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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 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0204202N / DDG-1000
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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	1,806.252	216.951	112.576	197.436	-	197.436	98.223	35.404	25.462	4.617	Continuing	Continuing
2464: <i>DD(X) Sys Design, Dev & Integration</i>	1,806.252	216.951	112.576	197.436	-	197.436	98.223	35.404	25.462	4.617	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 197

Note

The FY22 to FY23 increase of \$84.86M is for Conventional Prompt Strike (CPS) design, integration and test onboard the DDG 1000 class platform. Specifically the systems engineering, analysis, modeling and simulation, and planning activities necessary in advance of the planned CPS installation during the DDG 1000 Dry-Docking Selected Restricted Availability (DSRA) starting in FY24.

A. Mission Description and Budget Item Justification

This Program Element (PE) provides funds for development of the DDG 1000 Class of U.S. Navy surface combatants. The mission of the DDG 1000 class is to provide credible independent forward presence/deterrence and operate as an integral part of Naval, Joint or Combined Maritime Forces. DDG 1000 will establish and maintain surface and sub-surface superiority, provide local air defense, and incorporate signature reduction to operate in all threat environments. DDG 1000 will have seamless Joint Interoperability to integrate all source information for battlespace awareness and weapons direction.

Funding provided is for design activities necessary to integrate Conventional Prompt Strike (CPS) into all three ZUMWALT Class Destroyers to perform the required systems engineering, analysis, modeling and simulation necessary to install the Conventional Prompt Strike capability on DDG 1000 during her first DSRA in FY24. The funding provides a flexible, surface combatant launched long-range strike capability through the ships' remaining service life. When combined with the low observable characteristics of the ZUMWALT platform, the ships provide a compelling strike capability from a platform designed to complicate an adversaries' targeting problem. Funding enables ship modifications for installation of a CPS cold launch system common to the future Virginia Payload Module.

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B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	222.519	112.576	0.000	-	0.000
Current President's Budget	216.951	112.576	197.436	-	197.436
Total Adjustments	-5.568	0.000	197.436	-	197.436
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-5.568	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	-	-	197.436	-	197.436

Change Summary Explanation

The FY 2023 funding request was reduced by \$21.000 million to account for the availability of prior year execution balances.

Increase from FY22 to FY23 was \$84.86M due to Conventional Prompt Strike (CPS) design, integration and test onboard the DDG 1000 class platform

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 / 5					R-1 Program Element (Number/Name) PE 0204202N / DDG-1000				Project (Number/Name) 2464 / DD(X) Sys Design, Dev & Integration			
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
2464: DD(X) Sys Design, Dev & Integration	1,806.252	216.951	112.576	197.436	-	197.436	98.223	35.404	25.462	4.617	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 197												

A. Mission Description and Budget Item Justification

This project encompasses DDG 1000 development efforts required to deliver the Flight I DDG 1000 Class Ships. Major efforts include software requirements analysis, architectural and design code and unit testing, integration, qualification testing, and Independent Verification and Validation (IV&V) for Software Releases; execution of Integrated Power Systems (IPS) and ship control system testing and integration; Live Fire Test and Evaluation (LFT&E), Developmental Testing (DT), and Integrated Testing (IT) in support of the Test and Evaluation Master Plan (TEMP) and development of Tactical Tomahawk Weapon Control System (TTWCS) software. Funding for previous years is included in PE 0604300N and under 0204202N Project Unit 4009.

Funding provided is for design activities necessary to integrate Conventional Prompt Strike (CPS) into all three ZUMWALT Class Destroyers to perform the required systems engineering, analysis, modeling and simulation necessary to install the Conventional Prompt Strike capability on DDG 1000 during her first Dry-Docking Selected Restricted Availability (DSRA) in FY24. The funding provides a flexible, surface combatant launched long-range strike capability through the ships' remaining service life. When combined with the low observable characteristics of the ZUMWALT platform, the ships provide a compelling strike capability from a platform designed to complicate an adversaries' targeting problem. Funding enables ship modifications for installation of a CPS cold launch system common to the future Virginia Payload Module.

