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 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604756N *I Ship Self Def (Engage: Hard Kill)*							
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	1,403.132	92.547	107.427	71.818	-	71.818	45.519	45.468	40.830	38.002	Continuing	Continuing
0167: *5in Rolling Airframe Missile*	345.666	5.917	8.283	17.371	-	17.371	11.178	6.577	4.898	4.775	Continuing	Continuing
0173: *NATO Sea Sparrow*	954.732	59.591	65.209	46.169	-	46.169	34.255	38.802	35.840	33.134	Continuing	Continuing
0243: *ALaMO*	71.512	1.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	72.912
2070: *OTH Missile*	31.222	25.639	10.935	8.278	-	8.278	0.086	0.089	0.092	0.093	0.000	76.434
9999: *Congressional Adds*	0.000	0.000	23.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	23.000

A. Mission Description and Budget Item Justification

This program element provides funding for the development of systems that fulfill a portion of the third phase of the Ship Self Defense: Engage Hard Kill. Development in this line will focus on hard kill capabilities in which missiles are used to intercept incoming Anti-Ship Cruise Missiles (ASCM), as well as a Surface-to Surface Strike weapon system. Missile and system improvements necessary to meet their requirements are being addressed via NATO SEASPARROW Missile System (NSSMS) (0173), Rolling Airframe Missile (RAM) (0167), Advanced Low Cost Munition Ordnance (ALaMO) (0243 and C772), Over-The-Horizon (OTH) missile (2070), and Phalanx Close-In Weapon System (CIWS) SeaRAM (9081). Missile improvements include improved kinematic performance plus advanced seeker and low elevation fusing/warhead capability improvements. CIWS System improvements include Technology Refresh for current and future fleet population. ALaMO (0243 and C772) qualifies a guided 57mm projectile with an active seeker for United States Navy (USN) use. ALaMO provides enhanced lethality against Fast In-shore Attack Craft (FIAC) when compared to existing 57mm ammunition.

B. Program Change Summary ($ in Millions)	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**
Previous President's Budget	94.420	87.862	0.000	-	0.000
Current President's Budget	92.547	107.427	71.818	-	71.818
Total Adjustments	-1.873	19.565	71.818	-	71.818
• Congressional General Reductions	-	-0.061			
• Congressional Directed Reductions	-	-3.374			
• Congressional Rescissions	-	-			
• Congressional Adds	-	23.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.400	0.000			
• SBIR/STTR Transfer	-3.273	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	-	-	71.818	-	71.818

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 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604756N *I Ship Self Def (Engage: Hard Kill)*

Congressional Add Details ($ in Millions, and Includes General Reductions)

	FY 2021	FY 2022
Project: 9999: *Congressional Adds*		
Congressional Add: *ALaMO block 1 projectile*	0.000	23.000
Congressional Add Subtotals for Project: 9999	0.000	23.000
Congressional Add Totals for all Projects	0.000	23.000

Change Summary Explanation

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 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0167 / *5in Rolling Airframe Missile*	

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
0167: *5in Rolling Airframe Missile*	345.666	5.917	8.283	17.371	-	17.371	11.178	6.577	4.898	4.775	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Rolling Airframe Missile (RAM) program is an international cooperative program with the government of the Federal Republic of Germany. The purpose of this program is to develop, test, and field a surface-to-air self-defense system consisting of both a missile launcher and dual mode, passive radio frequency/infrared seeker missiles. The baseline RAM Block 2 missile upgrade program is a cooperative requirement of the U.S. and Federal Republic of Germany and agreed to in a signed international Memorandum of Understanding (MOU).

The RAM Block 2 missile defends against emerging, highly maneuverable Anti-Ship Cruise Missile (ASCM) threats utilizing advanced seekers while maintaining all the proven capabilities of previous RAM Block 0/1/1A's accurate terminal guidance, proven lethality, and post launch fire and forget capability. The RAM Block 2 missile is being further upgraded, referred to as the RAM Block 2A Fire Control Loop Improvement Project (FCLIP) ECP, via software only modifications to the missile and launcher to improve performance against multi-threat raid attacks. The latest RAM Block 2 upgrade, referred to as RAM Block 2B Raid ECP will provide an upgraded infrared seeker and Missile-to-Missile Link (MML) capability to counter emerging complex raid attacks. Development and flight testing of the RAM Block 2B Raid ECP will occur through FY 2022.

RAM FY 2023 through FY 2027 efforts will focus on integration efforts with the new Combat Systems baselines for Aircraft Carriers and Amphibious platforms (Ship Self Defense System Baseline (SSDS BL) 12 - RAM Integration) to include electromagnetic environmental effects (E3) testing to verify all RAM variants can be loaded and fired from SSDS platforms. Additionally, efforts will correct issues found during RAM Block 2B development flight tests and include evolutionary agile development that delivers critical missile software based capability packages to counter emerging threats such as hypersonic weapons.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Rolling Airframe Missile Block 2 Development and Test	5.917	8.283	17.371	0.000	17.371
Articles:	-	-	-	-	-
FY 2022 Plans: Execute Guided Test Vehicle-3 (GTV-3) flight test, the final development flight test in Q2 FY 2022. Correct issues uncovered during the developmental flight tests to support fielding in the Fleet. Perform in-flight missile vulnerability/susceptibility to the projected operational electromagnetic environments of the Combat Systems. Establish the test plans and assemble the test equipment to confirm that all RAM variant missile performance is					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0167 / *5in Rolling Airframe Missile*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
not degraded in the new shipboard electromagnetic environment i.e. Navy scheduled fielding of Enterprise Air Surveillance Radars (EASR) and upgraded Electronic Warfare (EW) suites. ***FY 2023 Base Plans:*** In support of integration efforts, perform regression flight testing to verify RAM Block 2A and 2B missile hardware and software raid performance improvements in SSDS BL 12. Conduct electromagnetic environmental effects (E3) testing for all fielded RAM variants with new US Navy emitters such as AN/SPY-6 (EASR) and AN/SLQ-32(V)7 (SEWIP Block 3), which is a requirement for combat systems certification. Build virtual RAM models for integrated combat system end-to-end development which enables rapid missile and combat system software development, certification and deployment to counter new and emerging threats. Initiate evolutionary agile development efforts that deliver critical missile software based capability packages to counter emerging threats such as hypersonic weapons. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase from FY 22 to FY 23 driven primarily by SSDS BL12 integration efforts in FY23. These efforts notably include live fire regression flight testing of RAM Block 2A and Block 2B with SSDS BL12. This flight testing is a key enabler of ensuring RAM can function effectively with the SSDS combat system. Additionally, increase also due to performance of E3 testing for all RAM variants which ensures RAM can be loaded and fired onboard Aircraft Carriers and Amphibious ships. FY23 initiates evolutionary agile development efforts which are critical to the ability for RAM to pace emerging threats.					
Accomplishments/Planned Programs Subtotals	5.917	8.283	17.371	0.000	17.371

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 2242: *RAM*	90.533	73.015	92.131	-	92.131	114.639	117.251	120.277	121.506	Continuing	Continuing
• OPN 5231: *Ship Missile Support Equipment*	9.723	7.025	6.817	-	6.817	6.903	7.028	7.171	0.000	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0167 / *5in Rolling Airframe Missile*

D. Acquisition Strategy

The RAM Program uses directed sole source contracts with Raytheon Missiles & Defense, Tucson, AZ.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0167 / *5in Rolling Airframe Missile*	

