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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy **Date:** April 2022

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0204229N / <i>Tomahawk Mssn Planning Ctr</i>
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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
Total Program Element	490.586	193.318	132.181	132.719	-	132.719	72.666	37.989	34.651	34.909	Continuing	Continuing
4032: <i>NAV/COMMS</i>	8.777	0.799	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.576
4033: <i>M-Code</i>	48.719	15.187	17.222	8.059	-	8.059	3.763	3.295	3.351	3.391	Continuing	Continuing
4034: <i>Maritime Strike</i>	348.921	120.959	69.568	85.101	-	85.101	28.306	6.875	2.966	2.720	Continuing	Continuing
4035: <i>JMEWS</i>	44.383	44.063	36.826	22.616	-	22.616	23.307	9.589	9.750	9.878	Continuing	Continuing
4036: <i>TTWCS TMPC PPPI</i>	39.786	12.310	8.565	16.943	-	16.943	17.290	18.230	18.584	18.920	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 289

A. Mission Description and Budget Item Justification

Funds support development of the Tomahawk Weapons System (TWS) encompassing Tactical Tomahawk upgrades including baseline improvements into the Block V missile All-Up Round (AUR), Tactical Tomahawk Weapons Controls System (TTWCS), Theater Mission Planning Center (TMPC) upgrades and other missile system improvements to maintain pace with threats. The TWS provides a long range cruise missile attack capability against fixed and mobile targets. Tomahawk is capable of being deployed from both submarines and surface ships and significantly increases the total capability of joint forces.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under Operational Systems Development because it includes development efforts to upgrade systems that have been fielded or have received approval for Full Rate Production (FRP) and anticipate funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	199.673	132.181	0.000	-	0.000
Current President's Budget	193.318	132.181	132.719	-	132.719
Total Adjustments	-6.355	0.000	132.719	-	132.719
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-6.355	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy		Date: April 2022	
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0204229N / <i>Tomahawk Mssn Planning Ctr</i>		
• Adjustments to Budget Year	-	-	132.719
			132.719
Change Summary Explanation			
Financial: The FY 2021 budget decreased by \$6.355M from the enacted budget due to mandatory SBIR transfers.			
Technical: Not applicable			
Schedule:			
PU 4032: N/A			
PU 4033: N/A			
PU 4034: MST Seeker Kit LRP 1 Contract Award from 3Q 2021 TO 1Q 2022 Recert Contract Modification to Install SKR Kit updated from 2Q 2022 TO 3Q 2023 MST Seeker Kit LRP 2 Contract Award updated from 1Q 2022 TO 2Q 2022 Missile Level Qual Testing start updated from 2Q 2022 TO 4Q 2022 SW & Sim Dev & Test start updated from 1Q 2020 TO 1Q 2021 Combined Inc 1 Segment Test and FB Development and Segments Tests and changed name to Inc/FB Development and Segment Tests and updated start to 2Q 2022. Seeker EDM Deliveries start updated from 4Q 2020 TO 1Q 2021 LRP 1 Seeker Del updated from 4Q 2022 TO 1Q 2024			
PU 4035: N/A			
PU 4036: TTWCS v5.6 Modernized Missile DT/OT removed due to completion TMPC v8.0 renamed to TMPC v8.0(JMEWS) TMPC v8.0(JMEWS) Requirements Definition moved from 1Q 2020 - 4Q 2021 to 1Q 2021 - 4Q 2022 TMPC v8.0(JMEWS) Software Development & Integration start moved from 1Q 2022 to 1Q 2023 TTWCS v5.6.0 renamed to v5.6.0.X TTWCS v5.6.1 renamed to v5.6.1.X TTWCS v5.7 renamed to TTWCS v7.X			

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1319: Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development	PE 0204229N / Tomahawk Mssn Planning Ctr

TTWCS v7.X (previously v5.7) Candidate Development renamed to TTWCS v7.X Design
TACTOM Preplanned Product Improvement (P3I) renamed to TACTOM Preplanned Product Improvement (P3I) / Cyber Improvements
TTWCS v5.6.1.X DT/OT start moved from 4Q FY2022 to 1Q FY2022
TTWCS v7.X (previously v5.7) SW Dev & Integration start moved from 1Q FY2022 to 4Q FY2022
TACTOM Preplanned Product Improvement (P3I) / Cyber Improvements start moved from 1Q FY2020 to 1Q FY2023

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

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4032 / NAV/COMMS
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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
4032: NAV/COMMS	8.777	0.799	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	9.576
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 289

A. Mission Description and Budget Item Justification

This project funds NAV/COMMS engineering change proposal (ECP) upgrades to the navigation and communication capabilities of the Tactical Tomahawk (TACTOM). TACTOM navigation modernization will enable launch via a fine alignment solution and navigation using TERCOM/DSMAC/Vertical Update Point in a GPS denied/degraded environment. TACTOM communications development replaces 5Khz DAMA with Advanced Communication Architecture (ACA) leveraging National Technical Means (NTM), replacing the Satellite Data Link Terminal (SDLT) with an Integrated Single Box Solution (ISBS) that combines Dual Transmit and Receive Capability in a single box, and replaces the current antenna with improved antennas.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Navigation/Communications	0.799	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					
Accomplishments/Planned Programs Subtotals	0.799	0.000	0.000	0.000	0.000

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 2301: Tomahawk Mods	38.463	35.160	59.672	-	59.672	62.413	64.361	65.977	68.773	438.525	833.344
• WPN 6120: Spares and Repair Parts	0.000	0.413	0.607	-	0.607	0.622	0.635	0.640	0.645	Continuing	Continuing
• WPN 2101: Tomahawk	224.685	139.983	160.190	-	160.190	35.339	83.592	177.017	169.756	191.688	15,855.308
• PMC 2101: Tomahawk	0.000	0.000	42.958	-	42.958	200.032	180.072	197.707	246.612	0.000	867.381

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4032 / NAV/COMMS

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

NAV/COMMS is an ECP to the ACAT I TACTOM program with other funding associated in WPN BLI 2101 and 2301, and PMC BLI 2101. Other Program Funding Summaries for WPN BLIs 2101, 2301 and 6120 do not include funding for the Tomahawk Recertification program as there is no RD TEN funding associated with that program.

D. Acquisition Strategy

Tactical Tomahawk communications and navigations were developed through the National Reconnaissance Office (NRO) for the new radios and architecture. The improved antennas were developed through Raytheon Missiles & Defense. NAV/COMM Kits (radios, antennas, cabling, etc.) get procured one year in advance of installation. Kits get installed into missiles inducted for Recertification, or during Block V missile production.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy **Date:** April 2022

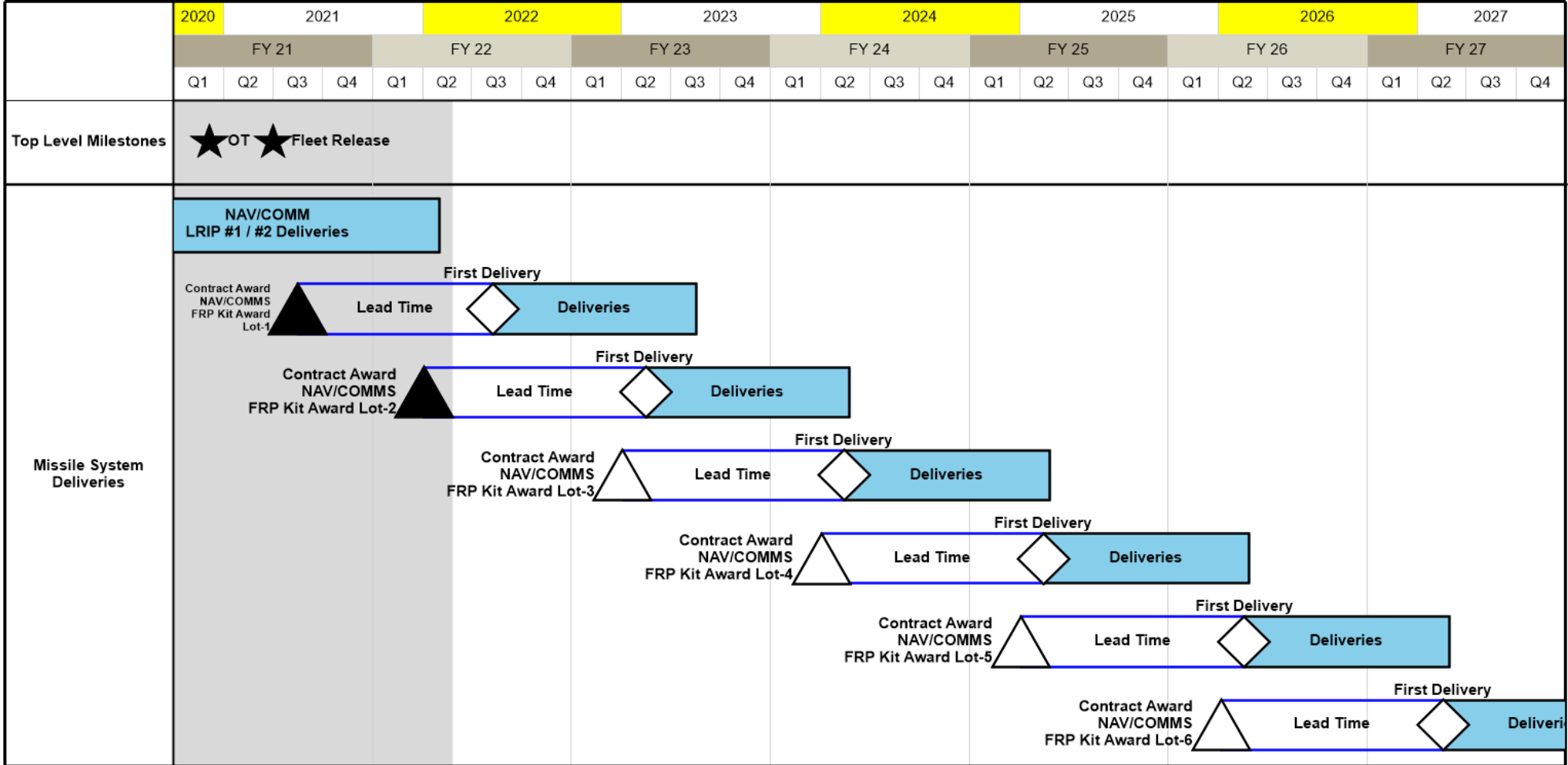
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4032 / NAV/COMMS
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NAV/COMMS Improvements Prime Integrator	SS/CPFF	Raytheon : Tucson, AZ	1.773	0.000		0.000		0.000		-		0.000	0.000	1.773	-
Subtotal			1.773	0.000		0.000		0.000		-		0.000	0.000	1.773	N/A