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

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Product / Software Development	154.151	96.176	170.011	0.000	170.011
Articles:	-	-	-	-	-
Description: Product Development/Software Development					
FY 2022 Plans:					
Continue product development for class technical issues to include Electro-Optical / InfraRed (EO/IR) Sensors, cybersecurity, propulsion motor drive controller upgrades and shaft encoder. The continuation of production on Maritime Targeting Cell - Afloat (MTC-A). Within Conventional Prompt Strike (CPS), In-Service Engineering Agent (ISEA) support for tech manual and drawing reviews and shipboard installation validations, Diminishing Manufacturing Sources/Material Shortages (DMSMS) support, conduct a Manpower Analysis study, critical engineering design efforts, complete critical Hardware and Software changes necessary for integrating CPS in the existing Total Ship Computing Environment (TSCE), and develop a model simulator to train Crew members					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>on console operations and weapon system employment. Continue systems engineering efforts for the assured performance, accuracy, integration, and compatibility of the CPS systems and related auxiliary systems by establishing system-level requirements, defining interfaces between sub systems and facilities, and initiating policy/design tenets to ensure overall system performance and interoperability.</p> <p>FY 2023 Base Plans: Continue product development for Conventional Prompt Strike (CPS), ISEA Support for tech manual and drawing reviews and shipboard installation validations, DMSMS support, conduct a Manpower Analysis study, critical engineering design efforts, complete critical Hardware and Software changes necessary for integrating CPS in the existed Total Ship Computing Environment (TSCE), and develop a model simulator to train Crew members on console operations and weapon system employment. Continue systems engineering efforts for the assured performance, accuracy, integration, and compatibility of the CPS systems and related auxiliary systems by establishing system-level requirements, defining interfaces between sub systems and facilities, and initiating policy/design tenets to ensure overall system performance and interoperability.</p> <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase is due to additional CPS Integration funding added to the Program.</p>					
<p>Title: Test and Evaluation</p> <p align="right">Articles:</p> <p>Description: Test and Evaluation Master Plan (TEMP) and CPS Execution</p> <p>FY 2022 Plans: Continued execution of DDG 1000 Class TEMP events</p> <p>FY 2023 Base Plans: Begin testing, analysis, modeling, and simulation to de-risk installation of Conventional Prompt Strike (CPS) on DDG 1000 class ships. Update and deliver the test support equipment design plans unique to ZUMWALT-Class installation and fielding of Test Support Equipment. Deliver technical material describing the approach to integration testing, such as requirements verification, traceability to the Model Based Systems Engineering (MBSE) model, demonstration of incremental system verification and maturation, recommendations</p>	62.800	9.800	16.125	0.000	16.125
	-	-	-	-	-

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
for retest or additional verification activities, identification of required follow on testing, identification of required design changes, and identification of risk in the design. FY 2023 OCO Plans: N/A FY 2022 to FY 2023 Increase/Decrease Statement: Increase is due to CPS Integration funding added to the Program					
Title: Management Services FY 2022 Plans: Conduct a Manpower Analysis study to determine manning requirements for new weapon system. Conduct a Front End Analysis (FEA) to determine training requirements for the crew to operate weapon system and develop a model simulator to train Crew members. FY 2023 Base Plans: Continue to conduct a Manpower Analysis study to determine manning requirements for new weapon system. Conduct a Front End Analysis (FEA) to determine training requirements for the crew to operate weapon system and develop a model simulator to train Crew members. Continue to support requirements associated with Conventional Prompt Strike (CPS) on DDG 1000 Class ships. FY 2023 OCO Plans: N/A FY 2022 to FY 2023 Increase/Decrease Statement: Increase due to planned installation of Conventional Prompt Strike on DDG 1000 Class Ships.	0.000	6.600	11.300	0.000	11.300
Articles:	-	-	-	-	-
Accomplishments/Planned Programs Subtotals	216.951	112.576	197.436	0.000	197.436

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
• OMN / 3B1K: <i>Specialized Skill Training</i>	11.976	3.175	3.258	-	3.258	3.361	3.431	3.487	3.538	0.000	747.894

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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>
• OPN / 0947: DDG 1000 <i>Class Support Equipment</i>	37.859	126.107	314.333	-	314.333	365.378	174.937	52.929	31.084	0.000	1,202.261
• OMN/15BUO: Life <i>Cycle Engineering (IWS)</i>	95.553	96.287	131.254	-	131.254	131.741	152.080	151.351	150.695	0.000	1,057.021
• OMN/15BR1: DDG 1000 Life <i>Cycle Engineering and Sustainment</i>	46.061	38.815	51.405	-	51.405	55.740	51.725	51.931	51.763	0.000	415.822
• SCN/2119: DDG 1000	78.205	56.597	72.976	-	72.976	28.200	0.000	0.000	0.000	0.000	13,378.734

Remarks

D. Acquisition Strategy

DDG 1002 accepted completion of contract requirements at Bath Iron Works in November 2021. The ship arrived at Huntington Ingalls Industries in January 2022 for conduct of her Combat System Availability.