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
Block 2 Upgrade	C/CPAF	Various : Various	154.650	0.000		0.000		0.000		-		0.000	0.000	154.650	-
Primary Hardware Dev/Blk 1	Various	Various : Various	10.081	0.000		0.000		0.000		-		0.000	0.000	10.081	-
FCLIP	WR	PHD : CA	0.777	0.000		0.000		0.000		-		0.000	0.000	0.777	-
FCLIP	SS/CPFF	AECOM : VA	1.226	0.000		0.000		0.000		-		0.000	0.000	1.226	-
Raid ECP	SS/CPFF	Raytheon : Tucson/ Louisville	73.937	3.429	Dec 2020	2.000	Dec 2021	0.000		-		0.000	0.000	79.366	-
FCLIP	SS/CPFF	Raytheon : Tucson/ Louisville	40.563	0.000		0.000		0.000		-		0.000	0.000	40.563	-
Raid ECP	SS/CPFF	JHU/APL : MD	1.065	0.050	Dec 2020	0.000		0.000		-		0.000	0.000	1.115	-
FCLIP	WR	China Lake : CA	8.735	0.000		0.000		0.000		-		0.000	0.000	8.735	-
Raid ECP	WR	China Lake : CA	3.133	1.173	Nov 2020	0.000		0.000		-		0.000	0.000	4.306	-
FCLIP	SS/CPFF	JHU/APL : MD	0.692	0.000		0.000		0.000		-		0.000	0.000	0.692	-
Raid ECP	WR	PHD : CA	0.050	0.000		0.000		0.000		-		0.000	0.000	0.050	-
Raid ECP	SS/CPFF	AECOM : VA	1.582	0.378	Dec 2020	0.000		0.000		-		0.000	0.000	1.960	-
FCLIP	WR	PT Mugu : CA	0.025	0.000		0.000		0.000		-		0.000	0.000	0.025	-
FCLIP	WR	NSWC DD : VA	0.844	0.000		0.000		0.000		-		0.000	0.000	0.844	-
Various	Various	Various : Various	1.946	0.087	Sep 2021	0.017	Nov 2021	0.000		-		0.000	0.000	2.050	-
2B Integration	SS/CPFF	Raytheon : Tucson/ Louisville	0.000	0.000		0.927	Nov 2021	0.000		-		0.000	0.000	0.927	-
2B Integration	WR	China Lake : CA	0.000	0.000		0.638	Oct 2021	0.000		-		0.000	0.000	0.638	-
2B Integration	C/CPFF	TBD : TBD	0.000	0.000		0.980	Dec 2021	0.000		-		0.000	0.000	0.980	-
2B P3I	SS/CPFF	Raytheon : Tucson/ Louisville	0.000	0.000		2.080	Mar 2022	0.000		-		0.000	0.000	2.080	-
2B Integration	WR	NSWC DD : VA	0.000	0.000		1.641	Oct 2021	0.000		-		0.000	0.000	1.641	-
RAM Evolutionary Agile	SS/CPFF	Raytheon : Tucson/ Louisville	0.000	0.000		0.000		2.237	Oct 2022	-		2.237	0.000	2.237	-
RAM Evolutionary Agile	WR	China Lake : CA	0.000	0.000		0.000		0.680	Dec 2022	-		0.680	0.000	0.680	-
RAM Evolutionary Agile	SS/CPFF	Cydecor : VA	0.000	0.000		0.000		0.425	Oct 2022	-		0.425	0.000	0.425	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0167 / *5in Rolling Airframe Missile*	

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
SSDS BL 12 - RAM Integration	SS/CPFF	Raytheon : Tucson/ Louisville	0.000	0.000		0.000		3.392	Oct 2022	-		3.392	0.000	3.392	-
SSDS BL 12 - RAM Integration	WR	China Lake : CA	0.000	0.000		0.000		0.985	Dec 2022	-		0.985	0.000	0.985	-
SSDS BL 12 - RAM Integration	WR	NSWC DD : VA	0.000	0.000		0.000		0.975	Jan 2023	-		0.975	0.000	0.975	-
SSDS BL 12 - RAM Integration	SS/CPFF	Cydecor : VA	0.000	0.000		0.000		0.355	Oct 2022	-		0.355	0.000	0.355	-
		Subtotal	299.306	5.117		8.283		9.049		-		9.049	0.000	321.755	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Studies and Analysis	Various	Various : Various	1.810	0.000		0.000		0.000		-		0.000	0.000	1.810	-
		Subtotal	1.810	0.000		0.000		0.000		-		0.000	0.000	1.810	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	C/CPFF	Raytheon : Tucson	18.487	0.300	Nov 2020	0.000		4.100	Oct 2022	-		4.100	0.000	22.887	-
Test Support	WR	China Lake/PHD : CA/CA	12.914	0.500	Oct 2020	0.000		4.222	Dec 2022	-		4.222	Continuing	Continuing	Continuing
FOT&E	WR	China Lake : PHD, CA	4.701	0.000		0.000		0.000		-		0.000	0.000	4.701	-
Miscellaneous	Various	Various : Various	5.765	0.000		0.000		0.000		-		0.000	0.000	5.765	-
Test Support	SS/CPFF	JHU/APL : MD	0.817	0.000		0.000		0.000		-		0.000	0.000	0.817	-
Integration	Various	Various : Various	1.719	0.000		0.000		0.000		-		0.000	0.000	1.719	-
		Subtotal	44.403	0.800		0.000		8.322		-		8.322	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0167 / *5in Rolling Airframe Missile*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Defense Acquisition Workforce Development Fund	Various	various : various	0.147	0.000		0.000		0.000		-		0.000	0.000	0.147	-
		Subtotal	0.147	0.000		0.000		0.000		-		0.000	0.000	0.147	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	345.666	5.917		8.283		17.371		-		17.371	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0167 / *5in Rolling Airframe Missile*

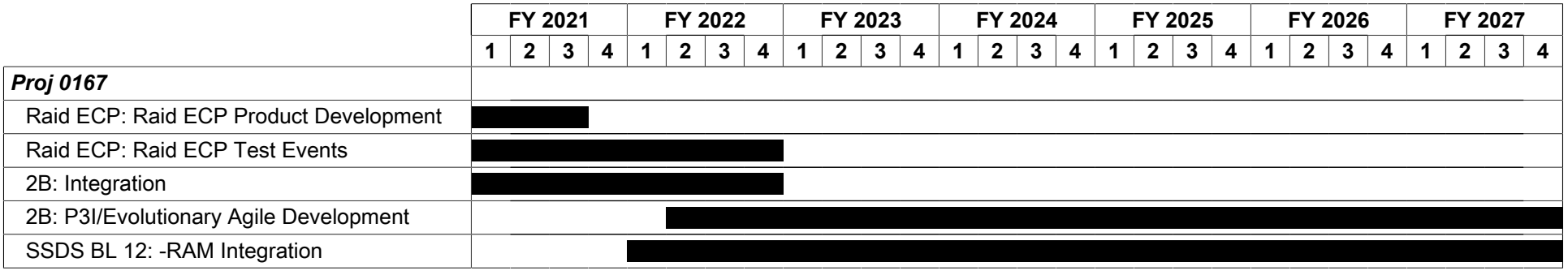

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0167 / *5in Rolling Airframe Missile*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0167				
Raid ECP: Raid ECP Product Development	1	2021	3	2021
Raid ECP: Raid ECP Test Events	1	2021	4	2022
2B: Integration	1	2021	4	2022
2B: P3I/Evolutionary Agile Development	2	2022	4	2027
SSDS BL 12: -RAM Integration	1	2022	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0173 / *NATO Sea Sparrow*	

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
0173: *NATO Sea Sparrow*	954.732	59.591	65.209	46.169	-	46.169	34.255	38.802	35.840	33.134	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project encompasses twelve (12) primary efforts to enhance ship self-defense:

1. Evolved SEASPARROW Missile (ESSM) Blk 1 Testing: Evolved SEASPARROW Missile (ESSM) Blk 1 is a cooperative effort among nine (9) NATO SEASPARROW Nations and the U.S. to provide crucial battlespace defense and fire power against the fast, low altitude, highly maneuverable Anti-Ship Cruise Missile (ASCM) threat. Modifications were made to both the MK 41 Vertical Launch System (VLS) to fire from a single cell with 4 ESSM (QuadPack) and the NATO SEASPARROW Surface Missile System (NSSMS), fielding ESSM Blk 1 onboard CVN 68 (Aircraft Carrier), LHD 1 (Multipurpose Amphibious Assault Ship), LHA 7 (Multipurpose Amphibious Assault Ship), CG 47 (Guided Missile Cruiser), and DDG 51 (Guided Missile Destroyer) class ships. ESSM Blk 1 integration efforts continue to bring the capability to CVN 78 and DDG 1000. Testing scheduled for FY22 includes ESSM Blk 1 firings from the lead ship in support of DDG 1000 class activation, AEGIS Baseline (B/L) 9C2 live fire testing, and Combat Systems Ship Qualification Trials (CSSQT) live fire tests aboard DDG 1000 and 1001, LHD 1 and 4, and CVN 73.

2. Blk 2 Follow-on Test & Evaluation (FOT&E): The ESSM Blk 2 Milestone Decision Authority mandated that ESSM Blk 2 conduct FOT&E on Ship Self-Defense System (SSDS) platform and fully support DDG Flight III operational testing. There will be planning efforts to support US Sole Combat Systems integration testing including but not limited to: Aegis Baseline 9 and 10 integration, SSDS integration, and other potential (future Frigate) platform integration testing as required. This includes support with appropriate ESSM Blk 2 Missile Simulator Unit (MSU) with operator support.

