Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy											Date: March 2023	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603860N *I JNT Precision Approach & Ldg Sys*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	1,408.671	20.223	18.628	22.590	-	22.590	6.628	6.609	7.132	7.668	Continuing	Continuing
2329: *JPALS*	1,408.671	20.223	18.628	22.590	-	22.590	6.628	6.609	7.132	7.668	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 238												

A. Mission Description and Budget Item Justification

A. Mission Description and Budget Item Justification

The Joint Precision Approach and Landing System (JPALS) is the primary precision approach and landing system for CVN and LHA/D ships to support aircraft without AN/SPN-46 Automatic Carrier Landing Systems (ACLS) capability including F-35B, F-35C, MQ-25A and future platforms. JPALS ship systems are required to provide CVN and LHA/D ships a primary precision approach capability during night and instrument flight conditions, including coupled approach capability to a hover transition point for LHA/D ships, and coupled approach to the deck (auto-land) capability aboard CVN ships, and contested environments. JPALS also provides the over-the-air inertial alignment capability for CVN and LHA/D ships to support aircraft platforms without Link-4A capability, including F-35, MQ-25A and future platforms. JPALS efforts include addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates.
This budget also ensures required capability improvements to JPALS shipboard systems is accomplished, to ensure the successful integration of Landing Autonomous Navigation Technology for Enhanced Recovery to Navy Ships (LANTERNS). LANTERNS is a technological improvement being researched by Future Naval Capabilities/Advanced Technology Development (PE 0603673N) to ensure the continued development of enhanced, Precise Ship-Relative Navigation (PS-RN) for reliable autonomous ship recovery of Unmanned Aerial Systems (UAS) in all weather, high deck motion environments.

The FNC research is centered on aircraft systems.

The JPALS RDT&E supports integration of LANTERNS into the JPALS shipboard systems, delivering lethality through resilient launch and recovery operations in contested environments and during Distributed Maritime Operations.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in high fidelity and realistic operating environments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603860N *I JNT Precision Approach & Ldg Sys*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	22.950	18.628	13.297	-	13.297
Current President's Budget	20.223	18.628	22.590	-	22.590
Total Adjustments	-2.727	0.000	9.293	-	9.293
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.979	0.000			
• SBIR/STTR Transfer	-0.748	0.000			
• Program Adjustments	0.000	0.000	9.088	-	9.088
• Rate/Misc Adjustments	0.000	0.000	0.205	-	0.205

Change Summary Explanation

Technical: N/A

Schedule: FY 2024 schedule change due to Air Vehicle delays for MQ-25.

Financial: FY 2024 funding increase funds JPALS M-Code receiver development which will provide protected JPALS-specific outputs needed to ensure precision navigation, precision coupled approach and landing, and over-the-air inertial alignment services to F-35, MQ-25, and future air platforms.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603860N / *JNT Precision Approach & Ldg Sys*	Project (Number/Name) 2329 / *JPALS*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
2329: *JPALS*	1,408.671	20.223	18.628	22.590	-	22.590	6.628	6.609	7.132	7.668	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 238

A. Mission Description and Budget Item Justification

This budget reflects the Department of Defense certified Component Cost Position of the restructured Joint Precision Approach and Landing System (JPALS) program that funds the developmental, testing, and integration activities to implement and field JPALS ship systems that deliver the primary precision approach, landing, on-deck inertial alignment, surveillance, and auto-land capability for current and future low observable manned and unmanned platforms onboard all CVN and LHA/D ships. JPALS provides for development, integration, installation, and test of JPALS on CVN and LHA/D ships in accordance with the Joint Requirements Oversight Council (JROC) March 2016 approved JPALS Capability Development Document (CDD). JPALS Engineering Development Model (EDM) articles have been delivered to support JPALS EMD activities.