The DDG 1000 program office is working closely with the Strategic Systems Programs (SSP) program office to perform the required systems engineering, analysis, modeling and simulation necessary to install the Conventional Prompt Strike capability on DDG 1000 during her first DSRA. Installation of CPS will follow on DDG 1001 and 1002 within those ships scheduled DSRA windows.

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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 0204202N / DDG-1000	Project (Number/Name) 2464 / DD(X) Sys Design, Dev & Integration
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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			
Ship Integration Development Software	SS/CPAF	Raytheon : Tewksbury MA	990.778	11.300	Dec 2020	2.300	Dec 2021	0.000		-		0.000	0.000	1,004.378	-
Ship Integration Development (Prod Dev), TTWCS /ASIST	SS/CPFF	Various : Various	108.324	0.000		0.000		0.000		-		0.000	0.000	108.324	-
Surface Strike	Various	Various : Various	40.112	46.665	Dec 2020	2.500	Oct 2021	0.000		-		0.000	0.000	89.277	-
Maritime Targeting Cell - Afloat	Various	Various : Various	36.945	59.499	Jan 2021	18.366	Jan 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Alternative Weapon System Analysis	Various	Various : Various	1.312	0.000		0.000		0.000		-		0.000	0.000	1.312	-
Cybersecurity	SS/CPAF	Raytheon : Tewksbury MA	0.000	6.500	Dec 2020	3.200	Dec 2021	0.000		-		0.000	0.000	9.700	-
Product Development for Technical Issues	Various	Various : Various	0.000	16.116	Dec 2020	5.510	Dec 2021	0.000		-		0.000	0.000	21.626	-
Conventional Prompt Strike Design and Integration	C/CPAF	BIW : BATH, ME	0.000	8.200	Feb 2021	28.000	Nov 2021	33.738	Dec 2022	-		33.738	48.300	118.238	-
Conventional Prompt Strike Support	C/CPIF	Lockheed Martin : Denver, CO	0.000	1.000	Apr 2021	31.300	Nov 2021	79.363	Nov 2022	-		79.363	66.300	177.963	-
Conventional Prompt Strike Design and Integration	WR	NSWC : Dahlgren, VA	0.000	2.046	Mar 2021	2.100	Nov 2021	23.902	Nov 2022	-		23.902	9.408	37.456	-
Conventional Prompt Strike Design and Integration	WR	NSWC : Philadelphia, PA	0.000	1.851	Mar 2021	1.900	Nov 2021	21.626	Nov 2022	-		21.626	8.512	33.889	-
Conventional Prompt Strike Design and Integration	Various	Various : Various	0.000	0.974	Mar 2021	1.000	Nov 2021	11.382	Nov 2022	-		11.382	4.480	17.836	-
Subtotal			1,177.471	154.151		96.176		170.011		-		170.011	Continuing	Continuing	N/A

Remarks
 CPS Support: Lockheed Martin will work with the ZUMWALT-Class Combat System Integrator, ZUMWALT Shipbuilder, NAVSEA organizations, and other stakeholders to ensure the CPS Weapon System (WS) is compatible with ZUMWALT-Class DDGs and it meets threshold requirements defined in the derived requirements from the CPS Technical Objectives and Guidelines (TOG).

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Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0204202N / DDG-1000	Project (Number/Name) 2464 / DD(X) Sys Design, Dev & Integration
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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			
SDTS (ITB1-120) / PRA TB	SS/CPFF	Raytheon : Portsmouth, RI	146.692	7.965	Dec 2020	0.300	Dec 2021	0.000		-		0.000	4.800	159.757	-
T&E Engineering	C/CPFF	CSC : Washington, DC	3.800	0.200	Dec 2020	0.000		0.000		-		0.000	0.200	4.200	-
SDTS/PRA/Integrated Test	Various	Various : Various	55.276	8.377	Nov 2020	2.500	Nov 2021	0.000		-		0.000	5.411	71.564	-
Advanced Program	C/CPFF	NSMA : Arlington, VA	20.022	2.986	Mar 2021	0.000		0.000		-		0.000	2.400	25.408	-
Maritime Targeting Cell - Afloat	TBD	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Eng/M&S/Cert Agents	WR	NSWC : Dahlgren, VA	8.983	1.456	Nov 2020	0.000		0.000		-		0.000	0.200	10.639	-
Integrated Test	WR	NSWC : Bethesda, MD	21.566	0.000		1.000	Nov 2021	0.000		-		0.000	1.825	24.391	-
HM&E Systems	WR	NSWC : Philadelphia, PA	0.850	0.000		0.000		0.000		-		0.000	0.125	0.975	-
SDTS/PRA/Test Bed/ ESSM Engagement	Various	Various : Various	11.264	0.000		0.000		0.000		-		0.000	0.000	11.264	-
Threat Assesment/IR	C/CPFF	NRL : Washington, DC	3.245	0.550	Dec 2020	0.000		0.000		-		0.000	1.800	5.595	-
SDTS	WR	SCSC : Wallops, Is, VA	5.903	0.000		0.000		0.000		-		0.000	0.000	5.903	-
LFT&E	C/CPFF	ROI : Mullica Hills, NJ	7.950	0.000		0.000		0.000		-		0.000	0.000	7.950	-
ITB3/ITB4/OPEVAL	Various	Various : Various	39.611	6.919	Nov 2020	0.500	Nov 2021	0.000		-		0.000	14.800	61.830	-
Integration and Testing	Various	Various : Various	12.552	0.000		2.100	Nov 2021	0.000		-		0.000	0.024	14.676	-
T&E Engineering	WR	COTF : Norfolk, VA.	15.261	2.700	Dec 2020	1.000	Dec 2021	0.000		-		0.000	2.634	21.595	-
Int Test/Undersea Warfare	WR	Various : Various	0.747	0.000		0.000		0.000		-		0.000	0.000	0.747	-
TTWCS	C/CPFF	NAVAIR : Not Specified	5.710	2.597	Mar 2021	0.000		0.000		-		0.000	3.600	11.907	-
Sonobouys	TBD	NAVAIR : Not Specified	0.300	0.000		0.000		0.000		-		0.000	0.650	0.950	-