3. NATO SEASPARROW Technical Direction Agent (TDA): The MK 57 NATO SEASPARROW Surface Missile Systems (NSSMS) provides a rapid response, integrated, self-defense missile capability. The TDA is tasked with providing systems engineering and technical support for the MK 9 Tracker Illuminator System (TIS), and MK 29 Guided Missile Launching System (GMLS). The Combat System (CS) TDA is tasked with providing an Analysis of Alternatives (AoA), in the form of studies, analysis, and evaluations of hardware and software improvements. This task encompasses requirements development, and assessment, artifact and document reviews, technical meetings, and test requirement development, participation in test and system integration events, and post test analysis. RDT&E funding is necessary to complete AoA activities and develop recommendations, based on data, for improvements to the MK 9 TIS and MK 29 GMLS.

4. ESSM Blk 2 Risk Reduction/ESSM Blk 2 Engineering and Manufacturing Development (E&MD): ESSM Blk 2 upgrade is a cooperative effort between U.S. Navy and NATO SEASPARROW Consortium Nations. ESSM Blk 2 upgrade replaces the largely obsolete guidance section with a dual mode Active/Semi-Active X-Band seeker capable of defeating future threat capabilities within the existing envelope, including; smaller signatures, increased raid sizes, and adverse environments including countermeasures. Threat types include: Advanced Anti-Ship Cruise Missiles (ASCMs), Anti-Ship Ballistic Missiles, surface and asymmetrical. The consortium nations provided the majority of their funding early in the program with the U.S. providing the bulk of its funding later in EMD. The remaining budget is required to complete ESSM Blk 2 EMD.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

5. ESSM Technology Roadmap & Studies: The ESSM Blk 2 Missile completed development in 2021, achieved IOC in December 2021 and transitioned to in-service. In order to achieve performance not realized during the execution of Engineering and Manufacturing Development (E&MD), pace the threat, and remain a viable weapon system, the missile and its supporting combat system components will require improvements. This effort will perform studies to identify technology candidates, find new manufacturing techniques, and determine applicability to the NATO SEASPARROW Project Office (NSPO) managed Combat System Elements for future hardware or software improvements to either the Consortium's combat systems or the missile, or both. RDT&E funding represented will develop and maintain an ESSM System roadmap and support specific studies to determine candidate combat system and/or missile performance and manufacturing efficiency improvements. Computer simulation updates will be needed to support the performance studies for future improvements.

6. Other Development (Blk 2 Obsolescence and Redesign, CSTB and Digital Datalink): Test Bed is the end-to-end integration of Combat System (CS) element models using Higher Level Architecture (HLA) to help assess a ship's ability to defend itself. Test Bed is maximizing the use of tactical code-based models in conjunction with physics-based environmental models to represent at sea performance of ships and their combat systems. The goal is to develop a system of systems modeling for multiple use cases including System Development, System Integration, Developmental Test (DT) or Operational Test (OT) for a variety of ships and weapon systems. This effort is to integrate ESSM Block 2 Tactical Simulation (ETS) model into the Combat Systems Testbed and Enterprise Testbed. This effort also includes improvements needing to be made in ETS based on the studies exploring missile launcher and MK 9 Tracker-Illuminator System (TIS) redesign in order to respond to obsolescence issues affecting ESSM systems on all CVN, LHA, and LHD class ships.

7. Evolved SEASPARROW Missile (ESSM) Blk 2 Software Upgrades: The ESSM Blk 2 Missile completed development in 2021, achieved IOC in December 2021 and transitioned to in-service. In order to pace the threat and remain a viable weapon, the missile may require software improvements. This effort will provide the performance updates
and fixes to the ESSM Block 2 missile software. The software updates will be identified as a result of the Initial Operational Test and Evaluation (IOT&E) phase, during Runs for the Record (RfR) that will be completed in support of IOC, from performance improvements studies, from identified software issues, during FOT&E flight test results and as a result of new hardware and combat system changes. These software changes will form the first opportunity to improve the baseline ESSM Block 2 missile.

8. C-Band Telemetry Upgrade: Department of Test and Evaluation (DOT&E) operational testing in Aegis Capability Baseline (ACB)-20 requires 12 active missiles in flight simultaneously to assess stream raids by threat systems. Current Evolved SEASPARROW Missile (ESSM) Telemeters operate in the S-band where Radio Frequency (RF) bandwidths are limited for Telemetry (TM) collection on the range. The current spectrum allocation and range infrastructure only supports TM collections for 3 active missiles in flight on the range at one time. The new requirement is due to the large number of missiles to support planned testing. The weapons and range are required to move telemetry into the C-Band where bandwidth exists to support required TM collections. Engineering has already certified that this is achievable.

9. Common Munitions Built In Test (BIT) and Reprogramming Equipment (CMBRE) Adaptor: Maintenance Built in Test (MBIT) and Reprogramming development efforts associated with the CMBRE Adapter will allow the United States Navy (USN) to perform reprogramming of the Evolved SEASPARROW Missile (ESSM) Blk 2 missile in the field. Specifically at forward deployed locations, either shore based or on the ships when deployed. Previously, reprogramming required the return of the missiles to

the Seal Beach, CA Intermediate Level Maintenance Facility (ILMF). Further, the CMBRE Adapter (once developed) will allow the completion of the ESSM Blk 2 MBIT. Conduct of the MBIT shipboard will allow the extension of the missiles certification period.

10. MK 9 Continuous Wave Tracking Illuminator (CWTI) (Transmitter) Replacement: The MK 57 NATO SEASPARROW Surface Missile System (NSSMS) supports the SPARROW missile family with Semi-Active illumination in the form of Continuous Wave Tracking Illuminator (CWTI). The CWTI enables the MK 9 Tracker-Illuminator System (TIS) to support self-defense mission requirements and paces emerging threats. The MK 9 TIS CWTI replacement eliminates obsolescence issues and increases the Radio Frequency (RF) power output to provide improved tracking, with uplink, performance, and higher Evolved SEASPARROW Missile (ESSM) probability of guidance (PG) on low RADAR Cross Section (RCS) threats. Additionally, a replacement of 1960's United States Air Force (USAF) Radar Test Set (RTS) adapted for the United States Navy (USN) will be required to fulfill maintenance requirements and enhance additional frequency selections and ensure post-launch RF missile support for noise and uplink requirements.

11. Next Generation Tracker-Illuminator System (TIS): An upgrade is required to existing ship's infrastructure to provide Semi-Active (SAX) illumination source that improves Evolved SEASPARROW Missile (ESSM) Block 2 probability of guidance (PG) when using Transition Section Guidance (TSG) Mode 0, 3 (current), or 5 (future). Additionally, an upgraded MK 9 TIS will improve Combat System probability of raid annihilation (PRA) for TSG Modes 0 and 5 (future). The receiver and tracking elements (1960's technology) have reached the limits of their ability to support system requirements and deficiencies have been noted in Follow-on Operational Test and Evaluation (FOT&E) out-briefs. This effort will develop (as required), qualify, test, and integrate modernized technology (equipment/ components) as part of the MK 9 TIS (e.g., Transmitter Group, Antenna, and Signal Processor).

12. Next Generation Launching System: Develop, qualify, test, and integrate an upgrade, or define a replacement for the MK 132 Launcher that addresses key deficiencies with the in-service design. This upgrade/replacement improves environmental protection for Guided Missile Assemblies (GMA) (reducing corrosion), Grade A Near Miss Shock (NMS) compliance, reduces manning requirements for loading/unloading operations, mitigates long term supportability issues, addresses obsolescence, reduces the life cycle cost for operating and maintaining the MK 132 Launcher, and reduces the cost and time for Evolved SEASPARROW Missile (ESSM) in-service refurbishment, or re-certification. This upgrade/replacement contains design margin to allow for growth, where the MK 132 Guided Missile Launcher is maximized today precluding ESSM Block 2 deployment.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Evolved Sea Sparrow Missile (ESSM) Blk 1 Testing	7.176	6.094	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2022 Plans: Plans for FY 2022 include supporting CSSQTs on DDG 1001, LHDs 1 and 4, and CVN 73 and supporting Aegis live fire events.					
FY 2023 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