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NAV/COMMS Development Support	WR	NAWC-AD : Pax River, MD	0.222	0.175	Oct 2020	0.000		0.000		-		0.000	0.000	0.397	-
NAV/COMMS Development Support	WR	NAWC-WD : China Lake, CA	1.016	0.056	Nov 2020	0.000		0.000		-		0.000	0.000	1.072	-
NAV/COMMS Development Support	WR	NUWC-NPT : Newport, RI	1.842	0.000		0.000		0.000		-		0.000	0.000	1.842	-
NAV/COMMS Development Support	WR	NSWC-CR : Corona, CA	0.120	0.000		0.000		0.000		-		0.000	0.000	0.120	-
NAV/COMMS Development Support	WR	NSWC-DD : Dahlgren, VA	1.546	0.000		0.000		0.000		-		0.000	0.000	1.546	-
NAV/COMMS Development Support	WR	COTF : Norfolk, VA	0.134	0.000		0.000		0.000		-		0.000	0.000	0.134	-
NAV/COMMS Development Support	SS/CPFF	Precise : Lexington Park, MD	0.335	0.000		0.000		0.000		-		0.000	0.000	0.335	-
NAV/COMMS Development Support	WR	NSWC-PHD : Port Hueneme, CA	0.276	0.181	Oct 2020	0.000		0.000		-		0.000	0.000	0.457	-
Subtotal			5.491	0.412		0.000		0.000		-		0.000	0.000	5.903	N/A

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4032 / NAV/COMMS



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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4032 / NAV/COMMS

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
NAV/COMMS				
Acquisition Milestones: Milestones: NAV/COMMS Modernization Blk V Fleet Release	2	2021	2	2021
Test and Evaluation: NAV/COMMS Operational Test	1	2021	1	2021
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-1	3	2021	3	2021
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-2	1	2022	1	2022
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-3	1	2023	1	2023
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-4	1	2024	1	2024
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-5	1	2025	1	2025
Production Milestones: Contract Awards: NAV/COMMS FRP Kit Award Lot-6	1	2026	1	2026

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4033 / M-Code
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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
4033: M-Code	48.719	15.187	17.222	8.059	-	8.059	3.763	3.295	3.351	3.391	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The M-Code (ACAT IVT) Increment I program upgrades the Tactical Tomahawk to the next generation Global Positioning System (GPS) satellite constellation required to maintain GPS-provided position, navigation, and timing (PNT) for the missiles and is planned for Milestone C production decision in FY 2025 and Fleet Release in FY 2026. The M-Code mandate and Public Law restricts the purchase of only M-Code-capable GPS User Equipment (MGUE) after FY 2017 unless a waiver is granted by the Secretary of Defense.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: M-Code	15.187	17.222	8.059	0.000	8.059
Articles:	-	-	-	-	-
FY 2022 Plans: M-Code planned activities include continuation of EMD. EMD efforts include hardware and software development, integration, testing, and qualification of an M-Code capable Tactical Tomahawk (TACTOM) Anti-Jam GPS Receiver.					
FY 2023 Base Plans: M-Code planned activities include continuation of EMD. EMD efforts include hardware and software development, integration, and testing of an M-Code capable Tactical Tomahawk (TACTOM) Anti-Jam GPS Receiver.					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: Decrease in funding from FY 2022 to FY 2023 due to schedule delays to accommodate late government furnished property. USAF has experienced delays in their ASIC crypto chip program, impacting USN AGR subsystem qualification, and TWS software and hardware integration efforts.					
Accomplishments/Planned Programs Subtotals	15.187	17.222	8.059	0.000	8.059

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4033 / <i>M-Code</i>

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• WPN 2301: <i>Tomahawk Mods</i>	0.000	0.000	0.000	-	0.000	22.431	14.071	14.245	14.667	112.848	178.262

Remarks

Other Program Funding Summary for WPN BLI 2301 does not include funding for the Tomahawk Recertification program as there is no RDTEN funding associated with that program.

D. Acquisition Strategy

The M-Code (ACAT IV) Increment I acquisition strategy includes the development, integration, test, qualification and production of a new GPS receiver which will satisfy Public Law 111-383, sec 913 compliance. Development includes the Tactical Tomahawk M-Code program co-developing the Common Architecture for Assured PNT (CAAP) high anti-jam M-Code Application Specific Integrated Circuit (ASIC) with USAF Small Diameter Bomb (SDB)-II Program Office. M-Code capability enables the missile to maintain GPS integrity in an enhanced spoofing environment. M-Code Milestone B occurred in FY 2019, Milestone C is planned for FY 2025, and the capability will Fleet Release in FY 2026. The M-Code program includes upgrades to the All-Up Round (AUR) missile, Tactical Tomahawk Weapons Control System (TTWCS) v5.x, Submarine Combat & Control System (CCS), and also requires upgrade to the Theater Mission Planning Center (TMPC) program (under PU 4036).

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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 0204229N / Tomahawk Mssn Planning Ctr					Project (Number/Name) 4033 / M-Code				

Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code-AUR	SS/CPFF	Raytheon : Tuscon, AZ	24.854	13.876	Mar 2021	13.020	Nov 2021	4.262	Nov 2022	-		4.262	Continuing	Continuing	Continuing
M-Code - AUR	SS/FFP	Raytheon : Raytheon, AZ/SAS:	9.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M-Code - TTWCS	SS/CPFF	LMVF : Valley Forge, PA	0.246	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M-Code - TTWCS	SS/CPFF	LMBM : Baltimore, MD	0.371	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
M-Code - TTWCS	SS/CPFF	BAE Systems : San Diego, CA	0.065	0.000		0.000		0.000		-		0.000	0.000	0.065	-
M-Code - AUR	SS/CPFF	UARC APL : Laurel, MD	4.517	0.000		0.927	Dec 2021	1.255	Oct 2022	-		1.255	0.000	6.699	-
Subtotal			39.053	13.876		13.947		5.517		-		5.517	Continuing	Continuing	N/A

Remarks
M-Code Product Development funds to UARC APL provided for initiation of AUR and TWS integration and test events.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code Development Support	WR	NAWC-WD : China Lake, CA	0.397	0.126	Oct 2020	0.485	Nov 2021	0.262	Nov 2022	-		0.262	Continuing	Continuing	Continuing
M-Code Development Support	WR	NAWC-AD : Patuxent River, MD	1.209	0.433	Jan 2021	0.907	Nov 2021	0.563	Nov 2022	-		0.563	0.000	3.112	-
M-Code Development Support	WR	NUWC-NPT : Newport, RI	0.712	0.189	Dec 2020	0.199	Nov 2021	0.257	Nov 2022	-		0.257	0.000	1.357	-
M-Code Development Support	WR	NSWC-IH : Indian Head, MD	0.734	0.091	Feb 2021	0.143	Nov 2021	0.180	Nov 2022	-		0.180	Continuing	Continuing	Continuing
M-Code/TTWCS Development Spt	WR	NSWC-DD : Dahlgren, VA	1.378	0.288	Oct 2020	0.908	Nov 2021	0.785	Nov 2022	-		0.785	Continuing	Continuing	Continuing