JPALS EDMs have been installed at shore based test facilities and (temporarily) on CVN and LHA/D ships to support F-35B/C developmental and operational testing and MQ-25A concept refinement, system requirements identification, allocation, surrogate risk reduction, and test. Two JPALS EDMs were procured in FY 2017 to support testing and F-35 shipboard operational deployments. JPALS will continue to invest in software development in direct support of precision approach and auto-land capabilities for the F-35B/C, MQ-25A, and future air platforms. JPALS effort includes addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates. Remaining costs are associated with the completion of the test and support to fielded EDM units and to develop, test, and transition JPALS to use GPS M-Code. Additionally, costs are to enhance Precision Ship-Relative Navigation (PS-RN) for Navy and Marine Corps unmanned, and potentially manned, platforms, enabling resilient Distributed Maritime Operations (DMO) via the Landing Autonomous Navigation Technology for Enhanced Recovery to Navy Ships (LANTERNS) Future Naval Capabilities (FNC) and other system improvements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: JPALS Ship Systems and Test	13.194	11.105	14.917	0.000	14.917
Articles:	-	-	-	-	-
Description: JPALS provides for development, integration, installation, and test of Sea-Based JPALS on CVN and LHA/D ships.					
FY 2023 Plans: Continue research and evaluation of GPS M-Code for implementation into the JPALS system. Continue analysis of available M-code capable Government off the Shelf (GOTS) receivers and development of JPALS-capable receiver interfaces and output requirements.					
FY 2024 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Begin development of M-code capable GOTS receivers and continue development of JPALS-capable receiver interfaces and output requirements. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of $3.812M from FY 2023 to FY 2024 is due to initiating the next phase for development of the JPALS M-Code receiver.					
Title: Joint Strike Fighter (JSF) F-35B Marine Corp STOVL and F-35C Navy Carrier Variant Support ***Articles:*** ***Description:*** Provide technical development, shore based, and ship based support for F-35B and F-35C JPALS Integration and Developmental Test (DT) and Operational Test (OT) events. Provide JPALS system certification and documentation to certify shipboard all weather precision approach capability for F-35 operational test and deployments. ***FY 2023 Plans:*** Continue development of JPALS two-way and autoland implementation into F-35 aircraft. ***FY 2024 Base Plans:*** Continue support of the JPALS UDB operations for F-35 aircraft. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of $.030M from FY 2023 to FY 2024 is due to inflation.	4.264 -	1.500 -	1.530 -	0.000 -	1.530 -
Title: MQ-25 Support ***Articles:*** ***Description:*** Provide technical support, lab support, requirements identification, allocation and test activities for MQ-25. Support MQ-25 concept refinement, requirements development, integration specifications, and risk reduction activities for JPALS integration. Support MQ-25 concept refinement and JPALS integration and developmental activities.	1.765 -	1.800 -	1.836 -	0.000 -	1.836 -

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 Plans: Continue JPALS algorithm integration support and testing. Continue preparation of JPALS system integration lab at Patuxent River for MQ-25 shore testing. ***FY 2024 Base Plans:*** Continue preparation of JPALS system integration lab at Patuxent River for MQ-25 shore-based testing. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of $.036M from FY 2023 to FY 2024 is due to inflation.					
Title: Advanced Technology Integration	1.000	4.223	4.307	0.000	4.307
Articles:	1	-	-	-	-
Description: This project provides funding for integrating and transitioning new capabilities into the JPALS ship system requirements. ***FY 2023 Plans:*** Surrogate aircraft engineering and modification, CVN ship flight test planning and execution, and post test data analysis. The system will be tested at-sea and baselined into the appropriate programs of record. ***FY 2024 Base Plans:*** Continue surrogate aircraft engineering and modification, CVN ship flight test planning and execution, and post test data analysis. The system will be shore-tested and baselined into the appropriate programs of record. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of $.084M is due to inflation.					
Accomplishments/Planned Programs Subtotals	20.223	18.628	22.590	0.000	22.590

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• OPN/2867: *JPALS*	35.386	8.186	3.343	-	3.343	11.453	9.759	8.245	4.331	Continuing	Continuing

