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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2025 Navy **Date:** March 2024

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0204228N / (U)SURFACE SUPPORT
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COST (\$ in Millions)	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
Total Program Element	169.307	11.983	8.619	8.420	-	8.420	8.822	9.020	9.114	9.299	Continuing	Continuing
3311: <i>Navigation Systems</i>	169.307	11.983	8.619	8.420	-	8.420	8.822	9.020	9.114	9.299	Continuing	Continuing

**A. Mission Description and Budget Item Justification**

The Surface Support RDT&E funding will be used for the research, design, development, integration testing, and documentation of the Inertial Navigation System (INS) AN/WSN-12 for all Navy ships and submarines. The INS provides mission critical ship position and attitude data to shipboard sensors (such as radars), combat and weapon systems. The INS uses data from the Global Positioning System (GPS) to periodically update (i.e., reset) its position and internal clock. The INS is the ship's primary position source in the absence of GPS, and it consists of an Inertial Sensor Module (ISM) and a Navigation Processing Module (NPM) that will provide a significant improvement with respect to attitude and velocity data over previous INS. RDT&E funding will support continued system design to create a baseline for Pre-Production Units (PPU), Low Rate Initial Production (LRIP), and Full Rate Production (FRP).

To increase overall Navy cybersecurity efficiency, starting in FY24, the cybersecurity work will be executed by Situational Awareness Boundary Enforcement and Response-Navigation (SABER-NAV). SABER-NAV is the common codified solution that provides cyber situational awareness suite, intrusion detection/prevention, boundary defense, cross-domain solutions (CDS), and various host-level data protections.

Military GPS User Equipment (MGUE) will provide assured Positioning, Navigation, and Timing (PNT) in a GPS degraded environment. Funding will be used for the development of interface and performance requirements, shipboard system architecture definition, and MGUE integration.

Submarine Speed Sensors will provide investigation, development, testing and integration of new Own-Ship Speed sensors to address new capabilities, reduce detection, and improve reliability.

Assured Positioning, Navigation, and Timing (APNT) funding will be used for Alternate GPS-independent sources of Positioning, Velocity, Attitude, and Timing (PVAT) data required to provide fire control solutions, ensure safety of navigation, and support aircraft and combat operations in a GPS degraded/denied environment. This effort provides a secure navigation method using the navigation resources being developed by Office of Naval research (ONR) Future Naval Capabilities (FNC) activity and Small Business Innovation Research (SBIR).

Automated Celestial Navigation System (ACNS) funding will be used for the research, development, Engineering Development Model (EDM), documentation and integration testing of the celestial navigation solution for the NoGAPSS navigation implementation on the fleet. Efforts will leverage ONR celestial navigation research into a reproducible ruggedized system fully integrated into the navigation suite.

After review, the Navigation as a Service (NaaS) initiative was defunded in FY23 due to higher priority Navy needs.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>
Previous President's Budget	12.197	8.619	10.702	-	10.702
Current President's Budget	11.983	8.619	8.420	-	8.420
Total Adjustments	-0.214	0.000	-2.282	-	-2.282
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.214	0.000			
• Program Adjustments	0.000	0.000	-2.279	-	-2.279
• Rate/Misc Adjustments	0.000	0.000	-0.003	-	-0.003

**Change Summary Explanation**

The funding request was reduced by \$2.282 million from FY 2024 to FY2025 due to amended program requirements.

**R-4 PROGRAM SCHEDULE CHANGES:**

AN/WSN-12: The development and testing timeline as well as the subsequent production timelines have been updated in FY23-FY25 to reflect the delay with initial shipboard demonstration due to external testing issues and integrated logistics support (ILS) immaturity.

ACNS: The schedule has been updated based on the latest development and testing status which also reflects ship installation moving from Q1 FY25 to Q2 FY25

APNT: The schedule reflects the divestment of funding starting in FY24.

