

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0204202N / DDG-1000							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	1,429.462	134.664	140.264	111.435	-	111.435	107.912	72.025	15.042	10.164	Continuing	Continuing
2464: DD(X) Sys Design, Dev & Integration	1,429.462	134.664	140.264	111.435	-	111.435	107.912	72.025	15.042	10.164	Continuing	Continuing
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 197												
A. Mission Description and Budget Item Justification												
The FY 2020 funding request was reduced by \$5.000 million to account for the availability of prior year execution balances.												
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.												
B. Program Change Summary (\$ in Millions)				FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total				
Previous President's Budget				140.500	161.264	132.337	-	132.337				
Current President's Budget				134.664	140.264	111.435	-	111.435				
Total Adjustments				-5.836	-21.000	-20.902	-	-20.902				
• Congressional General Reductions				-	-							
• Congressional Directed Reductions				-	-21.000							
• Congressional Rescissions				-	-							
• Congressional Adds				-	-							
• Congressional Directed Transfers				-	-							
• Reprogrammings				-1.512	0.000							
• SBIR/STTR Transfer				-4.324	0.000							
• Program Adjustments				0.000	0.000	-21.059	-	-21.059				
• Rate/Misc Adjustments				0.000	0.000	0.157	-	0.157				
Change Summary Explanation												
FY18: Reduction due to SBIR and reprogramming action to support the AMDR Mission Flight retest.												
FY19: Reduction of \$21.000M is due to the Lack of Acquisition and Test Strategies for MTC-A												
FY20: The FY20 funding request was reduced by \$5.000M to account for the availability of prior year execution balances, \$15.000M of MTC-A rephased for executability, \$1.059M for Contractor Services Reform reduction, and misc rate adjustments.												

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy									Date: March 2019			
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2464: DD(X) Sys Design, Dev & Integration	1,429.462	134.664	140.264	111.435	-	111.435	107.912	72.025	15.042	10.164	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, Advanced Gun System (AGS), on DD(X).												
Surface Strike												
After a comprehensive review of Zumwalt class requirements, Navy decided in November 2017 to refocus the primary mission of the Zumwalt Class Destroyers from Land Attack to Offensive Surface Strike. The funding requested in PB 19 will facilitate this change in mission and add lethal, offensive fires against targets afloat and ashore. These changes include integration of SM-6 capability, Maritime Strike Tomahawk Integration, and organic cryptologic collection equipment (SPECTRAL). In order to maintain the required radar signature, an upgrade in off-board platform communications to the Network Tactical Common Data Link (NTCDL) is also required, paired with the SPECTRAL system.												
The Advanced Gun Systems will remain on the ships, but in an inactive status for future use, when a gun round that can affordably meet the desired capability is developed and fielded.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product / Software Development  Articles:  Description: Product Development/Software Development  FY 2019 Plans: Enable the integration, lifecycle management and sustainment of the Total Ship Computing Environment (TSCE) Program of Record software as well as the capability to certify software at the Land Attack System Integration Lab (LASIL). Start development of the Surface Strike and Maritime Targeting Cell - Afloat (MTC-A).  FY 2020 Base Plans:								66.344	62.154	63.915	0.000	63.915
								-	-	-	-	-

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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				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue development of the Surface Strike with Critical Design Review (CDR), Software (S/W) development, testing, and roll-out, preparing for Land Based Testing for SM-6. Preliminary Design Review (PDR)/Critical Design Review (CDR), Prepping for Final Qualifications Trail (FQT)for Maritime Strike Tomahawk (MST). Development of a low Radar Cross Section (RCS) antenna for use with SPECTRAL to include requirements definition, CDR, PDR and preparation for testing and installation of the sensor for SPECTRAL. Array placement and integration efforts and procurement of initial LRIP unit for Navy Tactical Common Data Link (NTCDL) and Maritime Targeting Cell - Afloat (MTC-A) with a Phase 1 IPR, a RFP Release, and a software delivery.  <b>FY 2020 OCO Plans:</b> N/A  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Increase is due to the rephasing of MTC-A requirements into FY20 and follow.								
<b>Title:</b> Test and Evaluation  <b>Articles:</b>  <b>Description:</b> Test and Evaluation Master Plan (TEMP) Execution  <b>FY 2019 Plans:</b> Continued planning and execution of Post Delivery Test and Trials TEMP events to include: Survivability, Aviation Facilities certification, Boat Handling System certification, Fueling at Sea certification, Self Defense Test Ship (SDTS) Anti-Air Warfare (AAW), Infrared, Acoustic and Magnetic Signature events, PRA Test Bed modeling and simulation Pre-Flight Runs for lead Ship AAW events, equipment shock qualification, pre-requisite test events for Lead Ship Anti-Air Warfare (AAW) testing, Performance and Special Trials to include Calm Water and Rough Water trials, planning for Lead ship Combat System Ship Qualification Trials (CSSQT), AAW testing, sonar and torpedo defense testing, and Anti-Surface warfare (ASuW) testing.  <b>FY 2020 Base Plans:</b> Execution of TEMP events for AAW, ASuW, IUSW (ASW and Torpedo Defense), execution of leadship CSSQT events, completion of equipment shock qualification, planning for capability improvement, and testing IAW the CNO directed mission change to Offensive Surface Strike..  <b>FY 2020 OCO Plans:</b> N/A  <b>FY 2019 to FY 2020 Increase/Decrease Statement:</b>				68.320 -	78.110 -	47.520 -	0.000 -	47.520 -