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. Due to decrease in overall control funding was reduced to $0. Previous plans in FY2023 included supporting CSSQTs on CVN 71 and LHD 7. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Reduction in funding from FY22 to FY23 due to decrease in overall control, ESSM Blk 1 testing for DDG 1000 and CVN 78 decreasing significantly, and due to limited inventory, testing on legacy systems is being reduced.					
Title: BLK 2 Follow-on Test & Evaluation (FOT&E) ***Articles:*** ***FY 2022 Plans:*** Conduct FOT&E in support of Aegis/optimized interfaces. ESSM Blk 2 integration at Land Based Test Sites (LBTS) with SSDS, Aegis BL 10 and FFG combat systems. Conduct planning in support of Mk29 Min/Mod and SSDS integration. ***FY 2023 Base Plans:*** Base plans for FY 2023 include conducting live fire events on an Arleigh Burke Class ship and conducting several separate ESSM Blk 2 integration events with optimized systems including SSDS, Aegis, and FFG LBTS and ships. Conduct planning for executing DT/OT on an optimized system in early FY 2024. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in funding from FY22 to FY23 required to support ESSM Blk 2 integration events and live fire events.	1.500 -	4.744 -	9.017 -	0.000 -	9.017 -
Title: NATO Sea Sparrow Combat System Integraton Technical Direction Agent (TDA) ***Articles:*** ***FY 2022 Plans:*** As road map studies conclude their initial iteration and programs of record are initiated based on that long term planning, the CS TDA will provide systems engineering analysis, trade studies, and peer review(s), inclusive of recommendations for Launching System and RADAR architecture, configuration, performance requirements (including platform integration and alignment). The CS TDA will continue to provide independent analysis and	2.245 -	1.965 -	2.336 -	0.000 -	2.336 -

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
recommendations for emergent issues and engineering changes for deployed systems. ***FY 2023 Base Plans:*** The CS TDA will continue research into tracking algorithms and refining digital signal processing elements to support MK 9 TIS evolution. The CS TDA will also continue to evolve a local simulation capability with an ability to inject real target information to continue assessment of radar performance in support of mission area tasks with the integrated Combat System. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** The increase in funding from FY22 to FY 23 is due to the increased level of effort required to continue research into radar tracking algorithms and digital signal processing elements to align with Next Generation TSI requirements definition and feasibility studies.					
Title: Evolved Sea Sparrow Missile (ESSM) Blk 2 EMD	17.071	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2022 Plans: N/A ***FY 2023 Base Plans:*** N/A ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** N/A					
Title: ESSM Blk 2 Technology Roadmap and Studies	0.375	1.287	1.210	0.000	1.210
Articles:	-	-	-	-	-
FY 2022 Plans: The ESSM Block 2 contractors and field activities will continue to perform necessary updates to the Technology Roadmap and conduct specific studies as directed by the Government, support meetings, create Plan Of Actions and Milestones (POA&Ms) for capability improvements, and deliver reports as necessary. Prospective updates will include, technology assessment with respect to maturity and risk; understanding the specifics of production					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
impacts; assessing the impacts to ship integration impacts; and continuing to take into account the evolution of the threat. Maintenance of the Technology Roadmap must assess all these factors and provide an updated Roadmap periodically as appropriate. ***FY 2023 Base Plans:*** The ESSM Block 2 contractors and field activities will continue to perform necessary updates to the Technology Roadmap and conduct specific studies as directed by the Government, support meetings, create Plan Of Actions and Milestones (POA&Ms) for capability improvements, and deliver reports as necessary. Prospective updates will include, technology assessment with respect to maturity and risk; understanding the specifics of production impacts; assessing the impacts to ship integration impacts; and continuing to take into account the evolution of the threat. Maintenance of the Technology Roadmap must assess all these factors and provide an updated Roadmap periodically as appropriate. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease of funding from FY22 to FY23 due to less studies being completed.					
Title: Other Development	6.103	1.501	2.500	0.000	2.500
Articles:	-	-	-	-	-
FY 2022 Plans: Integrate ETS into CSTB and Enterprise Testbed as per the Testbed schedules. This effort also includes to development updates to the ETS model based on the outcomes of studies. The effort will ensure ESSM stays current with modeling and simulations efforts associated with the Combat Systems. ***FY 2023 Base Plans:*** Develops ET-17 software upgrade. Funds RMD to evaluate the SM Missile Family concept and software code, and to develop an additional Initialization Message (IM) and software within the missile to make use of the IM and the associated uplinks that use the ET-17 fix. Additional funding required for APL and field activities support to the DDL upgrade. Funds CSEDS and At-Sea testing and updates the Interface Control Documentation. ***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 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Increase in funding from FY22 to FY23 required to increase development efforts for the ET-17 software upgrade.					
Title: ESSM Blk 2 Software Upgrades	1.500	4.719	7.500	0.000	7.500
Articles:	-	-	-	-	-
FY 2022 Plans: FY22 starts a level loaded effort for annual support from the ESSM Block 2 Prime Contractor to implement software updates resulting from identified required fixes, flight test analysis, the missile performance studies, system performance studies, or other analyses focused on improving overall missile performance as directed by the Government. These efforts may include, Interface Control Documentation studies and updates to ensure compatibility with existing consortium hardware and combat systems. As part of the development and testing of software updates the Contractor may also need to perform computer simulation updates, verification and validation. Computer simulations will be needed for the software performance verification, performance predictions, for the software improvements. Areas of interest will include, but are not limited to, cost effective functional software performance improvements, fixes, and hardware and combat system changes. The Prime Contractor will support meetings, create POA&Ms, develop algorithms, build proof of concepts and estimates for the capability improvements, and deliver study reports, test plans/procedures, and test inspection reports as necessary. These software changes will form the first opportunity to improve the baseline ESSM Block 2 missile.					
FY 2023 Base Plans: The ESSM Block 2 Prime Contractor will continue to perform necessary software updates that are resulting from performance improvements studies, from software issues resulting from Follow-On Test and Evaluation (FOT&E) flight test results and as a result of new hardware and combat system changes as prioritized and directed by the Government. The effort will require the Prime Contractor to support meetings, create POA&Ms, develop algorithms, build proof of concepts and estimates for the capability improvements, and deliver software reports, test plans/procedures, and test inspection reports as necessary.					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: Increase in funding from FY22 to FY23 required for an anticipated increase of software updates, analysis, and associated studies activities to support capability improvements.					
Title: C-Band Telemetry Upgrades	6.234	10.724	4.334	0.000	4.334
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

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 Plans: Continues ESSM Block 2 and C band telemeter design and fabrication efforts. Completes the Critical Design Review (CDR). Initiates the delta qualification and TEMPEST testing in FY22. Failure to fund will inhibit USN's ability to assess the active missile engagement performance against stream raids in realistic environments in accordance with Title 10. There are multiple problems with active seekers that need to be assessed on the range. The data collected will support the VV&A of M&S used to assess missile and combat system performance against various threats. It will also be instrumental in addressing future fleet TTPs. ***FY 2023 Base Plans:*** Completes the ESSM Block 2 and C band telemeter qualification efforts and initial flight testing and telemetry verification. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY22 to FY23 funding decrease due to completion of major design work in FY22 and conducting the final qualification and flight testing in FY23.					
Title: CMBRE Adaptor Development	1.500	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2022 Plans: NA ***FY 2023 Base Plans:*** N/A ***FY 2023 OCO Plans:*** N/A					
Title: MK9 CWTI (Transmitter) Replacement	13.496	21.850	3.374	0.000	3.374
Articles:	-	-	-	-	-
FY 2022 Plans: Contract awarded in FY21. Plans for FY22 include continuing NRE efforts to develop an interface to/with the MK 9 TIS. Initiate the procurement of an Engineering Development Model (EDM) and First Article Unit (FAU) for					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
qualification and integration testing. Additionally, the Government will commence the establishment of a land-based test site (LBTS) at Yorktown, Naval Munitions Command (NMC). ***FY 2023 Base Plans:*** Continue development efforts for the MK9 TIS CWTI Replacement, including the sub-assembly manufacturer/ supplier interface for the MK 9 TIS to ensure long-lead items are accounted for. Complete procurement efforts until the first months of the fourth quarter. Finalize the LBTS, complete Formal Qualification Test (FQT), take receipt of the EDM & FAU, and initiate the Qualification and Integration testing. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Decrease in funding from FY22 to FY23 as development decreases and the end-item transitions to system integration and shipboard integration.					
Title: Next Generation Tracker- Illuminator System (TIS)	0.960	0.979	0.999	0.000	0.999
Articles:	-	-	-	-	-
FY 2022 Plans: Progress studies in support of Analysis of Alternatives and industry research to examine technologically mature solutions that will meet existing NATO SeaSparrow Surface Missile System requirements for a Tracker-Illuminator while also ensuring capability to pace mid-term evolving threats. This system will be required to perform tracking of the full spectrum of Air and Missile Defense threat set as well as terminal illumination to support missile guidance in final phase of intercept in a challenged Electromagnetic environment ***FY 2023 Base Plans:*** Continue and conclude studies in support of Analysis of Alternatives and industry research to identify technologically mature candidates that will meet existing NATO SeaSparrow Surface Missile System requirements for a Tracker-Illuminator while also providing capability to pace mid-term evolving threats. This system will be required to perform tracking of the full spectrum of Air and Missile Defense threat set as well as terminal illumination to support missile guidance in final phase of intercept in a challenged Electromagnetic environment. ***FY 2023 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