NaaS: The schedule reflects the divestment of funding starting in FY23.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Navy										<b>Date:</b> March 2024		
<b>Appropriation/Budget Activity</b> 1319 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0204228N / (U)SURFACE SUPPORT				<b>Project (Number/Name)</b> 3311 / Navigation Systems			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>FY 2029</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3311: <i>Navigation Systems</i>	169.307	11.983	8.619	8.420	-	8.420	8.822	9.020	9.114	9.299	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2025 Navy	<b>Date:</b> March 2024
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<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0204228N / (U)SURFACE SUPPORT	<b>Project (Number/Name)</b> 3311 / Navigation Systems
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
<p><b>Title:</b> AN/WSN-12 Inertial Navigation System - Replacement (INS-R)</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2024 Plans:</b>                      Complete AN/WSN-12 testing                      Complete NPM LRIP / Production                      Complete AN/WSN-12 System PRR                      Continue AN/WSN-12 follow-on development</p> <p><b>FY 2025 Base Plans:</b>                      Continue AN/WSN-12 follow-on development</p> <p><b>FY 2025 OCO Plans:</b>                      N/A</p> <p><b>FY 2024 to FY 2025 Increase/Decrease Statement:</b>                      \$1.238M increase due to AN/WSN-12 follow-on development efforts.</p>	2.372	3.000	4.238	0.000	4.238
<p><b>Title:</b> Cybersecurity</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2024 Plans:</b>                      N/A</p> <p><b>FY 2025 Base Plans:</b>                      N/A</p> <p><b>FY 2025 OCO Plans:</b>                      N/A</p>	0.672	0.000	0.000	0.000	0.000
<p><b>Title:</b> Military GPS User Equipment (MGUE)</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2024 Plans:</b>                      Complete TI-22 early integration and testing</p> <p><b>FY 2025 Base Plans:</b>                      N/A</p> <p><b>FY 2025 OCO Plans:</b></p>	0.800	1.724	0.000	0.000	0.000

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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025 Base</b>	<b>FY 2025 OCO</b>	<b>FY 2025 Total</b>
N/A					
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> \$1.724M decrease due to divestment of funding starting in FY25					
<b>Title:</b> Submarine Speed Sensors (SSS)	0.400	0.400	2.030	0.000	2.030
<b>Articles:</b>	-	-	-	-	-
<b>FY 2024 Plans:</b> Complete Indicator Transmitter Tech Refresh Continue new speed sensor research and development					
<b>FY 2025 Base Plans:</b> Continue new speed sensor research and development					
<b>FY 2025 OCO Plans:</b> N/A					
<b>FY 2024 to FY 2025 Increase/Decrease Statement:</b> \$1.630M increase due to new speed sensor research and development					
<b>Title:</b> Assured Positioning, Navigation, and Timing (APNT)	1.150	0.000	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b>FY 2024 Plans:</b> N/A					
<b>FY 2025 Base Plans:</b> N/A					
<b>FY 2025 OCO Plans:</b> N/A					
<b>Title:</b> Automated Celestial Navigation System (ACNS)	6.256	2.707	1.000	0.000	1.000
<b>Articles:</b>	-	-	-	-	-
<b>FY 2024 Plans:</b> Complete system development Continue system testing and evaluation					
<b>FY 2025 Base Plans:</b> Complete system testing and evaluation					

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

	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
ACNS ship installation <i>FY 2025 OCO Plans:</i> N/A <i>FY 2024 to FY 2025 Increase/Decrease Statement:</i> \$1.707M decrease due to completion of system development effort					
<i>Title:</i> Navigation Support  <i>FY 2024 Plans:</i> Provide engineering, logistics, and programmatic support for AN/WSN-12, MGUE, ACNS, and SSS including system integration, testing, and evaluation at multiple land-based and shipboard sites <i>FY 2025 Base Plans:</i> Provide engineering, logistics, and programmatic support for AN/WSN-12, SSS, and ACNS including system integration, testing, and evaluation at multiple land-based and shipboard sites <i>FY 2025 OCO Plans:</i> N/A <i>FY 2024 to FY 2025 Increase/Decrease Statement:</i> \$0.364M increase to support various Navigation development efforts including system integration, testing, and evaluation at multiple land-based and shipboard sites	0.333	0.788	1.152	0.000	1.152
<i>Articles:</i>	-	-	-	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	11.983	8.619	8.420	0.000	8.420

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

<u>Line Item</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025 Base</u>	<u>FY 2025 OCO</u>	<u>FY 2025 Total</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>FY 2029</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN/0670: <i>Other Navigation</i>	87.800	110.286	102.288	-	102.288	111.132	93.567	99.752	92.661	Continuing	Continuing

**Remarks**

**D. Acquisition Strategy**

AN/WSN-12 Inertial Sensor Module (ISM) sole source production contract awarded in FY 2023.  
ACNS top-side sensor sole source production contract awarded in FY 2023