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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			
LRLAP Test Article Procurement ITB3/ITB4 (EMD)	C/CPIF	BAE : Minneapolis, MN	54.064	0.000		0.000		0.000		-		0.000	0.000	54.064	-
LFT&E Engineering	C/CPIF	ROI : Mullica Hills, NJ	36.252	0.400	Dec 2020	0.000		0.000		-		0.000	0.600	37.252	-
ESSM/SM2 Procurement	C/CPIF	Raytheon : Tucson, AZ	39.538	0.000		0.000		0.000		-		0.000	0.000	39.538	-
MOE Test Bed	WR	NUWC : Various	16.390	7.411	Nov 2020	1.000	Oct 2021	0.000		-		0.000	1.657	26.458	-
Component Shock Qualification	WR	Various : Various	28.000	16.000	Oct 2020	0.000		0.000		-		0.000	21.000	65.000	-
SDTS and Integrated Test	Various	PEO IWS : Washington, DC	80.478	1.226	Nov 2020	0.000		0.000		-		0.000	9.298	91.002	-
T&E Engineering	WR	NSWC : Panama City, FL	5.672	1.813	Nov 2020	0.000		0.000		-		0.000	9.200	16.685	-
FSST	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
ESSM	Various	Various : Various	0.800	0.800	Dec 2020	0.200	Dec 2021	0.000		-		0.000	0.000	1.800	-
SM2	Various	Various : Various	1.400	1.400	Dec 2020	1.200	Dec 2021	0.000		-		0.000	0.000	4.000	-
Conventional Prompt Strike Test and Evaluation	C/CPIF	Lockheed Martin : Denver, CO	0.000	0.000		0.000		16.125	Nov 2022	-		16.125	31.100	47.225	-
Travel	Various	NAVSEA : Washington, DC	6.455	0.000		0.000		0.000		-		0.000	0.000	6.455	-
Subtotal			628.781	62.800		9.800		16.125		-		16.125	111.324	828.830	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			
Conventional Prompt Strike Training and Curriculum Development	Various	Various : Various	0.000	0.000		6.600	Nov 2021	11.300	Nov 2022	-		11.300	0.000	17.900	-
Subtotal			0.000	0.000		6.600		11.300		-		11.300	0.000	17.900	N/A

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	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	1,806.252	216.951	112.576	197.436	-	197.436	Continuing	Continuing	N/A