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:*** Funding will be increased in FY23 to accommodate continuing design plans and development features.					
Title: Next Generation Launching System	1.431	11.346	14.899	0.000	14.899
Articles:	-	-	-	-	-
FY 2022 Plans: The NSPO intends to execute the effort under an OTA and by following a two phase development process. The initial phase (FY22) will focus on hardware development, defining physical interface with ship and development of SW to allow for firing of ESSM Block 1 and ESSM Block 2. Phase 1 is planned to be an approximately 12 month effort; progress in this phase will be evaluated via three (3) design reviews and a Weapon System Energetics Safety Review Board (WSESRB) during latter half of Phase 1. ***FY 2023 Base Plans:*** Phase 2 (starting in FY23) consists of design qualification and culminating in final delivery of technical data package (TDP) to government. Qty 2. Prototypes, supporting equipment and missile hardware will be procured to support the qualification effort. Notional test plans includes shock, vibration, effects of electromagnetic radiation, transportation and insensitive munition testing. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** Increase in FY 23 is attributed to down select and hardware procurement for qualification testing and the planning and execution of qualification test events.					
Accomplishments/Planned Programs Subtotals	59.591	65.209	46.169	0.000	46.169

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 2307: *ESSM*	212.637	248.619	282.035	-	282.035	308.103	542.367	555.245	562.940	Continuing	Continuing
• OPN 5231: *Ship Missile Defense*	39.540	43.502	48.380	-	48.380	51.080	42.150	46.750	39.350	Continuing	Continuing
• OMN 1D4D: *NATO Seasparrow*	22.781	31.960	36.806	-	36.806	37.404	41.206	45.021	45.924	0.000	320.693

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

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

Remarks

OPN for Stalker is included in above LI 5231 - Ship Missile Defense
OMN funding is for ESSM Blk 1, NSSMS, & RIM-7; ESSM Blk 2 In-Service Support begins in FY 2021. There was no additional OMN funding for ESSM Blk 2 ISS in FY21 and only a portion in FY22; with the full requirement added in FY25 and beyond. This requirement cannot be reduced and the amount owed each FY will be added to the following year until the funds are in place.

D. Acquisition Strategy

Competitively awarded MK9 CWTI.
Competitively awarding the Next Generation Launching System.
Plan to competitively award Next Generation TIS.

ESSM Blk 2 EMD is a directed sole source contract to Raytheon Missile Systems Company.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0173 / *NATO Sea Sparrow*	

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
ESSM Systems Engineering/Firing Spt	WR	Corona : CA	12.390	0.901	Dec 2020	0.999	Dec 2021	0.000	Dec 2022	-		0.000	0.000	14.290	-
ESSM Systems Engineering/Firing Spt Blk 2	WR	Corona : CA	0.000	0.200	Dec 2020	0.202	Dec 2021	0.000	Dec 2022	-		0.000	0.000	0.402	-
NATO OC System Engineering	C/ FFPLOE	Raytheon : RI	1.955	0.000		0.000		0.000		-		0.000	0.000	1.955	-
NATO OC - Software	C/ FFPLOE	Raytheon : RI	8.054	0.000		0.000		0.000		-		0.000	0.000	8.054	-
Stalker System Engineering	WR	NSWC Crane : IN	4.782	0.000		0.000		0.000		-		0.000	0.000	4.782	-
Stalker Hardware Engineering	WR	NSWC Crane : IN	14.350	0.000		0.000		0.000		-		0.000	0.000	14.350	-
Stalker Software Engineering	WR	NSWC Crane : IN	2.725	0.000		0.000		0.000		-		0.000	0.000	2.725	-
ESSM Primary Hardware Development	C/CPAF	Raytheon : Tuscon	193.941	0.000		0.000		0.000		-		0.000	0.000	193.941	-
ESSM Ancillary Hardware	Various	Various : Various	71.324	0.000		0.000		0.000		-		0.000	0.000	71.324	-
ESSM Blk 2 EMD	C/CPIF	Raytheon : Tuscon	324.745	17.071	Nov 2020	0.000		0.000		-		0.000	0.000	341.816	-
I-Stalker Systems Engineering	WR	NSWC Crane : Crane, IN	4.690	0.000		0.000		0.000		-		0.000	0.000	4.690	-
TTP	SS/FFP	Raytheon : Tuscon	49.980	0.000		0.000		0.000		-		0.000	0.000	49.980	-
ESSM Blk 2 Risk reduction	SS/ FFPLOE	Raytheon : Tuscon	44.150	0.000		0.000		0.000		-		0.000	0.000	44.150	-
NATO OC Systems Engineering SPT	WR	NSWC PHD : CA	0.700	0.000		0.000		0.000		-		0.000	0.000	0.700	-
Dual Band Tranceiver	SS/FFP	Raytheon : Tuscon	6.155	0.000		0.000		0.000		-		0.000	0.000	6.155	-
Studies/Technology Roadmap	TBD	Raytheon : Tuscon	0.000	0.375	Oct 2020	1.287	Dec 2021	1.210	Dec 2022	-		1.210	0.000	2.872	-
Other Development	TBD	Raytheon : Tucson	0.000	6.103	Oct 2020	1.501	Dec 2021	2.500	Dec 2022	-		2.500	0.000	10.104	-
Software Upgrades	TBD	Raytheon : Tucson	0.000	1.500	Oct 2020	4.719	Dec 2021	7.500	Dec 2022	-		7.500	0.000	13.719	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