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy** **Date:** March 2024

<b>Appropriation/Budget Activity</b> 1319 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0204228N / (U)SURFACE SUPPORT	<b>Project (Number/Name)</b> 3311 / Navigation Systems
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<b>Product Development (\$ in Millions)</b>				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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/Design	WR	SPAWAR Atlantic : Little Creek, VA	28.043	1.250	Oct 2022	1.402	Oct 2023	3.320	Oct 2024	-		3.320	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	SPAWAR Pacific : San Diego, CA	1.875	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	WR Systems : Norfolk, VA	28.035	6.165	Oct 2022	2.574	Oct 2023	2.000	Oct 2024	-		2.000	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	Penn State/ARL : Warminster, PA	5.318	0.100	Oct 2022	0.200	Oct 2023	0.200	Oct 2024	-		0.200	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NSWC Dahlgren : Dahlgren, VA	9.959	1.279	Oct 2022	0.933	Oct 2023	0.850	Oct 2024	-		0.850	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NSWC Dam Neck : Dam Neck, VA	0.340	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NSWC PHD : Port Hueneme, CA	0.122	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NUWC Newport : Newport, RI	1.380	0.150	Oct 2022	0.200	Oct 2023	0.200	Oct 2024	-		0.200	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	Old Dominion University : Suffolk, VA	0.450	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	Northrop Grumman : Charlottesville, VA	46.234	0.300	Oct 2022	0.800	Oct 2023	0.800	Oct 2024	-		0.800	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	SPAWAR Atlantic : Charleston, SC	1.530	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NSWC Philadelphia : Philadelphia, PA	1.537	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	Electric Boat : Groton, CA	0.953	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	John Hopkins, APL : Laurel, MD	25.227	0.643	Oct 2022	0.100	Oct 2023	0.100	Oct 2024	-		0.100	Continuing	Continuing	Continuing
Systems Engineering/Design	C/CPFF	Draper : Cambridge, MA	8.183	1.549	Oct 2022	1.957	Oct 2023	0.400	Oct 2024	-		0.400	Continuing	Continuing	Continuing
Systems Engineering/Design	WR	NSWC Crane : Crane, IN	0.121	0.000		0.000		0.000		-		0.000	0.000	0.121	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Navy** **Date:** March 2024

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<b>Product Development (\$ in Millions)</b>				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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/ Design	WR	Submarine Special Projects : Washington, DC	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Systems Engineering/ Design	MIPR	COMOPTEVFOR : Norfolk, VA	0.021	0.000		0.200	Oct 2023	0.250	Oct 2024	-		0.250	0.000	0.471	-
Systems Engineering/ Design	WR	SPAWAR 5.0 : San Diego, CA	0.093	0.000		0.000		0.000		-		0.000	0.000	0.093	-
Systems Engineering/ Design	TBD	Carnegie Mellon : Not Specified	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
<b>Subtotal</b>			159.821	11.436		8.366		8.120		-		8.120	Continuing	Continuing	N/A

**Remarks**  
The decrease in Production Development contracts from FY24 to FY25 is due to program and rate adjustments as part of under-execution marks in FY23.

<b>Support (\$ in Millions)</b>				FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 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			
Program Management	C/CPFF	Various : Not Specified	9.486	0.547	Oct 2022	0.253	Oct 2023	0.300	Oct 2024	-		0.300	Continuing	Continuing	Continuing
<b>Subtotal</b>			9.486	0.547		0.253		0.300		-		0.300	Continuing	Continuing	N/A

**Remarks**  
The increase in Program Management Support contract from FY24 to FY25 is due to the new development efforts for AN/WSN-12 and SSS in FY25.

	Prior Years	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	169.307	11.983	8.619	8.420	-	8.420	Continuing	Continuing	N/A