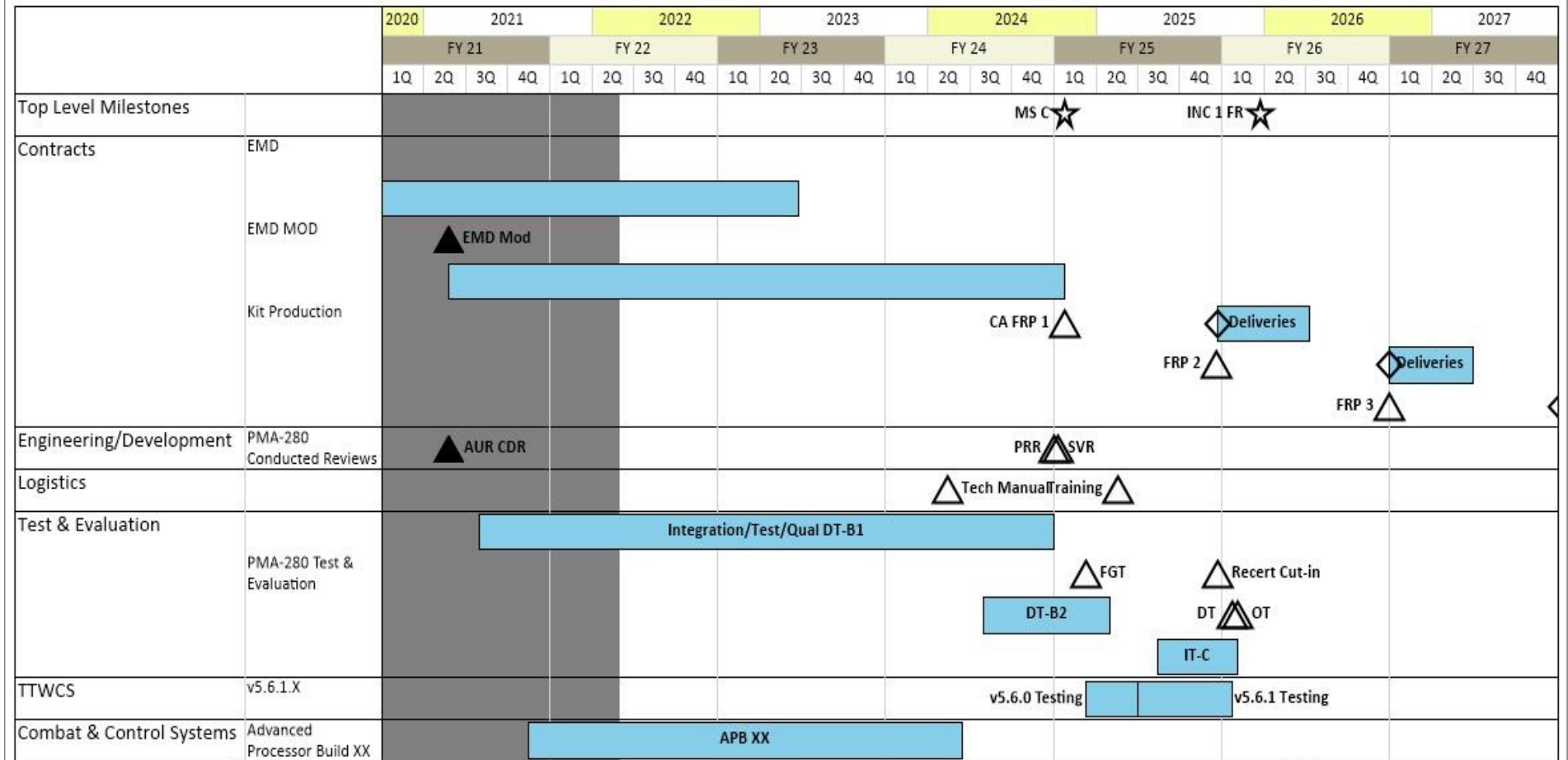
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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy												Date: April 2022				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
1319 / 7				PE 0204229N / Tomahawk Mssn Planning Ctr				4033 / M-Code								
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
M-Code Development Support	SS/CPFF	Various : Various	0.101	0.000		0.000		0.000		-		0.000	0.000	0.101	-	
M-Code NWCF Surcharge	WR	NAWC-WD : China Lake, CA	4.630	0.000		0.000		0.000		-		0.000	0.000	4.630	-	
Subtotal			9.161	1.127		2.642		2.047		-		2.047	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
M-Code Test & Evaluation	WR	NAWC-AD : Patuxent River	0.056	0.057	May 2021	0.138	Jun 2022	0.165	Jun 2023	-		0.165	Continuing	Continuing	Continuing	
M-Code/CCS Test & Evaluation	WR	NUWC-NPT : Newport, RI	0.000	0.000		0.325	Nov 2021	0.143	Nov 2022	-		0.143	0.000	0.468	-	
Subtotal			0.056	0.057		0.463		0.308		-		0.308	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
M-Code	WR	NAWC-AD : Patuxent River	0.449	0.127	Nov 2020	0.170	Jun 2022	0.187	Jun 2023	-		0.187	Continuing	Continuing	Continuing	
Subtotal			0.449	0.127		0.170		0.187		-		0.187	Continuing	Continuing	N/A	
Project Cost Totals			48.719	15.187		17.222		8.059		-		8.059	Continuing	Continuing	N/A	
Remarks																

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4033 / M-Code
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Snapshot Date: 3/2/2022

Version 1.0

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4033 / <i>M-Code</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
M-CODE				
Acquisition Milestones: Milestones: Milestone C	1	2025	1	2025
Systems Development: Critical Design Reviews: M-Code CDR	2	2021	2	2021
Systems Development: Test and Evaluation: EMD Modification	3	2025	1	2026
Systems Development: Test and Evaluation: M-Code Integrated Test (IT-C)	3	2025	1	2026
Systems Development: Test and Evaluation: M-Code Inc I Fleet Release	1	2026	1	2026
Production Milestones: Contract Awards: M-Code FRP Lot-1	1	2025	1	2025
Production Milestones: Contract Awards: M-Code FRP Lot-2	1	2026	1	2026
Production Milestones: Contract Awards: M-Code FRP Lot-3	1	2027	1	2027

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4034 / Maritime Strike
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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
4034: <i>Maritime Strike</i>	348.921	120.959	69.568	85.101	-	85.101	28.306	6.875	2.966	2.720	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Maritime Strike Tomahawk (MST) modernization effort provides the capability to hit moving maritime targets through mid-course guidance via a third party or seeker mode, to a terminal seeker engagement. MST began transitioning to a Program of Record in FY 2022. Transition to POR will complete by FY 2025. Milestone C and Full Rate Production Decisions will be concurrent with the RDC IOC in FY 2025. Program of Record will consist of a period of initial and follow-on operational test and evaluation, seeker software algorithm updates, and commensurate Weapons Control System (WCS) and Theater Mission Planning Center (TMPC) software updates.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Maritime Strike Tomahawk	120.959	69.568	85.101	0.000	85.101
Articles:	-	-	-	-	-
FY 2022 Plans: Continuation of activities in support of Maritime Strike Tomahawk (MST). Effort includes the transition to testing with the execution of ground test events to include functional ground test, and missile test flights from ground launcher apparatus to assess seeker performance and further mature algorithm refinement. Build-up, check-out, and lab test of MST test missiles for surface and subsurface test events. Engagement planning and coordination with other stakeholders and agencies that require MST support. Seeker system safety reviews and preparations for shock and environments testing. Modeling and Simulation (M&S) activity in laboratories to include development runs in the System of Systems Test Environment (SoSTE) Lab and the Signal Processor in the Loop (SPIL) environment to verify data and simulate mission performance. Extensive Missile System Qualification Testing to include vibrations, thermal loads, and environments. Shipping and handling safety analysis will be conducted and recommendations implemented. TTWCS will complete system integration test of the initial version 5.6.1 software build with all weapon system segments and address weapons control software fixes and debugging through a planned corrective build. Training curriculum development for the Fleet user, as well as crew training activities, which will be in concert with test ship availability and MST hardware install and preparation for ship install of MST software.					
FY 2023 Base Plans: Continuation of activities in support of Maritime Strike Tomahawk (MST). MST will continue test efforts in FY 2023 including captive flight testing of seeker assembly and missile test flights from ground launcher apparatus to assess seeker performance and further mature OES 5 software and associated algorithms. These events					

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4034 / <i>Maritime Strike</i>

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
are expected to result in discovery of required software fixes that will be included in OES 6 software builds. The program will also continue build-up, check-out, and lab test of MST test missiles for surface and subsurface test events to be conducted in FY 2024. Engagement planning and coordination with other stakeholders and agencies that require MST support will continue in FY 2023. Modeling and Simulation (M&S) activity in laboratories will continue in FY 2023 to include validation and verification runs in the System of Systems Test Environment (SoSTE) Lab and the Signal Processor in the Loop (SPIL) environment to verify and begin validation of mission performance. Additional shipping and handling safety analyses will be conducted and further recommendations implemented. TTWCS will continue system integration testing of version 5.6.1.X software build after Global Command and Control System interfaces have completed necessary fixes that were discovered in FY 2022. The testing will continue on system segments and address weapons control software fixes and debugging through the planned corrective build. The program will continue MST training curriculum and logistics product development for the Fleet user, conduct test ship crew training activities for version 5.6.1.X, and continue test ship installation activities, which will be in concert with test ship availability.					
<i>FY 2023 OCO Plans:</i> N/A					
<i>FY 2022 to FY 2023 Increase/Decrease Statement:</i> Increase in funding from FY 2022 to FY 2023 due to conducting Captive Flight Tests, conducting Government testing leading to QRA, testing of OES-5 software and building, testing, updating and releasing OES-6 software. Initiating Program of Record documentation.					
Accomplishments/Planned Programs Subtotals	120.959	69.568	85.101	0.000	85.101

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

Line Item	FY 2021	FY 2022	FY 2023	FY 2023	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Cost To	
			Base	OCO	Total					Complete	Total Cost
• WPN 6120: <i>Spares and Repair Parts</i>	0.000	1.093	2.364	-	2.364	1.912	1.440	1.936	1.950	Continuing	Continuing
• WPN 2301: <i>Tomahawk Mods</i>	19.595	44.470	117.468	-	117.468	78.577	80.654	82.840	83.124	1,280.128	1,786.856

Remarks

Other Program Funding Summaries for WPN BLIs 2301 and 6120 do not include funding for the Tomahawk Recertification program as there is no RD TEN funding associated with that program.