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
C-Band Telemetry upgrade	TBD	TBD : TBD	0.000	6.234	Dec 2020	10.724	Nov 2021	4.334	Nov 2022	-		4.334	0.000	21.292	-
CMBRE Adaptor	TBD	NG : NA	2.500	1.500	Oct 2020	0.000		0.000		-		0.000	0.000	4.000	-
MK9 CWTI Replacment	TBD	TBD : TBD	5.042	13.496	Jan 2021	21.850	Nov 2021	3.374	Nov 2022	-		3.374	0.000	43.762	-
Illuminator System	TBD	TBD : TBD	0.000	0.960	Jul 2021	0.979	Jan 2022	0.999	Jan 2023	-		0.999	0.000	2.938	-
Launching System	TBD	TBD : TBD	0.000	1.431	Jul 2021	11.346	Feb 2022	14.899	Feb 2023	-		14.899	0.000	27.676	-
I-Stalker Systems Engineering	WR	NRL : TBD	0.800	0.000		0.000		0.000		-		0.000	0.000	0.800	-
I-Stalker Systems Engineering	WR	APL : TBD	0.525	0.000		0.000		0.000		-		0.000	0.000	0.525	-
		Subtotal	748.808	49.771		53.607		34.816		-		34.816	0.000	887.002	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NATO System TDA	SS/FP	APL : MD	5.532	2.245	Jan 2021	1.965	Jan 2022	2.336	Jan 2023	-		2.336	Continuing	Continuing	Continuing
Stalker -ISEA/TDA/RM&A	SS/FFP	various : various	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
ILS/Engineering Support	Various	Various : Various	15.543	0.000		0.000		0.000		-		0.000	0.000	15.543	-
ESSM Blk 2 EMD	WR	APL : MD	20.454	0.000		0.000		0.000		-		0.000	0.000	20.454	-
ESSM Blk 2 EMD	WR	NAWC CL : CA	27.315	0.000		0.000		0.000		-		0.000	0.000	27.315	-
ESSM Blk 2 EMD	Various	Various : Various	11.581	0.000		0.000		0.000		-		0.000	0.000	11.581	-
I-Stalker Platform Integration	WR	Norfolk Naval Shipyard (NNSY) : Norfolk, VA	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
I-Stalker Platform Integration	C/BA	NSWC Dahlgren : Dahlgren, VA	0.847	0.000		0.000		0.000		-		0.000	0.000	0.847	-
I-Stalker Platform Integration	C/BA	NSWC Crane : Crane, IN	1.124	0.000		0.000		0.000		-		0.000	0.000	1.124	-
I-Stalker Platform Integration	WR	PSNSY : Puget Sound, WA	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0173 / *NATO Sea Sparrow*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NATO OC Support	WR	Dahlgren : VA	2.174	0.000		0.000		0.000		-		0.000	0.000	2.174	-
Dual Band Transceiver	WR	APL : MD	0.800	0.000		0.000		0.000		-		0.000	0.000	0.800	-
Dual Band Tranceiver	WR	NAWC CL : CA	1.600	0.000		0.000		0.000		-		0.000	0.000	1.600	-
		Subtotal	88.620	2.245		1.965		2.336		-		2.336	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ESSM Developmental Test & Evaluation	WR	NAWC CL : CA	23.964	0.917	Dec 2020	0.945	Dec 2021	0.000	Dec 2022	-		0.000	Continuing	Continuing	Continuing
ESSM Developmental Test & Evaluation Blk 2	WR	NAWC CL : CA	0.000	0.250	Dec 2020	0.501	Dec 2021	0.901	Dec 2022	-		0.901	0.000	1.652	-
ESSM OPEVAL/ TECHEVAL/Test Firings	WR	Corona, IHD, Dahlgren, SNSWC, PHD) : Various	21.700	1.654	Dec 2020	1.125	Nov 2021	0.000	Nov 2022	-		0.000	0.000	24.479	-
ESSM OPEVAL/ TECHEVAL/Test Firings Blk 2	WR	Corona, IHD, Dahlgren, SNSWC, PHD) : Various	0.000	0.150	Dec 2020	0.302	Nov 2021	0.502	Nov 2022	-		0.502	0.000	0.954	-
ESSM Developmental Test & Evaluation	SS/FFP	APL : MD	7.000	0.617	Nov 2020	0.620	Nov 2021	0.000	Nov 2022	-		0.000	Continuing	Continuing	Continuing
ESSM Test & Evaluation	C/CPAF	Raytheon : Tuscon	28.147	1.976	Nov 2020	1.501	Dec 2021	0.000	Dec 2022	-		0.000	Continuing	Continuing	Continuing
ESSM Test & Evaluation Blk 2	C/CPAF	Raytheon : Tuscon	0.000	0.599	Nov 2020	2.911	Dec 2021	6.615	Dec 2022	-		6.615	0.000	10.125	-
ESSM Test & Evaluation	WR	Dahlgren/PHD : VA/ CA	4.320	0.112	Nov 2020	0.113	Nov 2021	0.000	Dec 2022	-		0.000	0.000	4.545	-
Developmental Test & Evaluation	WR	Dahlgren : VA	0.418	0.000		0.000		0.000		-		0.000	0.000	0.418	-
I-Stalker Development Test and Evaluation	WR	NSWC Crane : IN	0.564	0.000		0.000		0.000		-		0.000	0.000	0.564	-
		Subtotal	86.113	6.275		8.018		8.018		-		8.018	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ESSM-Support and Performing Activity	Allot	PHD/NAWC CL/ APL : CA/MD	17.471	0.899	Nov 2020	0.691	Nov 2021	0.000	Nov 2022	-		0.000	Continuing	Continuing	Continuing
ESSM-Travel	Allot	Program Office : VA	3.727	0.100	Oct 2020	0.100	Oct 2021	0.100	Oct 2022	-		0.100	Continuing	Continuing	Continuing
ESSM-Misc	Various	various : various	2.149	0.000		0.000		0.000		-		0.000	0.000	2.149	2.065
NATO Travel/Misc	Various	Program Office : various	2.111	0.000		0.000		0.000		-		0.000	0.000	2.111	-
ESSM-Support and Performing Activity Blk 2	Allot	PHD/NAWC CL/ APL : CA/MD	0.000	0.301	Nov 2020	0.828	Nov 2021	0.899	Nov 2022	-		0.899	0.000	2.028	-
Engineering Support	Various	Various : Various	5.458	0.000		0.000		0.000		-		0.000	0.000	5.458	-
I-Stalker Engineering Support	Various	TMB : Various	0.275	0.000		0.000		0.000		-		0.000	0.000	0.275	-
		Subtotal	31.191	1.300		1.619		0.999		-		0.999	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	954.732	59.591		65.209		46.169		-		46.169	Continuing	Continuing	N/A

Remarks

Various used for multiple vendors and location under threshold.

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

1

0173 Development Schedule

7/15/21

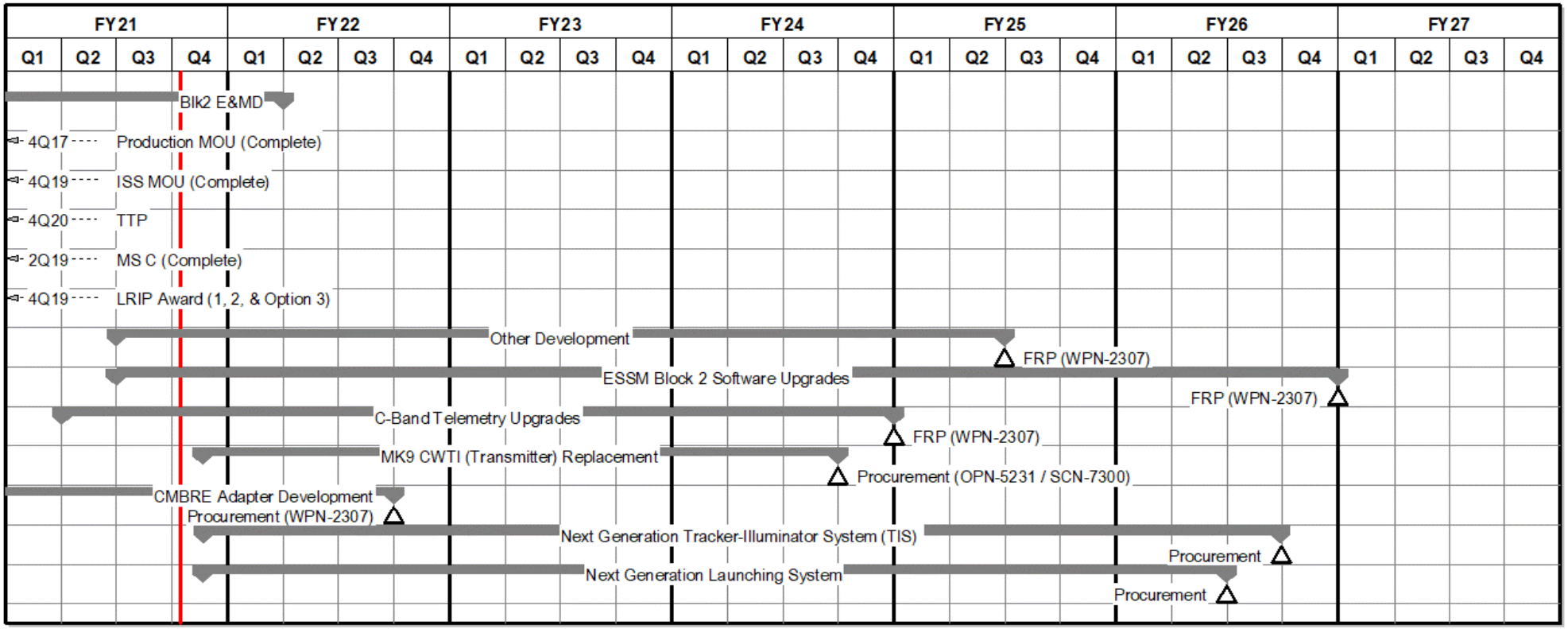

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0173 / *NATO Sea Sparrow*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0173				
ESSM BLOCK 2: Engineering and Manufacturing Development	1	2021	2	2021
ESSM BLOCK 2: In Service Support MOU Negotiation/Signature	1	2021	1	2021
ESSM DEVELOPMENT: Other Development	3	2021	2	2025
ESSM DEVELOPMENT: ESSM Blk 2 Software Upgrades	3	2021	4	2026
ESSM DEVELOPMENT: C-Band Telemetry Upgrades	2	2021	4	2024
ESSM DEVELOPMENT: MK9 CWTI (Transmitter) Replacement	4	2021	3	2024
ESSM DEVELOPMENT: CMBRE Adaptor Development	1	2021	3	2022
ESSM DEVELOPMENT: Next Generation Tracker-Illuminator System (TIS)	4	2021	2	2026
ESSM DEVELOPMENT: Next Generation Launching System	4	2021	3	2026