**Remarks**

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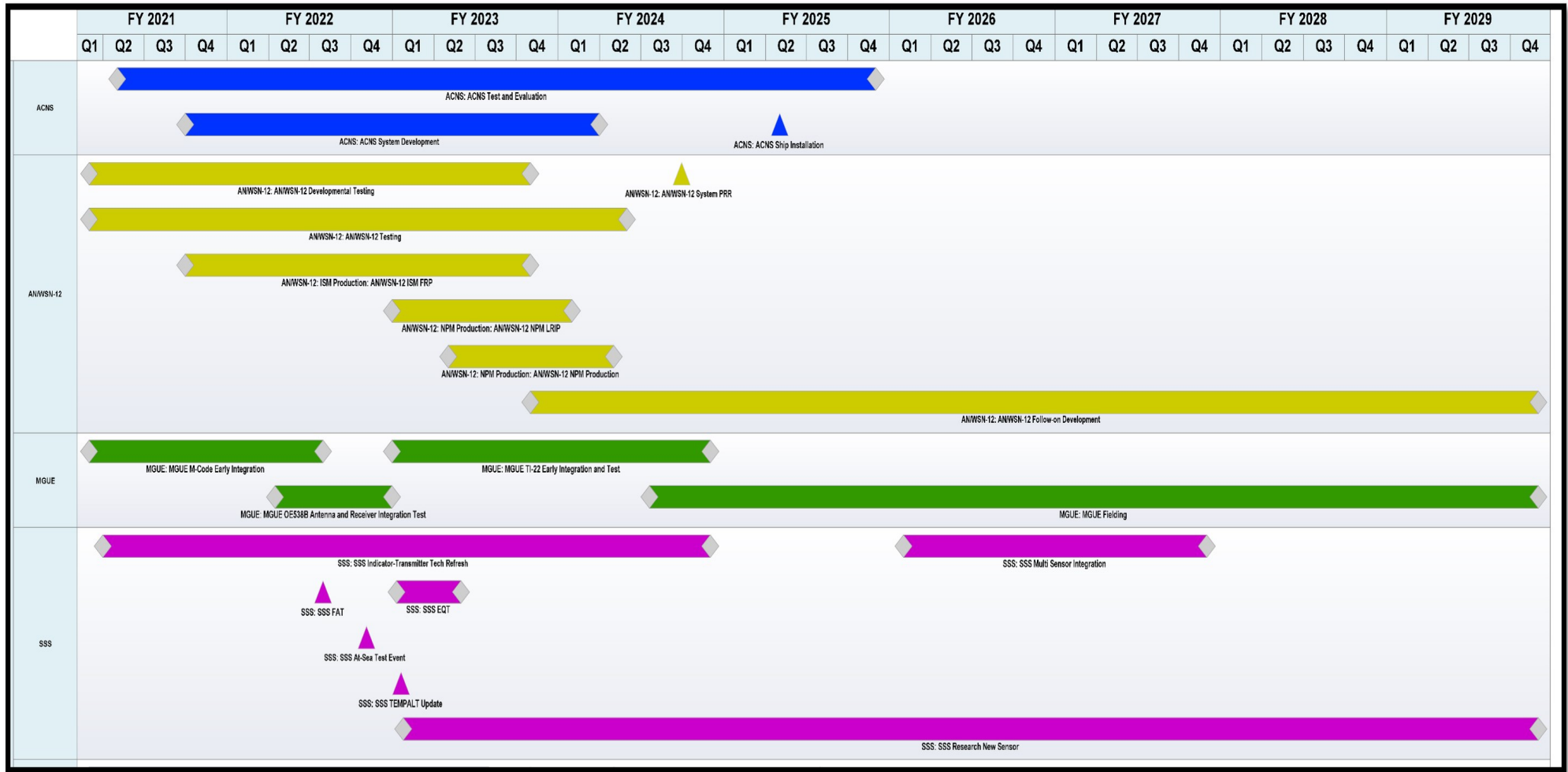
**Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy**

**Date: March 2024**

**Appropriation/Budget Activity**  
1319 / 7

**R-1 Program Element (Number/Name)**  
PE 0204228N / (U)SURFACE SUPPORT

**Project (Number/Name)**  
3311 / Navigation Systems



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Exhibit R-4, RDT&E Schedule Profile: PB 2025 Navy Date: March 2024

Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204228N / (U)SURFACE SUPPORT	Project (Number/Name) 3311 / Navigation Systems
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ACNS: Automated Celestial Navigation System

ISM: Inertial Sensor Module

PRR: Production Readiness Review

LRIP: Low-Rate Initial Production

FRP: Full Rate Production

MGUE: Military GPS User Equipment

SSS: Submarine Speed Sensor

EQT: Environmental Qualification Testing

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<b>Exhibit R-4A, RDT&amp;E Schedule Details: PB 2025 Navy</b>		<b>Date: March 2024</b>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>3311 RDTE</b>				
AN/WSN-12: ISM Production: AN/WSN-12 ISM FRP	1	2023	4	2023
AN/WSN-12: NPM Production: AN/WSN-12 NPM LRIP	1	2023	1	2024
AN/WSN-12: NPM Production: AN/WSN-12 NPM Production	2	2023	2	2024
AN/WSN-12: AN/WSN-12 Developmental Testing	1	2023	4	2023
AN/WSN-12: AN/WSN-12 Testing	1	2023	2	2024
AN/WSN-12: AN/WSN-12 System PRR	3	2024	3	2024
AN/WSN-12: AN/WSN-12 Follow-on Development	4	2023	4	2029
MGUE: MGUE TI-22 Early Integration and Test	1	2023	4	2024
MGUE: MGUE Fielding	3	2024	4	2029
SSS: SSS TEMPALT Update	1	2023	1	2023
SSS: SSS EQT	1	2023	2	2023
SSS: SSS Research New Sensor	1	2023	4	2029
SSS: SSS Indicator-Transmitter Tech Refresh	1	2023	4	2024
SSS: SSS Multi Sensor Integration	1	2026	4	2027
ACNS: ACNS System Development	1	2023	1	2024
ACNS: ACNS System Test and Evaluation	1	2023	4	2025
ACNS: ACNS Ship Installation	2	2025	2	2025