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4034 / <i>Maritime Strike</i>

D. Acquisition Strategy

Maritime Strike Tomahawk (MST) will enable surface warfare engagement capability from U.S. Navy Guided Missile Cruiser (CG), Guided Missile Destroyer (DDG), and Nuclear Powered Fast Attack Submarine (SSN) platforms. The MST program includes upgrades to the All-Up Round (AUR) missile, the Tactical Tomahawk Weapons Control System (TTWCS) and also required upgrades to the Theater Mission Planning Center (TMPC) programs (under PU 4036). MST was designated a DoDI 5000.02 Rapid Deployment Capability (RDC) by the Assistant Secretary of the Navy (Research, Development, and Acquisition) (ASN (RDA)) in Oct 2016. Milestone decision authority ensures program accountability through knowledge points which inform progress on critical design, production readiness, system test readiness, flight readiness, operational test readiness and fielding decision. To facilitate rapid fleet fielding, hardware design was phased to the beginning of the program. Technical Data package for seeker production units completed in 3Q FY 2020 at Knowledge Point 3 which supported procurement in FY 2021. Seeker software development will continue with initial Engineering Design Models. Initial Operational Capability (IOC) will occur in FY 2025 following a Quick Reaction Assessment and characterization of operational performance. This strategy affords the program flexibility in achieving a threshold capability in a timely manner. MST began transitioning to a Program of Record in FY 2022. Transition to POR will complete by FY 2025. Milestone C and Full Rate Production Decisions will be concurrent with the RDC IOC in FY 2025. Program of Record will consist of a period of initial and follow-on operational test and evaluation, seeker software algorithm updates, and commensurate Weapons Control System (WCS) and Theater Mission Planning Center (TMPC) software updates.

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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 0204229N / Tomahawk Mssn Planning Ctr				Project (Number/Name) 4034 / Maritime Strike							
Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Maritime Strike - AUR	SS/CPPIF	Raytheon : Tucson, AZ	253.955	89.953	Dec 2020	51.679	Dec 2021	66.854	Dec 2022	-		66.854	Continuing	Continuing	Continuing
Maritime Strike - AUR	WR	NAWCWD : China Lake, CA	18.690	1.372	Nov 2020	1.288	Nov 2021	1.314	Nov 2022	-		1.314	Continuing	Continuing	Continuing
Maritime Strike- TTWCS	SS/CPFF	LMVF : Valley Forge, PA	9.132	1.820	Dec 2020	1.289	Dec 2021	1.314	Dec 2022	-		1.314	0.000	13.555	12.252
Maritime Strike- TTWCS	WR	NSWC-DD : Dahlgren, VA	5.311	5.022	Oct 2020	2.138	Nov 2021	2.180	Nov 2022	-		2.180	Continuing	Continuing	Continuing
Maritime Strike- TTWCS	WR	NUWC-DN : Newport, RI	1.980	1.492	Oct 2020	0.989	Nov 2021	1.008	Nov 2022	-		1.008	Continuing	Continuing	Continuing
Maritime Strike - AUR	MIPR	NRO : Chantilly, VA	3.608	0.000		0.000		0.000		-		0.000	0.000	3.608	3.608
Maritime Strike - AUR	SS/CPFF	UARC APL : Laurel, MD	0.786	0.723	Apr 2021	0.587	Apr 2022	0.598	Apr 2023	-		0.598	0.000	2.694	2.386
Maritime Strike- VLS	SS/CPFF	LM : Baltimore, MD	1.200	1.126	Feb 2021	0.000		0.000		-		0.000	0.000	2.326	1.600
Martime Strike-AUR	WR	NSWC-PHD : Port Hueneme, CA	0.347	0.998	Oct 2020	0.000		0.000		-		0.000	0.000	1.345	1.548
Maritime Strike-AUR	SS/CPFF	ACE Electronics Defense Systems, LLC : Port Hueneme, CA	0.415	0.000		0.000		0.000		-		0.000	0.000	0.415	0.415
Martime Strike-AUR	WR	NAVWAR : San diego	1.234	0.250	Nov 2020	0.000		0.000		-		0.000	0.000	1.484	1.500
Martime Strike-AUR	MIPR	DCMA : Tucson, AZ	0.560	0.000		0.000		0.000		-		0.000	0.000	0.560	-
Maritime Strike- TTWCS	SS/CPFF	Various : Port Hueneme, CA	0.029	0.087	Sep 2021	0.000		0.000		-		0.000	0.000	0.116	-
Martime Strike-AUR	WR	NSWC-IHD : Indian Head, MD	0.000	0.020	Oct 2021	0.000		0.000		-		0.000	0.000	0.020	-
Martime Strike-AUR	MIPR	DLA : Philadelphia, PA	0.000	2.600	Jun 2021	0.000		0.000		-		0.000	0.000	2.600	-
Subtotal			297.247	105.463		57.970		73.268		-		73.268	Continuing	Continuing	N/A

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4034 / Maritime Strike
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
 FY 2023 Maritime Strike funding continues the refinement of software algorithm code. FY 2023 funding continues support of system test software development evaluation in support of Quick Reaction Assessment software, continues System of Systems Test Environment and Signal Processor in the Loop laboratory performance runs and analysis. Continue Tactical Tomahawk Weapons Control System v5.6.X system integration testing, correction of deficiencies in Increment (Inc)/Fix-it Build (FB) development, training and curriculum development, and entry into Inc/FB Segment Test. Continue MST training development, and Tomahawk Mission Planning Center initial Product Acceptance Test and Inc/FB complete. Continue planning for the additional capabilities and the correction of MST deficiencies in TTWCS, V5.7 or v7.X, the follow on derivative software to v5.6.X.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maritime Strike Development Support	WR	NAWC-WD : China Lake	9.848	0.313	Nov 2020	0.240	Nov 2021	0.244	Nov 2022	-		0.244	Continuing	Continuing	Continuing
Maritime Strike Development Support	SS/CPFF	UARC APL : Laurel, MD	0.317	0.000		0.000		0.000		-		0.000	0.000	0.317	0.318
Maritime Strike Development Support	WR	NSWC-DD : Dahlgren, VA	8.460	1.039	Oct 2020	0.430	Nov 2021	0.434	Nov 2022	-		0.434	Continuing	Continuing	Continuing
Maritime Strike Development Support	WR	NAWC-AD : Pax River, MD	3.393	1.939	Oct 2020	1.166	Nov 2021	1.210	Nov 2022	-		1.210	Continuing	Continuing	Continuing
Maritime Strike Development Support	WR	NUWC-NPT : Newport, RI	0.387	0.000		0.000		0.000		-		0.000	0.000	0.387	0.403
Maritime Strike Development Support	WR	NSWC-PHD : Port Hueneme, CA	1.813	0.023	Oct 2020	0.000		0.000		-		0.000	0.000	1.836	1.850
Maritime Strike Development Support	C/CPFF	SSC : San Diego, CA	5.622	0.337	Aug 2021	0.490	Jul 2022	0.498	Jul 2023	-		0.498	0.000	6.947	6.122
Maritime Strike Development Support	WR	NAVWAR : San Diego, CA	2.980	1.160	Nov 2020	0.660	Nov 2021	0.670	Nov 2022	-		0.670	Continuing	Continuing	Continuing
Maritime Strike Development Support	C/CPFF	Sea Corp : Newport, RI	0.758	0.333	Mar 2021	0.000		0.000		-		0.000	0.000	1.091	1.091
Maritime Strike Development Support	SS/CPFF	Precise : Pax River, MD	1.554	0.217	Sep 2021	0.280	Apr 2022	0.286	Apr 2023	-		0.286	0.000	2.337	2.521

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4034 / Maritime Strike
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Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maritime Strike Development Support	MIPR	US Army : Redstone Arsenal, AL	1.870	0.154	Aug 2021	0.590	Aug 2022	0.600	Aug 2023	-		0.600	Continuing	Continuing	Continuing
Maritime Strike Development Support	SS/CPFF	Various : Dahlgren, VA	0.609	0.485	Mar 2021	0.380	Apr 2022	0.385	Apr 2023	-		0.385	Continuing	Continuing	Continuing
Maritime Strike Development Support	MIPR	Other DOD : Various	0.021	0.018	Dec 2020	0.000		0.000		-		0.000	0.000	0.039	0.615
Maritime Strike Development Support	PO	Naval Research Lab : Washington, DC	0.592	0.250	Nov 2020	0.134	Mar 2022	0.136	Mar 2023	-		0.136	Continuing	Continuing	Continuing
Maritime Strike Development Support	SS/CPFF	Various : Port Hueneme, CA	0.475	0.511	Feb 2021	0.438	Mar 2022	0.447	Mar 2023	-		0.447	Continuing	Continuing	Continuing
Maritime Strike Development Support	SS/CPFF	Various : Pax River, MD	0.529	1.257	Feb 2021	0.044	Feb 2022	0.045	Feb 2023	-		0.045	Continuing	Continuing	Continuing
Maritime Strike Development Support	SS/CPFF	BAE : McLean, VA	0.035	0.088	Feb 2021	0.000		0.000		-		0.000	0.000	0.123	0.085
Maritime Strike Development Support	WR	NSWC Corona : Corona, CA	0.127	0.096	Oct 2020	0.039	Nov 2021	0.039	Nov 2022	-		0.039	Continuing	Continuing	Continuing
Maritime Strike Development Support	WR	NSWC-IHD : Indian Head, MD	0.060	0.000		0.000		0.000		-		0.000	0.000	0.060	0.105
Maritime Strike Development Support	SS/CPFF	Keysight Tech : Colorado Springs, CO	5.101	0.000		0.000		0.000		-		0.000	0.000	5.101	5.101
Subtotal			44.551	8.220		4.891		4.994		-		4.994	Continuing	Continuing	N/A

Remarks
FY 2023 funding continues Program of Record documentation activities.