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
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				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The decrease of \$30.590M is due to the completion of Equipment Shock Qualification, and the deferral of TEMP events to after completion of the Lead Ship Post Shakedown Availability (PSA).												
Accomplishments/Planned Programs Subtotals								134.664	140.264	111.435	0.000	111.435
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost	
• OMN / 3B1K: Specialized Skill Training	2.971	3.024	3.070	-	3.070	3.129	3.191	3.246	3.311	0.000	728.636	
• OPN / 0947: DDG 1000 Class Support Equipment	0.000	57.700	9.930	-	9.930	14.791	24.516	21.635	22.067	0.000	184.043	
• OMN/15BUO: Life Cycle Engineering (IWS))	18.804	65.356	53.411	-	53.411	40.354	36.571	42.851	43.708	0.000	318.507	
• OMN/15BR1: DDG 1000 Life Cycle Engineering and Sustainment	9.825	12.026	8.368	-	8.368	12.302	11.429	11.531	11.761	0.000	112.225	
• RDTEN/0603795N_2020: Advanced Gun System Projectile	2.884	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	2.884	
• SCN/2119: DDG 1000	216.968	270.965	155.944	-	155.944	50.400	2.100	0.000	0.000	0.000	13,195.453	
Remarks												
D. Acquisition Strategy												
In October 2010 a revised acquisition strategy had been determined that supports the DDG-1000/DDG-51 restart shipyard allocation workload Memorandum of Agreements (MOAs). Execution of the MOAs shifted primary construction of all three DDG-1000 class ships to Bath Iron Works (BIW). Award of the DDG 1001/1002 to BIW occurred in September 2011.												
E. Performance Metrics												
Successfully complete Operational Test Readiness Review. Successfully complete Developmental Test/Integrated Test/Live Fire/Operational Test. Successfully achieve Initial Operational Capability.												

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy** **Date:** March 2019

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0204202N / DDG-1000	<b>Project (Number/Name)</b> 2464 / DD(X) Sys Design, Dev & Integration
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Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Ship Integration Development Software	SS/CPAF	Raytheon : Tewksbury MA	911.935	48.456	Dec 2017	30.387	Dec 2018	0.000		-		0.000	0.000	990.778	-
Ship Integration Development (Prod Dev), TTWCS /ASIST	SS/CPFF	Various : Various	78.281	16.576	Dec 2017	13.467	Dec 2018	0.000		-		0.000	0.000	108.324	-
Surface Strike Implementation	Various	Various : Various	0.000	0.000		8.300	Jan 2019	33.970	Dec 2019	-		33.970	Continuing	Continuing	Continuing
Maritime Targeting Cell - Afloat	Various	Various : Various	0.000	0.000		10.000	Jan 2019	29.945	Jan 2020	-		29.945	Continuing	Continuing	Continuing
Alternative Weapon System Analysis	Various	Various : Various	0.000	1.312	Jun 2018	0.000		0.000		-		0.000	0.000	1.312	-
<b>Subtotal</b>			990.216	66.344		62.154		63.915		-		63.915	Continuing	Continuing	N/A

**Remarks**  
Industry Day for surface strike and MTC-A was conducted in August 2018. This effort is in preparation of RFP release for development efforts beginning in FY19.

Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
SDTS (ITB1-120) / PRA TB	SS/CPFF	Raytheon : Portsmouth, RI	120.799	6.500	Dec 2017	11.300	Dec 2018	8.438	Dec 2019	-		8.438	4.800	151.837	-
T&E Engineering	C/CPFF	CSC : Washington, DC	3.200	0.200	Dec 2017	0.200	Dec 2018	0.200	Dec 2019	-		0.200	0.200	4.000	-
SDTS/PRA/Integrated Test	Various	Various : Various	43.064	6.078	Nov 2017	2.116	Nov 2018	4.018	Nov 2019	-		4.018	5.411	60.687	-
Advanced Program	C/CPFF	NSMA : Arlington, VA	12.179	4.400	Nov 2017	2.400	Nov 2018	3.853	Feb 2020	-		3.853	2.400	25.232	-
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	8.127	0.200	Nov 2017	0.244	Nov 2018	0.412	Nov 2019	-		0.412	0.200	9.183	-
Integrated Test	WR	NSWC : Bethesda, MD	15.333	1.614	Nov 2017	2.450	Nov 2018	2.169	Nov 2019	-		2.169	1.825	23.391	-

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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					
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
HM&E Systems	WR	NSWC : Philadelphia, PA	0.600	0.250	Nov 2017	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/CPIF	NRL : Washington, DC	0.000	1.400	Dec 2017	1.320	Dec 2018	0.525	Dec 2019	-		0.525	1.800	5.045	-
SDTS	WR	SCSC : Wallops, Is, VA	5.903	0.000		0.000		0.000		-		0.000	0.000	5.903	-
LFT&E	C/CPIF	ROI : Mullica Hills, NJ	7.950	0.000		0.000		0.000		-		0.000	0.000	7.950	-
ITB3/ITB4/OPEVAL	Various	Various : Various	0.000	16.092	Nov 2017	12.983	Nov 2018	10.536	Nov 2019	-		10.536	14.800	54.411	-
Integration and Testing	Various	Various : Various	11.930	0.023	Dec 2017	0.599	Dec 2018	0.000		-		0.000	0.024	12.576	-
T&E Engineering	WR	COTF : Norfolk, VA.	9.931	2.516	Dec 2017	2.110	Dec 2018	0.704	Dec 2019	-		0.704	2.634	17.895	-
Int Test/Undersea Warfare	WR	Various : Various	0.747	0.000		0.000		0.000		-		0.000	0.000	0.747	-
TTWCS	C/CPIF	NAVAIR : Not Specified	0.000	2.100	Mar 2018	1.805	Mar 2019	1.805	Apr 2020	-		1.805	3.600	9.310	-
Sonobouys	TBD	NAVAIR : Not Specified	0.000	0.000		0.300	Dec 2018	0.000		-		0.000	0.650	0.950	-
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	33.652	1.600	Dec 2017	0.600	Dec 2018	0.400	Dec 2019	-		0.400	0.600	36.852	-
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	1.760	1.469	Nov 2017	8.515	Nov 2018	4.646	Nov 2019	-		4.646	1.657	18.047	-
Component Shock Qualification	WR	Various : Various	0.000	5.693	Nov 2017	21.000	Nov 2018	1.307	Oct 2019	-		1.307	21.000	49.000	-
SDTS and Integrated Test	Various	PEO IWS : Washington, DC	51.220	16.285	Nov 2017	8.668	Nov 2018	5.565	Nov 2019	-		5.565	9.298	91.036	-
T&E Engineering	WR	NSWC : Panama City, FL	3.530	0.900	Nov 2017	0.500	Nov 2018	0.742	Nov 2019	-		0.742	9.200	14.872	-

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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					
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
FSST	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
ESSM	Various	Various : Various	0.000	0.000		0.000		0.800	Dec 2019	-		0.800	0.000	0.800	-
SM2	Various	Various : Various	0.000	0.000		0.000		1.400	Dec 2019	-		1.400	0.000	1.400	-
Travel	Various	NAVSEA : Washington, DC	4.455	1.000	Oct 2017	1.000	Dec 2018	0.000		-		0.000	1.000	7.455	-
Subtotal			439.246	68.320		78.110		47.520		-		47.520	81.224	714.420	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			1,429.462	134.664		140.264		111.435		-		111.435	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy