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0243 / *ALaMO*	

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
0243: *ALaMO*	71.512	1.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	72.912
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 57mm MK 332 HE-4G Projectile significantly increases MK 110 Gun Mount lethality and effectiveness against Fast Attack Craft and Fast In-Shore Attack Craft (FAC/FIAC). The 57mm ALaMO concluded development as part of a classified program and transitioned to qualification for Navy use in FY 2017. ALaMO will transition to full rate production at the conclusion of the 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: New Accomplishment/Planned Program Entry	1.400	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2022 Plans: Continue hazard classification and insensitive munitions qualification. Continue remaining safety and suitability environmental qualification tests. Complete build of DT test assets. Conduct land based and shipboard DT events. Conduct Weapons System Explosives Safety Review Board reviews for qualification closure. Conduct Weapons System Explosives Safety Review Board reviews for DT events.					
FY 2023 Base Plans: N/A					
FY 2023 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	1.400	0.000	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

MK 332 HE-4G will be completed qualifications and transition into LRIP FY2019.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 0243 / *ALaMO*	

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
Produce Design Verification	MIPR	DOTC PICATINNY : ARSENAL, NJ	60.149	0.648	Oct 2021	0.000		0.000		-		0.000	0.000	60.797	-
		Subtotal	60.149	0.648		0.000		0.000		-		0.000	0.000	60.797	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering Services	WR	NSWC DD : Dahlgren, VA	10.554	0.752	Sep 2021	0.000		0.000		-		0.000	0.000	11.306	-
Government Engineering Services	WR	NSWC IH : Indian Head, MD	0.809	0.000		0.000		0.000		-		0.000	0.000	0.809	-
		Subtotal	11.363	0.752		0.000		0.000		-		0.000	0.000	12.115	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	71.512	1.400		0.000		0.000		-		0.000	0.000	72.912	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0243 / *ALaMO*

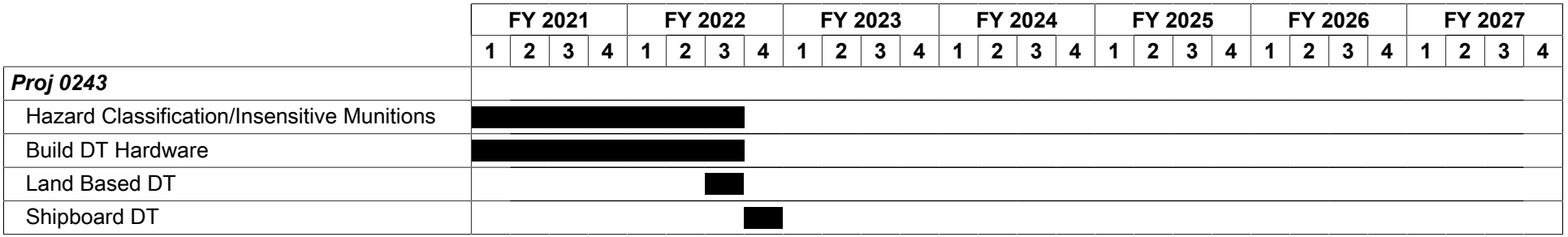

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 0243 / *ALaMO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0243				
Hazard Classification/Insensitive Munitions	1	2021	3	2022
Build DT Hardware	1	2021	3	2022
Land Based DT	3	2022	3	2022
Shipboard DT	4	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 2070 / *OTH Missile*	

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
2070: *OTH Missile*	31.222	25.639	10.935	8.278	-	8.278	0.086	0.089	0.092	0.093	0.000	76.434
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Over-The-Horizon (OTH) Missile funds competitive acquisition, testing, integrating and fielding of a modern, technologically mature Over-the-Horizon Missile Launch System (OTH-MLS) surface to surface missile capability will be installed onto commissioned and in-production Littoral Combat Ship Variants/Frigate(LCS/FFG)beginning FY 2019.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: OTH-MLS Test and Evaluation and Systems Engineering	25.639	10.935	8.278	0.000	8.278
Articles:	-	-	-	-	-
FY 2022 Plans: - Continue Over-the-Horizon Weapon System (OTH-MLS) ship engineering activities to include integration planning and design on LCS variants, LCS Lethality and Survivability, FFG, and LPD platforms. - Procure test articles (inert operational missiles, components inert operational missiles, warheads, boosters) required to conduct environmental qualification test, safety tests and Insensitive Munitions tests in accordance with the OTH-MLS Test and Evaluation Master Plan (TEMP) and as required by Explosive Ordnance Disposal (EOD), Development Operational Tests (DOT) and Weapon System Explosives Safety Review Board (WSESRB). - Conduct Operational Tests events to support the TEMP. - Conduct cyber testing to obtain Authority To Operate (ATO) for system deployment. - Validate integrated Modeling and Simulation tools to support Operational Test and Flight Test predictions. - Conduct Electro-Magnetic Environmental Effects (E3) testing. - Execute required full environmental testing to include vibration testing, low/high/cycling temperature testing, humidly testing, rain/salt/fog/sand & dust testing. - Execute required performance testing to include Seeker Discrimination Testing, restrained firing, warhead lethality testing, survivability testing, and initiator train testing. - Provide OTH-MLS missile and fire control subject matter expertise to support the program office with program execution. - Implement organic Navy OTH-MLS training capability in accordance with the Naval Training System Plan (NTSP).					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
- Prepare for OTH-MLS Full Rate Production (FRP) decision. - Support operational testing of OTH missiles at Pt. Mugu Test Range for system qualification. ***FY 2023 Base Plans:*** - Continue to provide OTH-MLS missile and fire control subject matter expertise to support the program office with program execution. - Continue Electro-Static discharge (ESD) and Electro-magnetic vulnerability (EMV) testing to obtain safety certification. - Complete system environmental testing. - Support Fleet and User evaluation. - Continue with OTH-MLS and Combat System integration growth. - Obtain OTH WS Full Rate Production (FRP) decision. - Complete EOD tests as mandated by DoD EOD and - Continued Insensitive Munitions (IM) testing will be executed in accordance with the OTH-MLS IM test plan. IM testing includes fast/slow energetics cook offs, bullet / fragment impact testing, sympathetic reaction testing, and missile drop tests. - Continue safety testing to support the WSESRB - Continue Live Fire Test and Evaluation (LFT&E) program. - Continue OT in accordance with the OTH-MLS Test and Evaluation Master Plan (TEMP.) - Complete operational flight tests. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 is final year of development and integration funds. Reduction due to decrease of development and integration efforts as Naval Strike Missile (NSM) progresses toward Full Rate Production.					
Accomplishments/Planned Programs Subtotals	25.639	10.935	8.278	0.000	8.278

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 /5231: *Ship Missile Support Equipment/OTH Missile*	19.717	10.490	13.231	-	13.231	6.625	8.946	8.944	4.435	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

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 2292: *LCS OTH Missile*	31.610	52.377	59.034	-	59.034	29.873	28.716	30.208	31.736	Continuing	Continuing
• PMC/2292: *LCS OTH Missile*	0.000	0.000	174.369	-	174.369	157.690	160.722	100.073	159.206	0.000	752.060

Remarks

OPN 5231 is a shared BLI - Funding only reflects OTH-MLS cost elements.
PMC 2292 is a new LI previously executed out of PMC 2212. LI will procure same NSM configuration as the DON.

D. Acquisition Strategy

The OTH-MLS is an Acquisition Category (ACAT) II level weapon system production and sustainment program to provide the current Littoral Combat Ship (LCS) variants and Frigate (FFG) ships with an Over-the-Horizon Surface-To-Surface Missile (SSM) capability. The Navy awarded a seven-year competitive contract awarded to Raytheon May 31, 2018 that procures material, procures test assets, and provides installation support.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