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4034 / Maritime Strike
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Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maritime Strike Test and Evaluation	WR	NAWC-WD : China Lake	3.063	5.378	Nov 2020	4.969	Nov 2021	5.069	Nov 2022	-		5.069	Continuing	Continuing	Continuing
Maritime Strike Test and Evaluation	WR	NAWC-AD : Pax River	0.000	0.094	Nov 2020	0.234	Nov 2021	0.239	Nov 2022	-		0.239	Continuing	Continuing	Continuing
Maritime Strike Test and Evaluation	WR	NSWC-DD : Dahlgren, VA	0.000	1.179	Oct 2020	0.982	Nov 2021	1.001	Nov 2022	-		1.001	Continuing	Continuing	Continuing
Maritime Strike Test and Evaluation	WR	NSWC-PHD : Port Hueneme, CA	0.644	0.420	Oct 2020	0.381	Nov 2021	0.388	Nov 2022	-		0.388	Continuing	Continuing	Continuing
Maritime Strike Test and Evaluation	WR	NSWC-IHD : Indian Head, MD	0.000	0.104	Oct 2020	0.093	Nov 2021	0.094	Nov 2022	-		0.094	Continuing	Continuing	Continuing
Martime Strike Test and Evaluation	WR	NUWC-NPT : Newport, RI	0.000	0.101	Oct 2020	0.048	Nov 2021	0.048	Nov 2022	-		0.048	Continuing	Continuing	Continuing
Martime Strike Test and Evaluation	MIPR	DLA : Philadelphia, PA	3.416	0.000		0.000		0.000		-		0.000	0.000	3.416	6.034
Subtotal			7.123	7.276		6.707		6.839		-		6.839	Continuing	Continuing	N/A

Remarks
 FY 2023 Test and Evaluation Maritime Strike funding required to continue transition to production representative testing. Efforts to support continued missile Operationally Embedded Software development to support full seeker capabilities and performance requirements; build-up of missiles for test events to include hardware and software integration; continuation of Quick Reaction Assessment (QRA) software build-up, System of Systems Test Environment and Signal Processor in the Loop performance runs and analysis. Tactical Tomahawk Weapons Control System Increment/Fix-it Build #1 completion in preparation for Segment Test and QRA. Continue fleet training and ship install of MST hardware and preparations for ship install of MST software.

	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	348.921	120.959	69.568	85.101	-	85.101	Continuing	Continuing	N/A

Remarks

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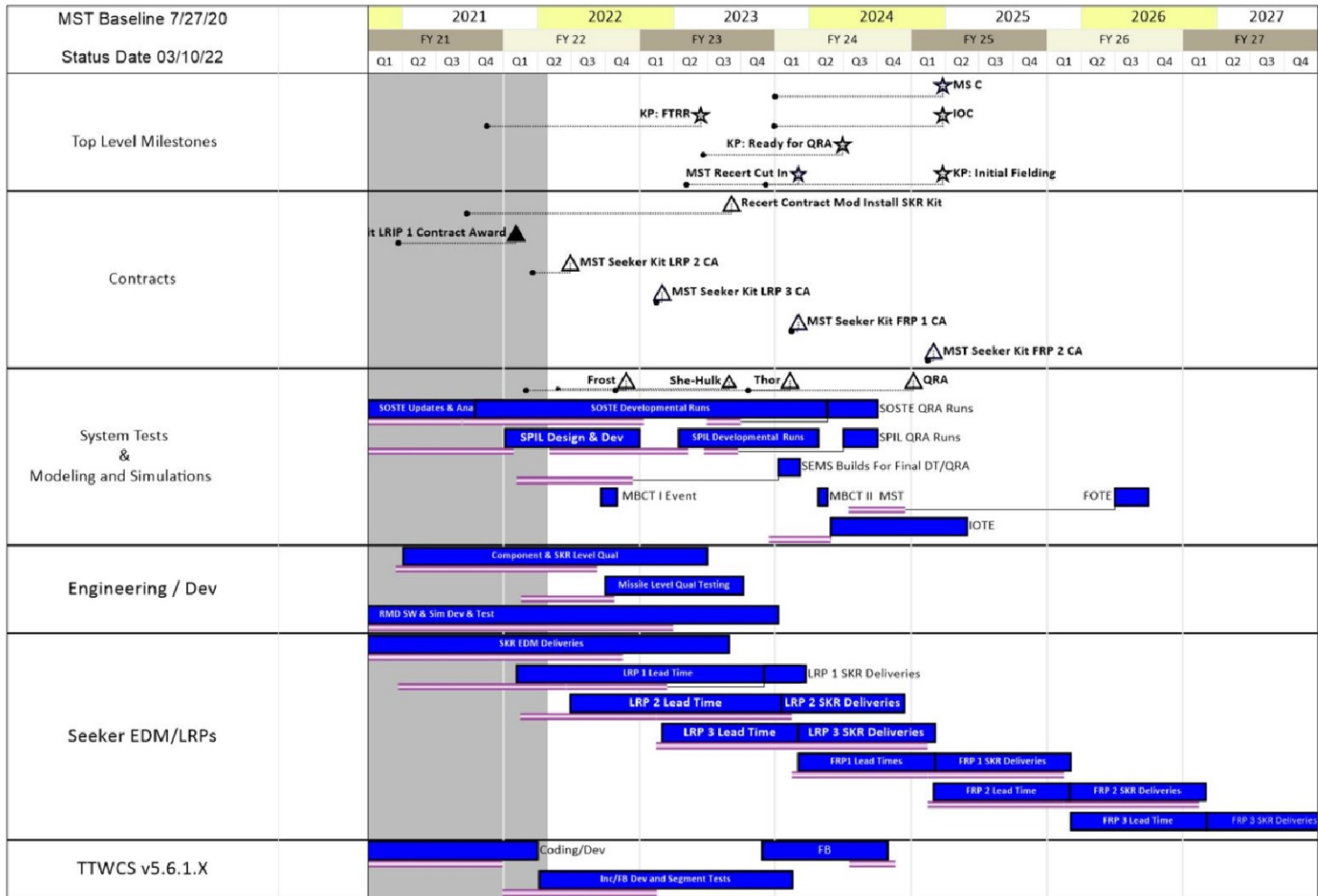
Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy

Date: April 2022

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0204229N / Tomahawk Mssn Planning Ctr

Project (Number/Name)
4034 / Maritime Strike



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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 0204229N / Tomahawk Mssn Planning C tr	Project (Number/Name) 4034 / Maritime Strike
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4034				
Acquisition Milestones: Top Level Milestones: KP Flight Readiness Review	1	2023	1	2023
Acquisition Milestones: Top Level Milestones: KP Ready for Quick Reaction Assessment	3	2024	3	2024
Acquisition Milestones: Top Level Milestones: MST IOC	1	2025	1	2025
Acquisition Milestones: Top Level Milestones: KP Initial Fielding	1	2025	1	2025
Acquisition Milestones: Top Level Milestones: Milestone C	1	2025	1	2025
Contracts: Contract Awards: MST Seeker Kit LRP 1 Contract Award	1	2022	1	2022
Contracts: Contract Awards: Recert Contract Modification to Install SKR Kit	3	2023	3	2023
Contracts: Contract Awards: MST Seeker Kit LRP 2 Contract Award	2	2022	2	2022
Contracts: Contract Awards: MST Seeker Kit LRP 3 Contract Award	1	2023	1	2023
Contracts: Contract Awards: MST Seeker Kit FRP 1 Contract Award	1	2024	1	2024
Contracts: Contract Awards: MST Seeker Kit FRP 2 Contract Award	1	2025	1	2025
System Test & Modeling & Simulation: SPIL Design & Dev	1	2022	1	2023
System Test & Modeling & Simulation: SPIL Development Runs	2	2023	2	2024
System Test & Modeling & Simulation: SPIL QRA Runs	3	2024	4	2024
System Test & Modeling & Simulation: SoSTE Update & Analysis	1	2021	4	2021
System Test & Modeling & Simulation: SoSTE Development Runs	4	2021	2	2024
System Test & Modeling & Simulation: SoSTE QRA Runs	3	2023	4	2024
System Test & Modeling & Simulation: Frost	4	2022	4	2022
System Test & Modeling & Simulation: She-Hulk	3	2023	3	2023
System Test & Modeling & Simulation: Thor	2	2024	2	2024

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4034 / <i>Maritime Strike</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
System Test & Modeling & Simulation: SEMS Builds for final DT/QRA	1	2024	2	2024
System Test & Modeling & Simulation: IOT&E	2	2024	2	2025
System Test & Modeling & Simulation: FOT&E	3	2026	4	2026
Reviews: Engineering/Dev: Component & Seeker Level Qual Testing	2	2021	2	2023
Reviews: Engineering/Dev: Missile Level Qual Testing	4	2022	4	2023
Reviews: Engineering/Dev: SW & Sim Dev & Test	1	2021	1	2024
Reviews: TTWCS v5.6.1.X: Coding/Dev	1	2021	1	2022
Reviews: TTWCS v5.6.1.X: Inc/FB Development and Segment Tests	2	2022	4	2023
Seeker EDM/LRPS: Seeker EDM Deliveries	1	2021	3	2023
Seeker EDM/LRPS: LRP 1 Seeker Del	1	2024	1	2024
Seeker EDM/LRPS: LRP 2 Seeker Del	1	2024	4	2024
Seeker EDM/LRPS: LRP 3 Seeker Del	2	2024	2	2025
Seeker EDM/LRPS: FRP 1 Seeker Del	2	2025	1	2026
Seeker EDM/LRPS: FRP 2 Seeker Del	2	2026	1	2027
Seeker EDM/LRPS: FRP 3 Seeker Del	2	2027	4	2027

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4035 / JMEWS
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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
4035: JMEWS	44.383	44.063	36.826	22.616	-	22.616	23.307	9.589	9.750	9.878	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Multiple-Effects Warhead System (JMEWS) ACAT III program enables the Tactical Tomahawk to utilize multiple lethal effects to address Hard and Deeply Buried Targets (HDBT) while increasing the Tomahawk Weapon System (TWS) capabilities against Integrated Air Defense Systems (IADS) and Weapons of Mass Destruction (WMD).