Date: March 2019

Appropriation/Budget Activity

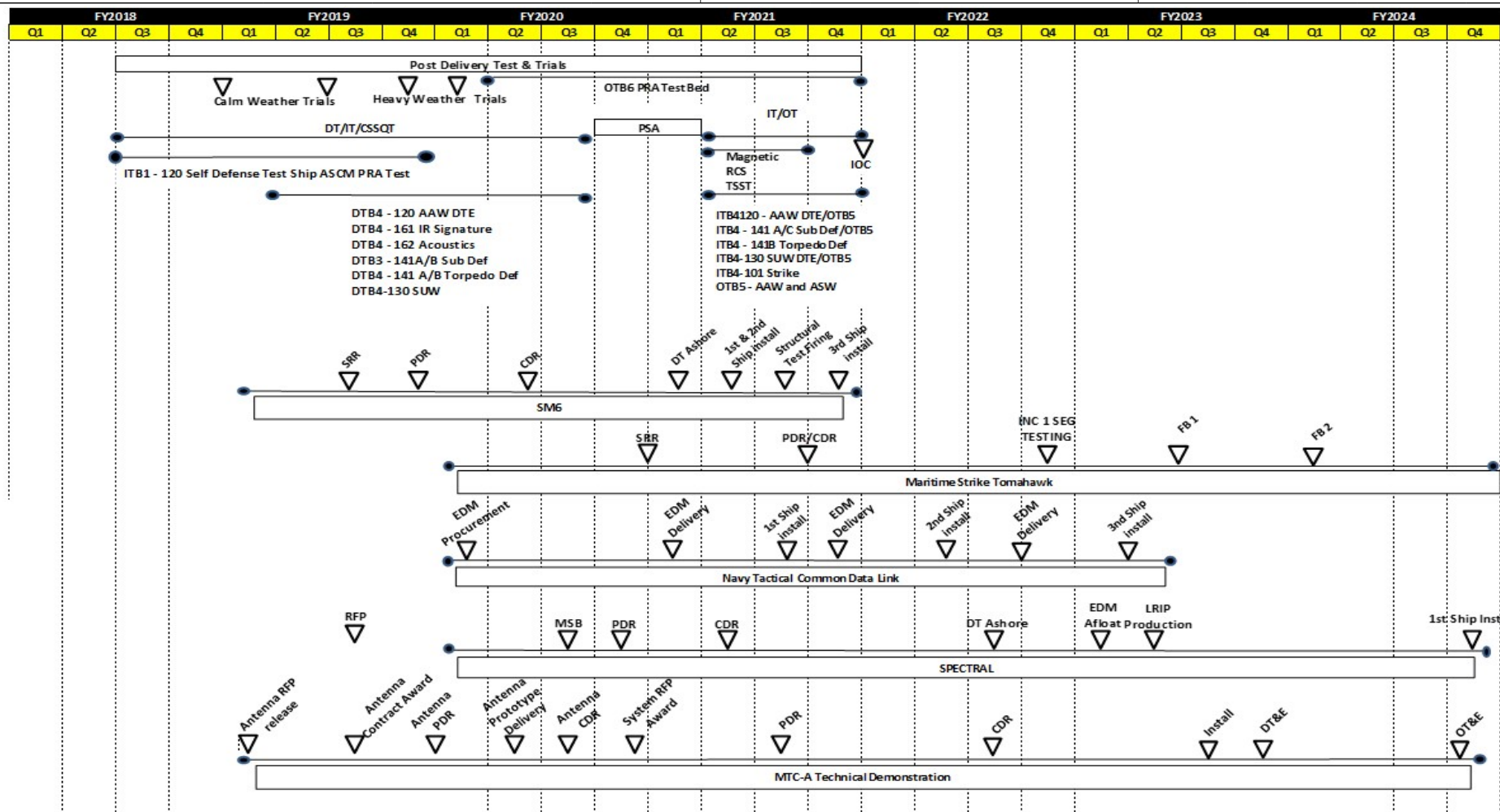
1319 / 5

R-1 Program Element (Number/Name)

PE 0204202N / DDG-1000

Project (Number/Name)

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





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2020 Navy			<b>Date:</b> March 2019
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0204202N / DDG-1000	<b>Project (Number/Name)</b> 2464 / DD(X) Sys Design, Dev & Integration	

**Schedule Details**

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 2464</b>				
Conduct ITB1 - SDTS	2	2018	4	2019
Post Delivery Test & Trials	3	2018	4	2021
PSA	4	2020	1	2021
IOC	4	2021	4	2021
OTB6 PRA Test Bed	2	2020	4	2021
Calm Weather Trials 1	4	2018	4	2018
Calm Weather Trials 2	2	2019	2	2019
Heavy Weather Trials 1	4	2019	4	2019
Heavy Weather Trials 2	1	2020	1	2020
TSST	2	2021	4	2021
Magnetics	2	2021	3	2021
DTB4-120 AAW DTE, DTB4-161 IR Signature, DTB4-162 Acoustics, DTB3-141A/B Sub Def, DTB4-141 A/B Torpedo Def, DTB4-130 SUW	2	2019	3	2020
ITB4-120 AAW DTE/OTB5, ITB4-141 A/C Sub Def/OTB5, ITB4-141B Torpedo Def, ITB4-130 SUW DTE/OTB5, ITB4-101 Strike, OTB5 AAW and ASW	2	2021	4	2021
SM6	1	2019	4	2022
Maritime Strike Tomahawk	1	2020	4	2024
Navy Tactical Common Data Link	1	2020	2	2023
SPECTRAL	1	2020	4	2024
MTC-A Technical Demonstration	1	2019	4	2024