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
OTH All Up Round (AUR) Technical Design Agent	WR	NAWC/WD : China Lake, CA	4.811	4.226	Oct 2020	1.625	Oct 2021	1.625	Oct 2022	-		1.625	0.000	12.287	-
OTH Simulation and Analysis	WR	NSWC/COR : Corona, CA	1.063	0.636	Oct 2020	0.150	Oct 2021	0.431	Oct 2022	-		0.431	0.000	2.280	-
OTH Weapon System Design Agent	WR	NSWC/DD : Dahlgren, VA	1.652	1.685	Oct 2020	0.310	Oct 2021	0.310	Oct 2022	-		0.310	0.000	3.957	-
OTH Test & Evaluation / ILS	WR	NSWC/PHD : Port Hueneme, CA	1.405	1.348	Oct 2020	1.300	Oct 2021	1.300	Oct 2022	-		1.300	0.000	5.353	-
OTH Weapon System Safety	WR	NSWC/DD : Dahlgren, VA	0.359	0.471	Oct 2020	0.550	Oct 2021	0.600	Oct 2022	-		0.600	0.000	1.980	-
Weapons Systems Engineering Planning	FFRDC	JHU/APL : Laurel, MD	0.462	0.565	Dec 2020	0.400	Dec 2021	0.400	Dec 2022	-		0.400	0.000	1.827	-
OEM Engineering Support	C/CPFF	Raytheon : Tucson, AZ	7.339	0.941	Nov 2020	0.610	Nov 2021	0.680	Nov 2022	-		0.680	0.000	9.570	-
Test & Evaluation Assets	C/FFP	Raytheon : Tucson, AZ	11.339	0.000		0.000		0.000		-		0.000	0.000	11.339	-
Range & Target	Various	Various : Various	0.550	6.700	Oct 2020	2.551	Oct 2021	0.000		-		0.000	0.000	9.801	-
Test Asset Procurement	C/FFP	Raytheon : Tucson, AZ	0.000	7.353	Nov 2020	2.000	Nov 2021	2.000	Nov 2022	-		2.000	0.000	11.353	-
OTH WEAPON System safety	WR	NSWC/IHD : Indian Head, MD	0.030	0.000		0.000		0.000		-		0.000	0.000	0.030	-
Test and Eval	WR	COTF : Norfolk, VA	0.030	0.263	Nov 2020	0.000		0.000		-		0.000	0.000	0.293	-
OTH Safety Testing	WR	White Sands : White Sands, NM	0.000	0.733	Nov 2020	0.000		0.000		-		0.000	0.000	0.733	-
		Subtotal	29.040	24.921		9.496		7.346		-		7.346	0.000	70.803	N/A

Remarks

Required procurement of EOD, Safety and Insensitive Munition Test Assets that support continued deployment and integration efforts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
OTH Contractor Acquisition Mgt Support	C/CPIF	BAH : Arlington, VA	0.621	0.000	Dec 2020	0.389	Dec 2021	0.150	Dec 2022	-		0.150	0.000	1.160	-
OTH Program Management Support	C/CPIF	Strategic Insight : Arlington, VA	0.100	0.000	Dec 2020	0.280	Dec 2021	0.050	Dec 2022	-		0.050	0.000	0.430	-
OTH Program Management Support	WR	PEO IWS : Arlington, VA	0.375	0.575	Oct 2020	0.290	Oct 2021	0.282	Oct 2022	-		0.282	0.000	1.522	-
OTH Contractor Engineering Support	C/CPIF	SERCO : Arlington, VA	1.086	0.143	Dec 2020	0.480	Dec 2021	0.300	Dec 2022	-		0.300	0.000	2.009	-
TH Contractor Acquisition Mgt Support	C/CPIF	BAE : Arlington, VA	0.000	0.000		0.000		0.150	Dec 2022	-		0.150	0.000	0.150	-
		Subtotal	2.182	0.718		1.439		0.932		-		0.932	0.000	5.271	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	31.222	25.639		10.935		8.278		-		8.278	0.000	76.074	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

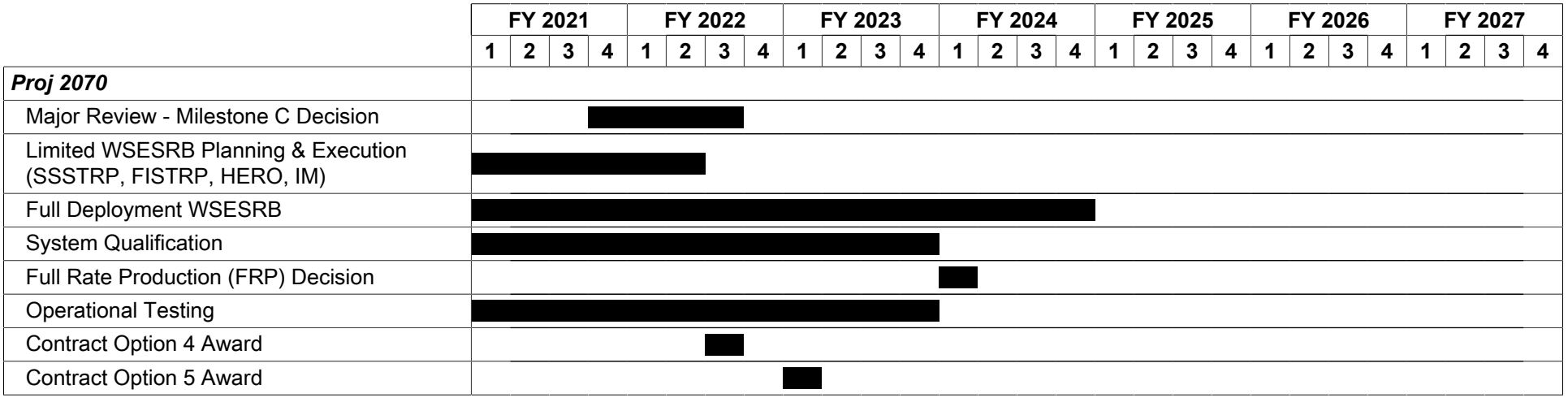

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 2070 / *OTH Missile*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2070				
Major Review - Milestone C Decision	4	2021	3	2022
Limited WSESRB Planning & Execution (SSSTRP, FISTRP, HERO, IM)	1	2021	2	2022
Full Deployment WSESRB	1	2021	4	2024
System Qualification	1	2021	4	2023
Full Rate Production (FRP) Decision	1	2024	1	2024
Operational Testing	1	2021	4	2023
Contract Option 4 Award	3	2022	3	2022
Contract Option 5 Award	1	2023	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	23.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	23.000
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 57mm MK 332 HE-4G Projectile significantly increases MK 110 Gun Mount lethality and effectiveness against Fast Attack Craft and Fast In-Shore Attack Craft (FAC/FIAC). ALaMO Block 1 demonstrates an alternative seeker and guidance technologies, potentially providing improved lethality compared to base ALaMO projectile.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: ALaMO block 1 projectile	0.000	23.000
FY 2021 Accomplishments: N/A		
FY 2022 Plans: Award prototype contract and execute initial government engineering analysis and baseline testing.		
Congressional Adds Subtotals	0.000	23.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

MK 332 HE-4G Block 1 development and prototype hardware build will be awarded competitively in late 2022 to support production and test of assets in FY23.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	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
Design and build of prototype hardware	MIPR	DOTC PICATINNY : Arsenal, NJ	0.000	0.000		19.000	Oct 2022	0.000		-		0.000	0.000	19.000	-
		Subtotal	0.000	0.000		19.000		0.000		-		0.000	0.000	19.000	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Engineering and Test	WR	NSWC DD : Dahlgren, VA	0.000	0.000		4.000	Apr 2022	0.000		-		0.000	0.000	4.000	-
		Subtotal	0.000	0.000		4.000		0.000		-		0.000	0.000	4.000	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		23.000		0.000		-		0.000	0.000	23.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 9999 / *Congressional Adds*

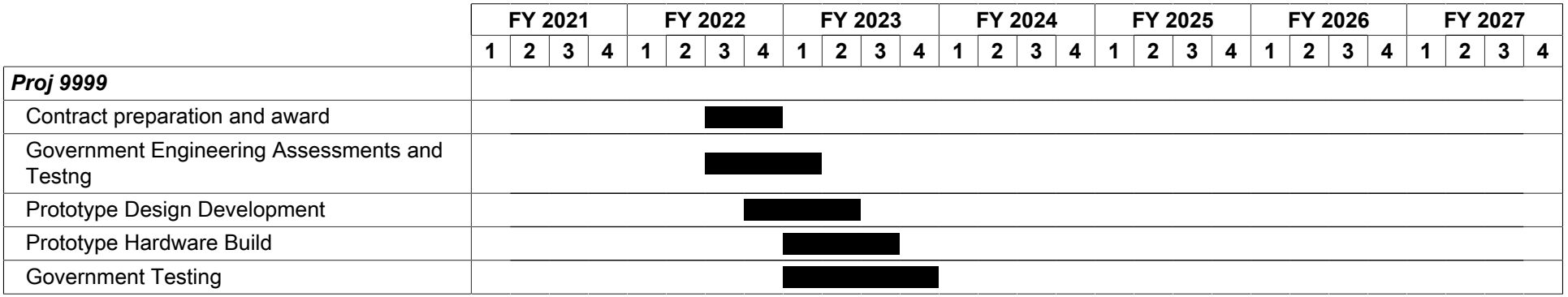

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604756N / *Ship Self Def (Engage: Hard Kill)*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Contract preparation and award	3	2022	4	2022
Government Engineering Assessments and Testng	3	2022	1	2023
Prototype Design Development	4	2022	2	2023
Prototype Hardware Build	1	2023	3	2023
Government Testing	1	2023	4	2023