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: JMEWS	44.063	36.826	22.616	0.000	22.616
Articles:	-	-	-	-	-
FY 2022 Plans: JMEWS planned activities include the continuation of the EMD phase and completion of the Critical Design Review (CDR). EMD efforts continue with hardware and software development, target construction, Insensitive Munition (IM) and Hazard Classification (HC) testing, arena testing, fuze and warhead integration, systems engineering reviews and Safety Review Boards.					
FY 2023 Base Plans: JMEWS planned activities include the continuation of the EMD phase and post Critical Design Review (CDR) testing, to include Functional Ground Test (FGT) and the start of Flight Testing. EMD efforts continue with hardware and software development, target construction, Insensitive Munitions (IM) and Hazard Classification (HC) testing, arena testing, fuze and warhead integration, systems engineering reviews, and Safety Review board.					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement: Decrease in funding from FY 2022 to FY 2023 due to completion of post Critical Design Review (CDR) testing, fuze development efforts and EMD fuze material procurement.					
Accomplishments/Planned Programs Subtotals	44.063	36.826	22.616	0.000	22.616

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4035 / JMEWS

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• WPN 2301: <i>Tomahawk Mods</i>	0.000	0.000	1.406	-	1.406	12.318	25.307	26.983	25.831	516.289	608.134

Remarks

Other Program Funding Summary for WPN BLI 2301 does not include funding for the Tomahawk Recertification program as there is no RDTE funding associated with that program.

D. Acquisition Strategy

Joint Multiple Effects Warhead System (JMEWS) (ACAT III) acquisition strategy includes the development, integration, test, qualification and production of a new warhead that will greatly expand the land target set that the Tomahawk missile is capable of defeating by combining the blast and fragmentation capabilities of the current warhead with a new penetration capability and improved mission planning. JMEWS will also be compliant with Insensitive Munitions requirements which improves safety during transportation and storage on land and aboard ships and submarines. JMEWS Milestone B occurred in FY 2020, Milestone C is planned for FY 2024, and the capability will Fleet Release in FY 2027. JMEWS program includes upgrades to the All-Up Round (AUR) missile, the Tactical Tomahawk Weapons Control System (TTWCS) and also required upgrades Theater Mission Planning Center (TMPC) program (under PU 4036).

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4035 / JMEWS
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMEWS	SS/CPPIF	Raytheon : Tucson, AZ	19.046	30.139	Nov 2020	24.664	Nov 2021	15.000	Nov 2022	-		15.000	Continuing	Continuing	Continuing
JMEWS	WR	NAWC-WD : China Lake, CA	8.844	5.288	Nov 2020	6.260	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
JMEWS/TTWCS	SS/CPFF	LMVF : Valley Forge, PA	0.073	0.049	Jul 2021	0.052	Feb 2022	0.300	Feb 2023	-		0.300	0.000	0.474	-
JMEWS	WR	NSWC-DD : Dahlgren, VA	0.000	0.000		0.000		1.695	Nov 2022	-		1.695	0.000	1.695	-
Subtotal			27.963	35.476		30.976		16.995		-		16.995	Continuing	Continuing	N/A

Remarks
FY 2023 JMEWS Product Development funds NSWC Dahlgren for TTWCS Development support software development and testing efforts to implement JMEWS into TTWCS.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMEWS Development Support	SS/CPFF	UARC-APL : Laurel, MD	0.125	0.055	Jul 2021	0.060	Dec 2021	0.141	Dec 2022	-		0.141	Continuing	Continuing	Continuing
JMEWS Development Support	WR	NSWC-IH : Indian Head, MD	0.902	0.508	Dec 2020	0.182	Nov 2021	0.281	Nov 2022	-		0.281	Continuing	Continuing	Continuing
JMEWS Development Support	WR	NSWC-DD : Dahlgren, VA	0.755	0.332	Dec 2020	0.580	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
JMEWS Development Support	WR	NAWC-AD : Patuxent River, MD	0.885	0.422	Oct 2020	0.367	Nov 2021	0.315	Nov 2022	-		0.315	0.000	1.989	-
JMEWS Development Support	WR	NAWC-WD : China Lake, CA	4.885	0.000		0.000		0.000		-		0.000	0.000	4.885	-
JMEWS VLS Dev Support	SS/CPFF	BAE Systems : Dahlgren, VA	0.230	0.300	Mar 2021	0.100	Nov 2021	0.294	Nov 2022	-		0.294	0.000	0.924	-
JMEWS Development Support	SS/CPFF	Precise Systems : Lexington Park, MD	0.161	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Subtotal			7.943	1.617		1.289		1.531		-		1.531	Continuing	Continuing	N/A

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4035 / JMEWS
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Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
FY 2023 JMEWS Development Support funds government oversight efforts of the Engineering and Manufacturing Development phase, including conduct of scheduled technical reviews. Funds to NSWC Dahlgren support JMEWS implementation into TTWCS.

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMEWS T&E	WR	NAWC-WD : China Lake, CA	8.272	6.837	Nov 2020	4.461	Dec 2021	3.990	Dec 2022	-		3.990	0.000	23.560	-
JMEWS T&E	WR	NSWC-DD : Dahlgren, VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
JMEWS/TTWCS T&E	WR	NUWC-NPT : Newport, RI	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			8.272	6.837		4.461		3.990		-		3.990	0.000	23.560	N/A

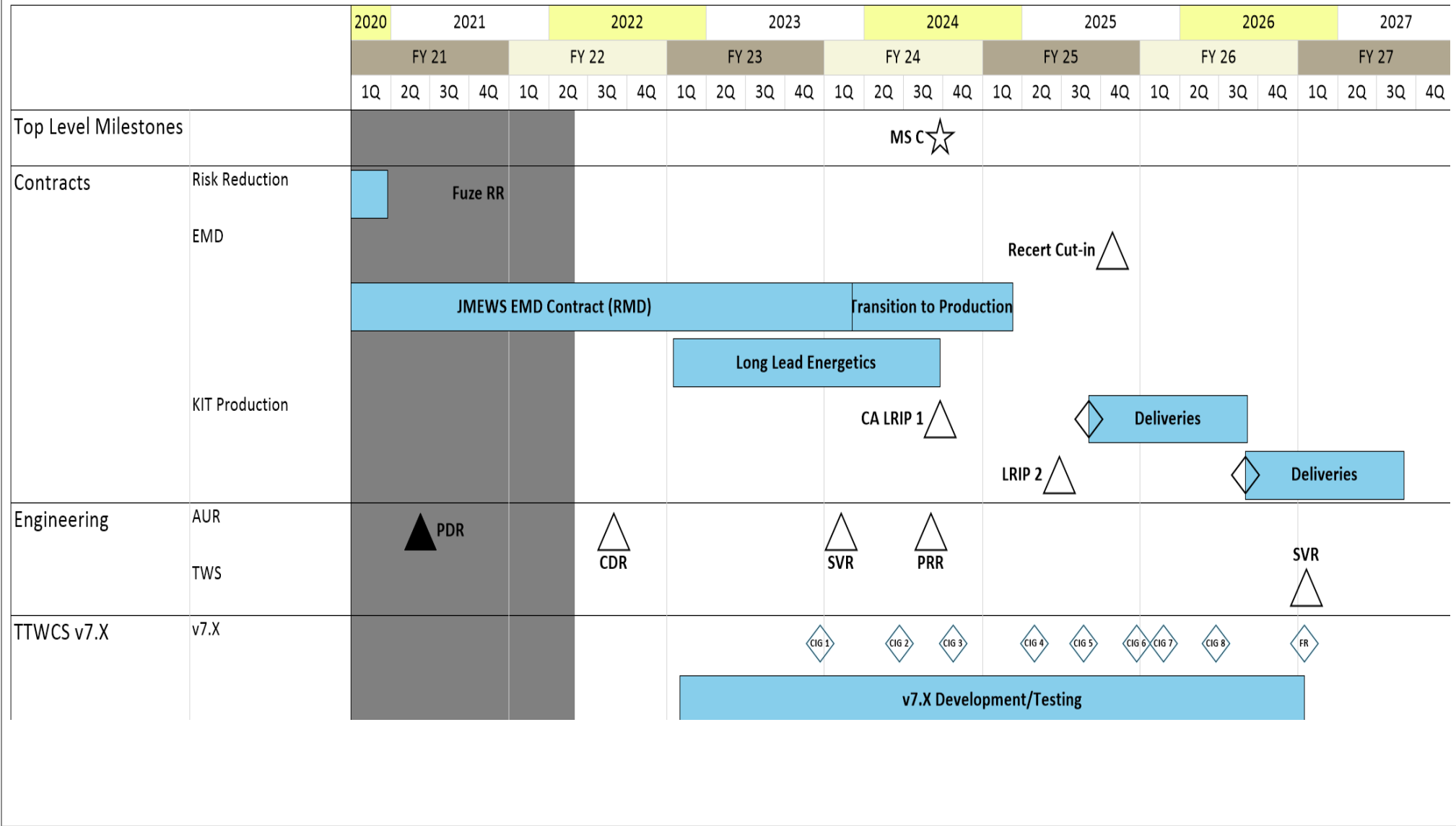
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMEWS	WR	NAWC-AD : Patuxent River, MD	0.205	0.133	Aug 2021	0.100	Nov 2021	0.100	Nov 2022	-		0.100	0.000	0.538	-
Subtotal			0.205	0.133		0.100		0.100		-		0.100	0.000	0.538	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			44.383	44.063	36.826	22.616	-	22.616	Continuing	Continuing	N/A