Remarks

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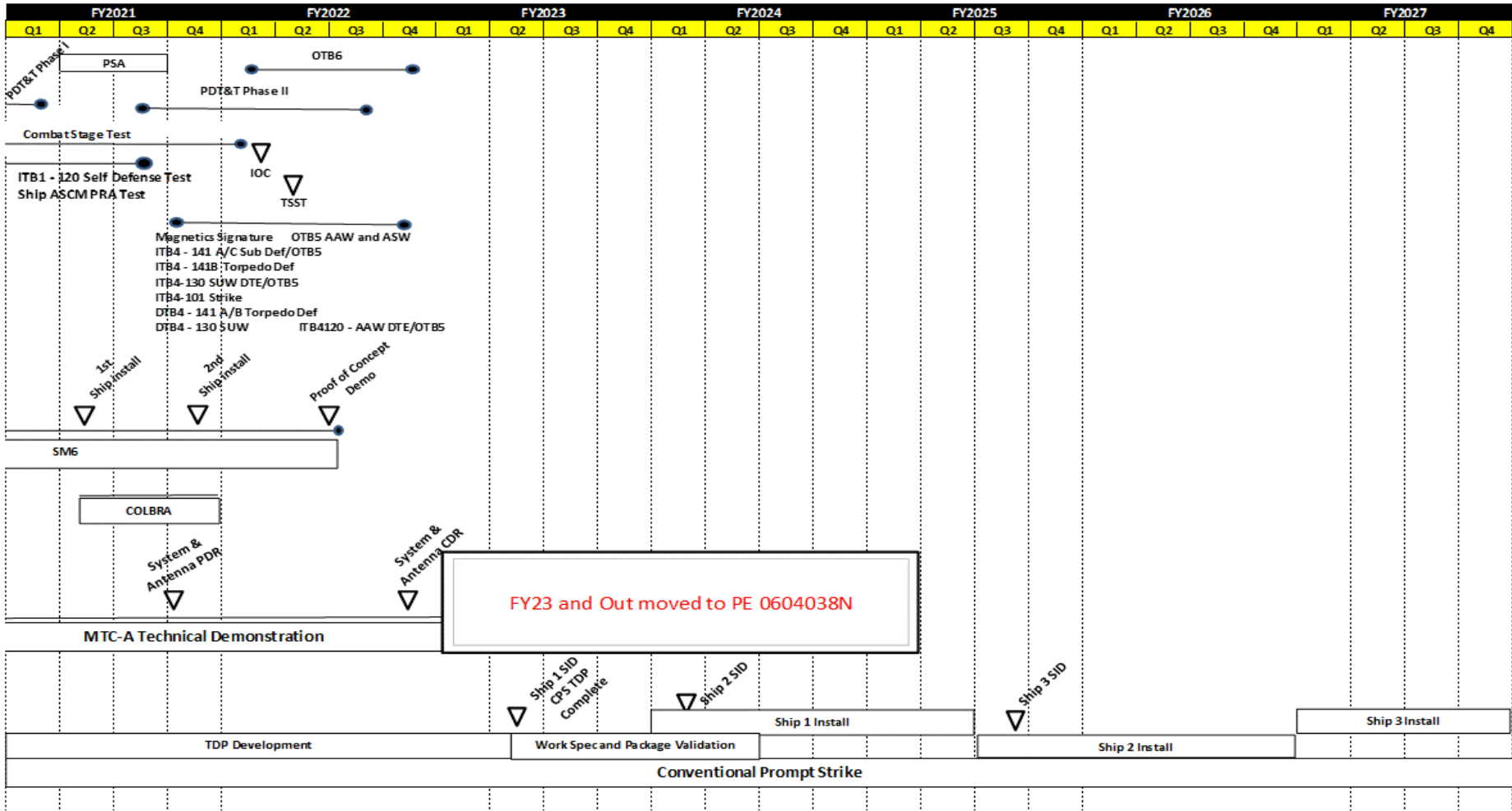
Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy

Date: April 2022

Appropriation/Budget Activity
1319 / 5

R-1 Program Element (Number/Name)
PE 0204202N / DDG-1000

Project (Number/Name)
2464 / DD(X) Sys Design, Dev & Integration



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

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2464				
Conduct ITB1-120 - SDTS	1	2021	3	2021
Combat Stage Test	1	2021	1	2022
Post Delivery Test & Trials Phase I	1	2021	1	2021
Post Shakedown Availability (PSA)	2	2021	3	2021
Post Delivery Test & Trials Phase II	3	2021	3	2022
Initial Operational Capability (IOC)	1	2022	1	2022
Operational Test (OTB6)	1	2022	4	2022
Total Ship Survivability Test (TSST)	2	2022	2	2022
DTB4-141 A/B Torpedo Def, DTB4-130 SUW	4	2021	2	2022
Test Events (Magnetics, ITB4-120 LVAT/Subsonic Weave/Supersonic Diver, ITB4-141 A/C Sub Def/OTB5, ITB4-141B Torpedo Def, ITB4-130 SUW DTE/OTB5, ITB4-101 Strike, OTB5 AAW and ASW)	4	2021	4	2022
Standard Missile (SM6) Operational Demonstration	1	2021	3	2022
Compact Low Profile Broadband Antenna (COLBRA) Integration and Qualification	2	2021	4	2021
MTC-A Technical Demonstration	1	2021	4	2022
Conventional Prompt Strike	1	2021	4	2027