Remarks

D. Acquisition Strategy

Technology Development phase was conducted jointly by NAVAIRSYSCOM (PMA-213), USAF Electronic Systems Command (Global Air) and multiple industry partners. This effort provided the concept of operations, performance specifications and technology readiness levels necessary to provide the foundation from which to launch the Increment 1 System Development and Demonstration (SDD) phase development. Joint Precision Approach and Landing System (JPALS) reached MS-B on 14 July 2008 and the SDD phase development contract was awarded on 17 July 2008. Tasking consisted of sea-based JPALS, related ship and airborne reference systems, end-to-end software algorithms, necessary ship installation hardware, test equipment, system simulation software, and other RDT&E deliverable products. The SDD contract was awarded after full and open competition. JPALS is being developed by the Navy with an open system architecture in order to facilitate the compatible integration of many different aircraft and avionics architectures. JPALS provides for development, integration, installation, and test of Sea-Based JPALS to meet Initial Operation Capability of CVN and LHA/D ships in accordance with the JPALS Capability Development Document (CDD). Additionally, this requirement provides critical enabling technology for Joint Strike Fighter (JSF) F-35B Marine Corps Short Take-Off and Vertical Landing (STOVL) and F-35C Navy Carrier Variant, ship-based MQ-25A, and future Navy and Marine Corps air platforms.

As a result of the DON Resource and Requirements Review Board approved PALC Roadmap, the JPALS production phase was deferred to include design improvements to provide manned and unmanned aircraft with autoland capabilities. The current Engineering and Manufacturing Development (EMD) contract was modified in FY14 to add detailed requirements and design trade studies to identify specific system design improvements. An extension for pre-Milestone B efforts was awarded in fourth quarter FY15.

A Development RFP Release Decision Point (DRRDP) Defense Acquisition Board (DAB) was completed and the RFP for JPALS EMD 16 was released on 24 November 2015. A Milestone B (MS B) DAB was completed 02 June 2016. The MS B Acquisition Decision Memorandum (ADM) was approved 27 June 2016, which granted entry into the EMD phase for the restructured JPALS program and officially completed all actions required to exit Nunn-McCurdy. JPALS now has an approved Acquisition Program Baseline (APB) and has been designated an Acquisition Category (ACAT) 1C program. Sole Source contract was awarded to Raytheon in fourth quarter FY 2016. Completed Milestone C in April 2019.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ship Integration	WR	NAWCAD : Pax River, MD	85.018	0.000		0.000		0.000		-		0.000	0.000	85.018	-
Primary Hardware Development - EMD Phase I	C/CPIF	Raytheon : Fullerton, CA	410.181	0.000		0.000		0.000		-		0.000	0.000	410.181	410.181
Primary Hardware Development - New EMD Contract	C/CPIF	Raytheon : Fullerton, CA	250.646	14.561	Nov 2021	0.000		0.000		-		0.000	0.000	265.207	268.895
JPALS Modifications for ARC-210	C/CPFF	RCI : Cedar Rapids, IA	8.603	0.000		0.000		0.000		-		0.000	0.758	9.361	10.119
Risk Reduction for Auto-land - FFRDC Support	FFRDC	JHU : Laurel, MD	0.493	0.000		0.000		0.000		-		0.000	0.000	0.493	-
Primary Hardware Development - M-Code	TBD	Various : Various	0.000	0.000		8.689	Nov 2022	13.333	Nov 2023	-		13.333	0.000	22.022	-
Prior Year Prod Dev no longer funded in the FYDP	TBD	Various : Various	249.870	0.000		0.000		0.000		-		0.000	0.000	249.870	-
		Subtotal	1,004.811	14.561		8.689		13.333		-		13.333	0.758	1,042.152	N/A