Remarks

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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 0204229N / Tomahawk Mssn Planning Ctr					Project (Number/Name) 4035 / JMEWS				



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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4035 / JMEWS

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
JMEWS				
Acquisition Milestones: Milestones: Milestone C	3	2024	3	2024
Systems Development: Software Development: JMEWS TTWCS SW Dev	1	2022	3	2024
Systems Development: Software Development: JMEWS TTWCS SW Test	3	2024	4	2025
Reviews: Acquisition Reviews: JMEWS PDR	2	2021	2	2021
Reviews: Acquisition Reviews: JMEWS CDR	3	2022	3	2022
Reviews: Contract Awards: JMEWS Long-Lead Energetics Award	1	2023	1	2023
Reviews: Contract Awards: JMEWS LRIP Lot 1 Award	3	2024	3	2024
Reviews: Contract Awards: JMEWS LRIP Lot 2 Award	2	2025	2	2025

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4036 / <i>TTWCS TMPC PPPI</i>
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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
4036: <i>TTWCS TMPC PPPI</i>	39.786	12.310	8.565	16.943	-	16.943	17.290	18.230	18.584	18.920	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Theater Mission Planning Center (TMPC) consists of Commercial and Government Off-The-Shelf (COTS/GOTS) software and COTS hardware. TMPC is the mission planning segment of the Tomahawk Weapon System (TWS) that provides subsystems for the precision targeting, route planning, mission distribution, and strike management of Tomahawk cruise missile missions from sites located ashore and afloat. TMPC optimizes all aspects of the Tomahawk missile mission to successfully engage a target.

TMPC provides mission planning at the theater and operational levels and is designed for high rate mission planning production responsive to national strategic, operational, and tactical requirements. TMPC develops and distributes missions; provides command information services for all variants of the Tomahawk missile; provides strike planning, execution, coordination, control and reporting, and provides Maritime Component Commanders (MCC) the capability to plan or modify conventional TWS missions. TMPC is employed in major joint combat operations and Overseas Contingency Operations. TMPC has evolved into 4 scalable configurations deployed at 191 sites: Cruise Missile Support Activities (CMSAs) (3), Tomahawk Strike Mission Planning Cells (TSMPCs) (3), Carrier Strike Groups (CSGs) (19 Total: 12 Afloat / 7 Shore), and Firing Units (FRUs) (144 - 89 Surface / 55 Subsurface). Additionally, TMPC is installed in Labs (6) and Training Classrooms (13) that contain various combinations of the four configurations. TMPC software development activities support new capabilities for the Tomahawk Weapon System while also decreasing mission planning time, increasing the quality and accuracy of each mission and reducing complexity. TMPC was previously referred to as Tomahawk Command and Control System (TC2S).

The Tactical Tomahawk Weapons Control System (TTWCS) provides launch capability for surface and submarine platforms. Development of the TTWCS provides a common architecture to launch the TACTOM and all variants in inventory. Development of upgrades to the TTWCS is required to meet the Department of Defense Information Technology Standards Registry, address cyber threats through system security builds, remain interoperable within the Joint Service Architecture, and to retain weapons system viability and usability for our Sailors. Additionally, TTWCS provides launch capability for various fielded missiles, through an incremental approach to software and hardware performance upgrades. These efforts provide battle-group tactical flexibility and responsiveness while maximizing TWS wartime capability.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Theater Mission Planning Center (TMPC)	12.275	8.565	10.838	0.000	10.838
Articles:	-	-	-	-	-
FY 2022 Plans:					

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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 0204229N / Tomahawk Mssn Planning C tr	Project (Number/Name) 4036 / TTWCS TMPC PPPI

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>Continue evaluation of TMPC design process to ensure Tomahawk missile performance characteristics are adequately modeled in TMPC. Complete navigation and communications system testing at the TWS level required to support the TWS Modernization program and resolve critical deficiencies as required. Continue coding of Maritime Strike Tomahawk (MST) capability. Continue requirements definition and preliminary design to support TWS Joint Multiple Effects Warhead System (JMEWS) transition, demonstration and test efforts.</p> <p>FY 2023 Base Plans: Continue evaluation of TMPC design process to ensure Tomahawk missile performance characteristics are adequately modeled in TMPC. Complete coding of TMPC 7.0 and the Maritime Strike Tomahawk (MST) capability. Commence software development and integration of the TWS Joint Multiple Effects Warhead System (JMEWS). Conduct Product Acceptance Testing (PAT) and DT/OT of TMPC 7.0. Commence PAT & DT/OT for MST.</p> <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase in FY23 funding provides for PAT & DT/OT of the TMPC 7.0.</p>					
<p>Title: Tactical Tomahawk Weapons Control System (TTWCS)</p> <p align="right">Articles:</p>	0.035 -	0.000 -	6.105 -	0.000 -	6.105 -
<p>FY 2022 Plans: N/A</p> <p>FY 2023 Base Plans: FY 2023 plans include initial planning, and design/development and validation of new advanced computing hardware (HW) components with increased capacity/throughput, security measures, and software architecture that increases performance for fielded systems and is aligned/interoperable with future networking capabilities. Address development of automated software (SW) testing to reduce cycle time, improve quality, and enhance HW/SW for security engineering. Evaluate fielded systems for cyber threats, create impact assessments and mitigation plans, and develop suitable alternatives/roadmaps.</p> <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement:</p>					

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4036 / <i>TTWCS TMPC PPPI</i>

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 FY2022 to FY2023 is due to the initial planning, and design/development of new advanced computing software (SW) and hardware (HW) components with increased capacity/throughput, security measures, and software architecture that increases performance for fielded systems, and is aligned/ interoperable with future networking capabilities. Funding will address the development of automated software (SW) testing to reduce cycle time, improve quality, and enhance HW/SW for security engineering. The increased funding supports the evaluation of fielded systems for cyber threats, creation of impact assessments and mitigation plans, and development of suitable alternatives/roadmaps, the necessary evaluation and prototyping following system analyses, hardware/software procurement in support of test bed development of performance enhancements, and prototyping of software and hardware.					
Accomplishments/Planned Programs Subtotals	12.310	8.565	16.943	0.000	16.943

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN 5253: <i>Tomahawk Support Equipment</i>	77.370	87.147	95.856	-	95.856	92.168	90.776	92.197	93.850	Continuing	Continuing
• OPN 9020: <i>Initial and Vendor Direct Spares</i>	0.387	0.599	0.764	-	0.764	0.762	0.589	0.741	0.755	Continuing	Continuing

Remarks

D. Acquisition Strategy
 TMPC and TTWCS require periodic hardware and software updates to maintain compliance with cybersecurity standards and maintain system performance against obsolescence and emerging security threats. TMPC and TTWCS segments rely on a blend of industry and government (COTS/GOTS) materiel, new technologies, Fleet CONOPs and shipboard capabilities, and Naval engineering expertise to predict, upgrade, field, and maintain systems that meet our requirement to service the Fleet with Tomahawk.

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4036 / TTWCS TMPC PPPI
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TMPC 7.0	SS/CPFF	Perspecta : San Jose, CA	6.885	3.292	Dec 2020	0.293	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 7.0	SS/CPFF	Tapestry : St. Louis, MO	0.333	0.095	Jan 2021	0.097	Jan 2022	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 7.0	SS/CPFF	BAE Systems : San Diego, CA	1.295	1.095	Dec 2020	0.097	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 7.0	SS/CPFF	Leidos : California, MD	7.961	3.309	Dec 2020	1.426	Dec 2021	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 7.0	SS/CPFF	UARC APL : Laurel, MD	0.992	0.114	May 2021	0.105	May 2022	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 7.0	WR	NAWC-AD : Patuxent River, MD	3.724	2.331	Nov 2020	0.296	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	SS/CPFF	Perspecta : San Jose, CA	1.507	0.236	Dec 2020	0.687	Dec 2021	0.589	Dec 2022	-		0.589	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	SS/CPFF	Tapestry : St. Louis, MO	1.863	0.248	Jan 2021	0.610	Jan 2022	0.308	Jan 2023	-		0.308	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	SS/CPFF	BAE Systems : San Diego, CA	1.117	0.204	Dec 2020	0.916	Dec 2021	1.178	Dec 2022	-		1.178	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	SS/CPFF	Leidos : California, MD	3.583	0.272	Dec 2020	2.175	Dec 2021	1.980	Dec 2022	-		1.980	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	SS/CPFF	UARC APL : Laurel, MD	1.001	0.287	May 2021	0.584	May 2022	1.125	May 2023	-		1.125	Continuing	Continuing	Continuing
TMPC 8.0 (JMEWS)	WR	NAWC-AD : Patuxent River, MD	1.306	0.367	Nov 2020	1.004	Nov 2021	1.658	Nov 2022	-		1.658	Continuing	Continuing	Continuing
Systems Engineering - TTWCS Improvements	WR	NSWC : Dahlgren, VA	1.705	0.000		0.000		1.989	Oct 2022	-		1.989	Continuing	Continuing	Continuing
Systems Engineering-TTWCS Software Support Activity	SS/CPFF	LMVF : Valley Forge, PA	1.102	0.035	Dec 2020	0.000		1.777	Dec 2022	-		1.777	Continuing	Continuing	Continuing
Systems Engineering - TTWCS Hardware Support	WR	NSWC PHD : Port Hueneme	0.000	0.000		0.000		0.940	Dec 2022	-		0.940	0.000	0.940	-

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4036 / TTWCS TMPC PPPI
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Systems Engineering - TTWCS Software Support	WR	NUWC NPT : Newport, RI	0.000	0.000		0.000		0.685	Nov 2022	-		0.685	0.000	0.685	-
Subtotal			34.374	11.885		8.290		12.229		-		12.229	Continuing	Continuing	N/A

