2022
Congressional Add: Strategic Weapons Systems Shipboard Navigation System Modernization: Strategic Weapons Systems Shipboard Navigation System Modernization	1	2022	4	2022