Remarks

Increase in Primary Hardware Development from FY 2023 to FY 2024 is due to the development of M-code capable GOTS receivers and development of JPALS-capable receiver interfaces and output requirements.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering Support - JPALS	WR	NAWCAD : Pax River, MD	221.218	2.967	Nov 2021	3.948	Nov 2022	3.410	Nov 2023	-		3.410	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NAWCAD : Pax River, MD	22.779	0.000		0.000		0.000		-		0.000	0.000	22.779	-
Systems Engineering Suppt - Advanced Technologies	TBD	Various : Various	0.000	1.000	Nov 2021	3.951	Nov 2022	3.898	Nov 2023	-		3.898	0.000	8.849	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603860N / *JNT Precision Approach & Ldg Sys*	Project (Number/Name) 2329 / *JPALS*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Support Costs non longer funded in FYDP	Various	Various : Various	21.514	0.000		0.000		0.000		-		0.000	0.000	21.514	-
		Subtotal	265.511	3.967		7.899		7.308		-		7.308	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	NAWCAD : Pax River, MD	76.770	0.000		0.000		0.000		-		0.000	0.000	76.770	-
Prior Year Operational Test & Evaluation Not Funded FYDP (PYOT&E)	WR	COMOPTEVFOR : Norfolk, VA	6.703	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	NAWCAD : Pax River, MD	8.633	0.716	Nov 2021	1.413	Nov 2022	1.441	Nov 2023	-		1.441	Continuing	Continuing	Continuing
		Subtotal	92.106	0.716		1.413		1.441		-		1.441	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	WR	NAWCAD : Pax River, MD	30.618	0.837	Nov 2021	0.617	Nov 2022	0.503	Nov 2023	-		0.503	0.000	32.575	-
PM Support - MSS	C/CPFF	Amelex : Pax River, MD	10.753	0.000		0.000		0.000		-		0.000	0.000	10.753	-
PM Support - MSS	C/CPFF	Avian : Pax River, MD	1.592	0.000		0.000		0.000		-		0.000	0.000	1.592	-
PM Support - MSS	C/CPFF	SAIC : Pax River, MD	2.487	0.000		0.000		0.000		-		0.000	0.000	2.487	-
PM Support - MSS	C/CPFF	DDG : Pax River, MD	0.263	0.127	Nov 2021	0.000		0.000		-		0.000	0.000	0.390	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603860N / *JNT Precision Approach & Ldg Sys*	Project (Number/Name) 2329 / *JPALS*	

Management Services ($ in Millions)

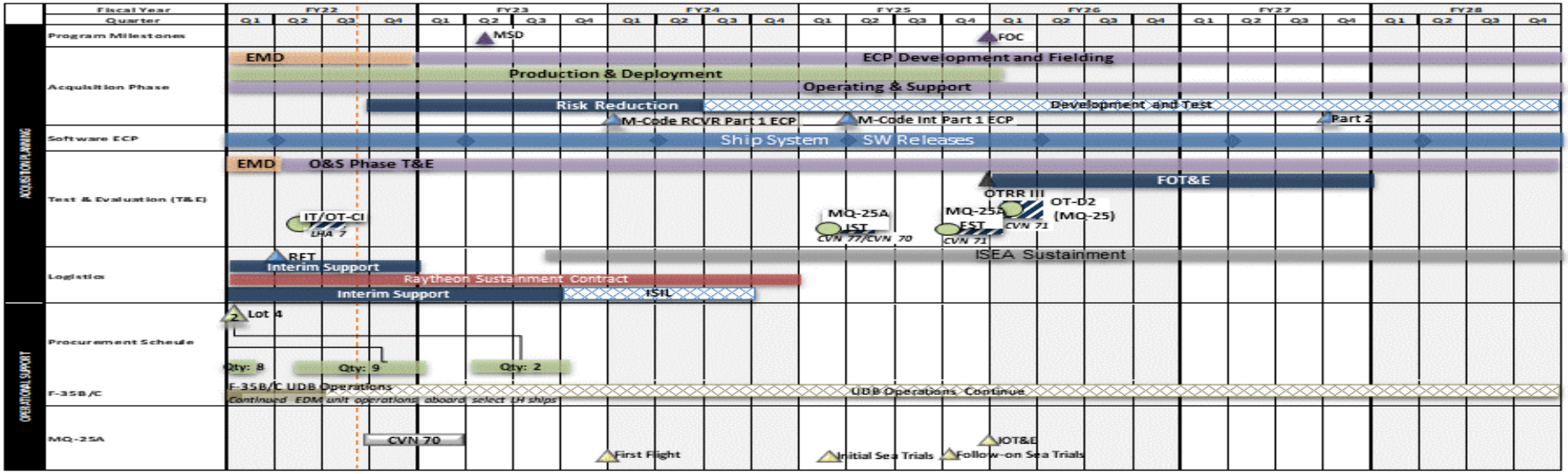
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Travel	WR	NAVAIR : Pax River, MD	0.530	0.015	Nov 2021	0.010	Nov 2022	0.005	Nov 2023	-		0.005	0.000	0.560	-
		Subtotal	46.243	0.979		0.627		0.508		-		0.508	0.000	48.357	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,408.671	20.223		18.628		22.590		-		22.590	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