Remarks
 Change has been made to Cost Category Item Name from TMPC 8.0 to JMEWS.
 TMPC 7.0 Implements functionality to support Maritime Strike Tomahawk. Aligns with PU 4034.
 TMPC 8.0 (JMEWS) Implements functionality to support JMEWS and additional M-Code capabilities. Aligns with PU 4033 and 4035.
 TTWCS Product Development funds to support to design/development and validation of new advanced computing hardware (HW) components with increased capacity/throughput, security measures, and software architecture that increases performance for fielded systems and is aligned/interoperable with future networking capabilities.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TMPC 6.0	SS/CPFF	Perspecta : San Jose, CA	1.395	0.000		0.000		0.000		-		0.000	0.000	1.395	1.496
TMPC 6.0	SS/CPFF	Leidos : California, MD	2.484	0.425	Nov 2020	0.000		0.000		-		0.000	0.000	2.909	1.717
TMPC 7.0	SS/CPFF	Leidos : California, MD	0.000	0.000		0.275	Dec 2021	0.175	Dec 2022	-		0.175	0.000	0.450	-
PPPI Development Support	SS/CPFF	Precise : Lexington Park, MD	1.143	0.000		0.000		0.000		-		0.000	0.000	1.143	-
Subtotal			5.022	0.425		0.275		0.175		-		0.175	0.000	5.897	N/A

Remarks
 TMPC 6.0 Implements functionality to support Missile Modernization; Timeline Improvements; Navigation and Communications Upgrades and M-Code compatibility. Aligns with PU: 4032.
 TMPC 7.0 Implements functionality to support Maritime Strike Tomahawk capability. Aligns with PU: 4034.

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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4036 / TTWCS TMPC PPPI
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Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
TTWCS Mod Testing	WR	NSWC PHD : Port Hueneme	0.390	0.000		0.000		0.000		-		0.000	0.000	0.390	-
TMPC 7.0	C/CPFF	Perspecta : San Jose, CA	0.000	0.000		0.000		0.500	Dec 2022	-		0.500	0.000	0.500	-
TMPC 7.0	C/CPFF	Leidos : California, MD	0.000	0.000		0.000		1.825	Dec 2022	-		1.825	0.000	1.825	-
TMPC 7.0	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.000		1.500	Dec 2022	-		1.500	0.000	1.500	-
TTWCS Hardware Testing	WR	NSWC PHD : Port Hueneme	0.000	0.000		0.000		0.714	Nov 2022	-		0.714	0.000	0.714	-
Subtotal			0.390	0.000		0.000		4.539		-		4.539	0.000	4.929	N/A

Remarks
 TTWCS Test and Evaluation funds are required to support testing of new hardware.
 TMPC funding increase in FY 2023 supports PAT and DT/OT for TMPC 7.0.

	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	39.786	12.310	8.565	16.943	-	16.943	Continuing	Continuing	N/A

Remarks

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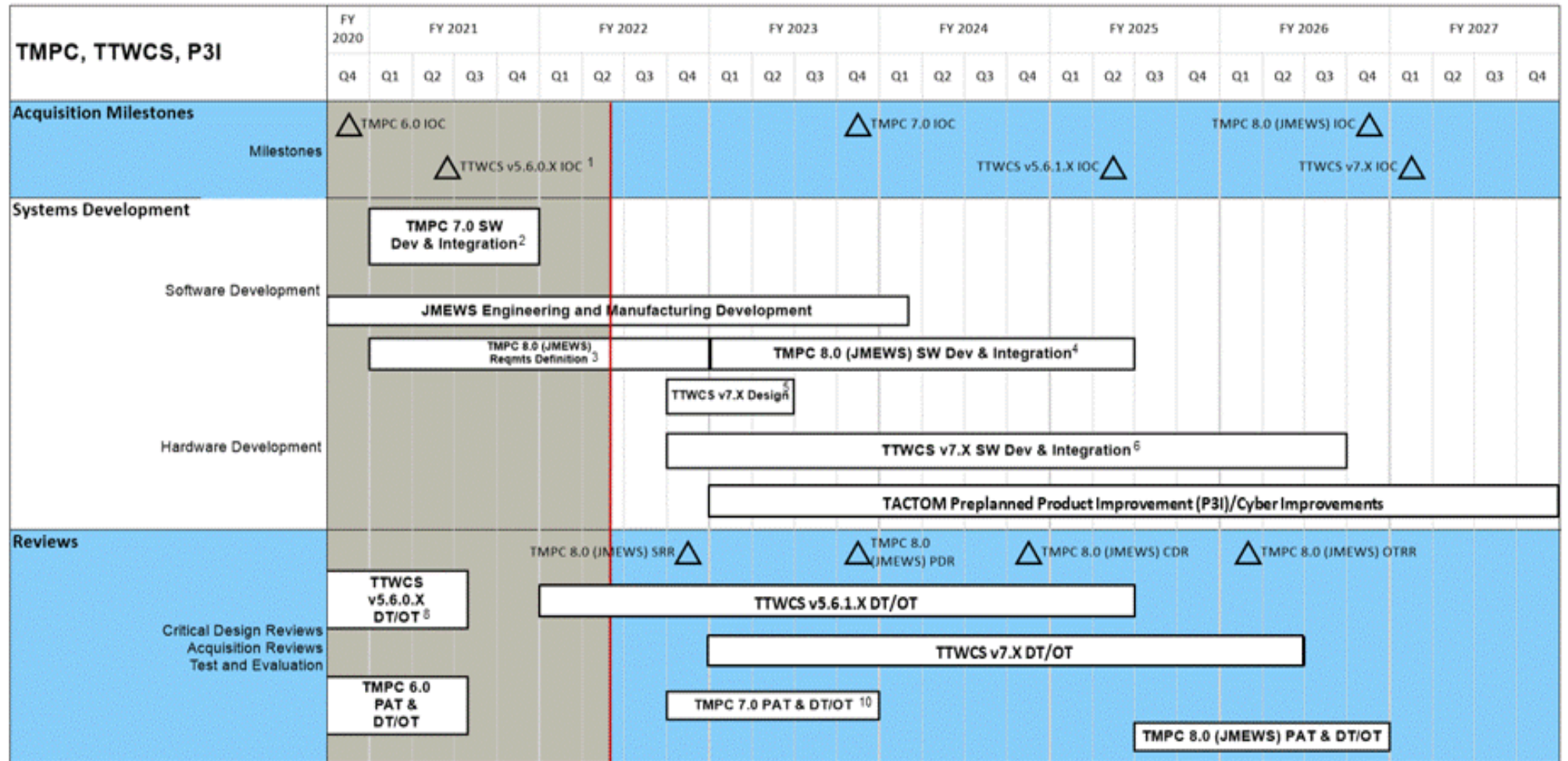
Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy

Date: April 2022

Appropriation/Budget Activity
1319 / 7

R-1 Program Element (Number/Name)
PE 0204229N / Tomahawk Mssn Planning Ctr

Project (Number/Name)
4036 / TTWCS TMPC PPPI



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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 0204229N / Tomahawk Mssn Planning Ctr	Project (Number/Name) 4036 / TTWCS TMPC PPPI

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
TMPC, TTWCS, P3I				
Acquisition Milestones: Milestones: TMPC 7.0 IOC	4	2023	4	2023
Acquisition Milestones: Milestones: TMPC 8.0 (JMEWS) IOC	4	2026	4	2026
Acquisition Milestones: Milestones: TTWCS v5.6.0.X IOC	2	2021	2	2021
Acquisition Milestones: Milestones: TTWCS v5.6.1.X IOC	2	2025	2	2025
Acquisition Milestones: Milestones: TTWCS v7.X (previously v5.7) IOC	1	2027	1	2027
Systems Development: Software Development: TMPC 7.0 SW Dev & Integration	1	2021	4	2022
Systems Development: Software Development: TMPC 8.0 (JMEWS) SW Dev & Integration	1	2023	2	2025
Systems Development: Software Development: TMPC 8.0 (JMEWS) Requirements Definition	1	2022	4	2022
Systems Development: Software Development: TTWCS v7.X (previously v5.7) Design	4	2022	2	2023
Systems Development: Software Development: TTWCS v7.X (previously v5.7) SW Dev & Int	4	2022	3	2026
Systems Development: Hardware Development: TACTOM Preplanned Product Improvement (P3I) / Cyber Improvements	1	2023	4	2027
Reviews: Critical Design Reviews: TMPC 8.0 (JMEWS) System Requirements Review (SRR)	4	2022	4	2022
Reviews: Critical Design Reviews: TMPC 8.0 (JMEWS) Critical Design Review (CDR)	4	2024	4	2024
Reviews: Critical Design Reviews: TMPC 8.0 (JMEWS) Preliminary Design Review (PDR)	4	2023	4	2023
Reviews: Test and Evaluation: TTWCS v5.6.1.X DT/OT	1	2022	2	2025
Reviews: Test and Evaluation: TTWCS v7.X (previously v5.7) DT/OT	1	2023	2	2026
Reviews: Test and Evaluation: TMPC 7.0 Product Acceptance Testing (PAT) & DT/OT	4	2022	4	2023

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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 0204229N / <i>Tomahawk Mssn Planning Ctr</i>	Project (Number/Name) 4036 / <i>TTWCS TMPC PPPI</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Reviews: Test and Evaluation: TMPC 8.0 (JMEWS) Product Acceptance Testing (PAT) & DT/OT	3	2025	4	2026
Reviews: Test and Evaluation: TMPC 8.0 (JMEWS) Operational Test Readiness Review (OTRR)	1	2026	1	2026