JPALS Program Schedule



Notes:
M-Code schedule based on notional planning package

Legend:
- Critical Path to JPALS IOC
- EDM Unit
- Production Unit
- System Build 4.x.y
- Lot Buys
- Unit Delivery
- Projected Test/Cert

Revision Date: May 2022

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & L dg Sys*	**Project (Number/Name)** 2329 / *JPALS*

Advanced Technology Integration

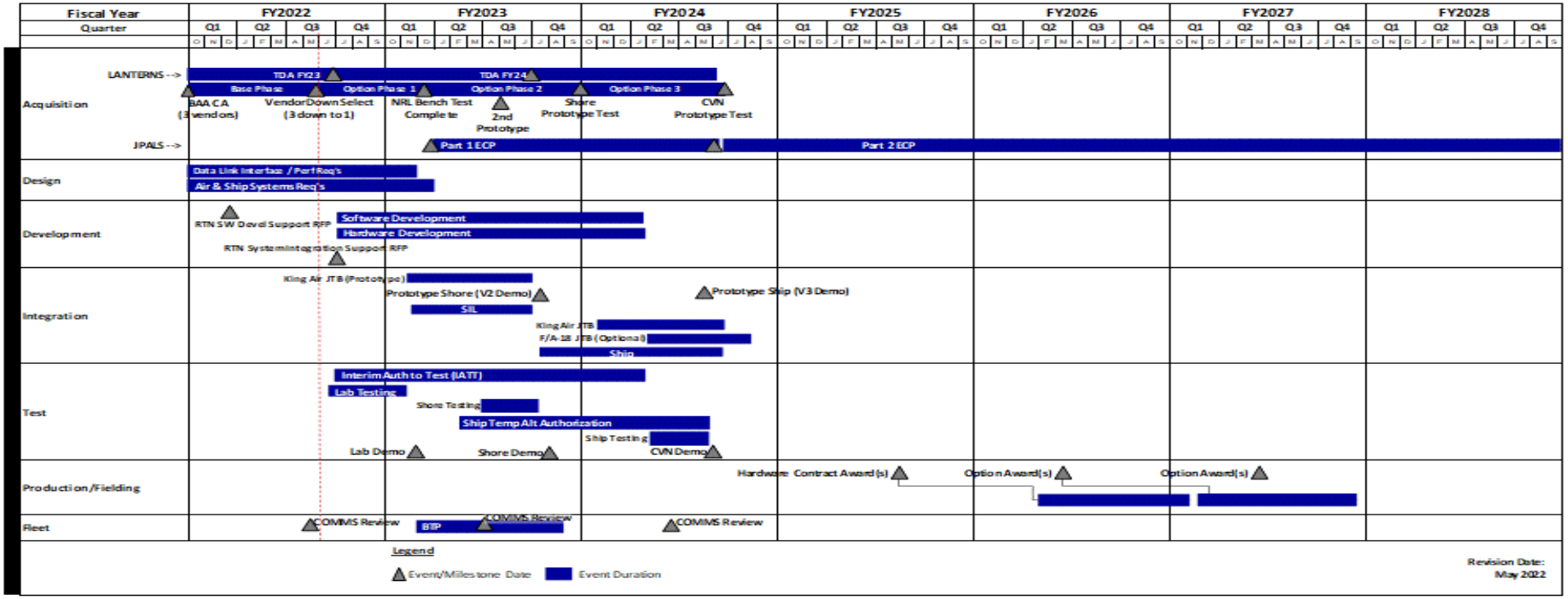


Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603860N / *JNT Precision Approach & Ldg Sys*	**Project (Number/Name)** 2329 / *JPALS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JPALS				
Acquisition Milestones: MSD	2	2023	2	2023
Acquisition Milestones: FOC	1	2026	1	2026
Systems Development: Engineering and Manufacturing Development	1	2022	4	2022
Test & Evaluation: JPALS Operational Test Readiness Review (OTRR) III	1	2026	1	2026
Test & Evaluation: JPALS Follow-on Operational Test and Evaluation	1	2026	4	2027
Advanced Technology Integration				
Acquisition Milestones: Demo	3	2024	3	2024
Systems Development: Hardware/Software Development	3	2022	2	2024