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 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604504N *I Air Control*

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	382.815	32.614	39.138	42.656	-	42.656	34.635	30.077	30.722	31.964	Continuing	Continuing
0718: *MATCALS*	22.523	3.108	3.020	1.063	-	1.063	0.878	0.938	0.998	1.059	Continuing	Continuing
0993: *Carrier ATC*	225.285	11.825	10.560	8.655	-	8.655	8.773	8.945	9.125	9.594	Continuing	Continuing
1657: *ATC Improvement*	5.463	0.344	0.474	0.452	-	0.452	0.457	0.462	0.463	0.479	Continuing	Continuing
3372: *ATC Systems*	129.544	17.337	25.084	32.486	-	32.486	24.527	19.732	20.136	20.832	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element provides for the development, integration, and testing of Automated Air Traffic Control (ATC) hardware and software required to provide improved flight safety and more reliable all-weather ATC and landing system capabilities at Naval Air Stations (NASs) and Marine Corps Air Stations (MCASs) and Fleet Area Control and Surveillance Facilities (FACSFAC) worldwide. Programs are required to upgrade or replace aging ATC and landing system equipment on aircraft, aircraft carriers, amphibious ships, NASs, MCASs and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites. These upgrades include addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates. Virtual Warfare Center (VWC) supports the Marine Air Ground Task Force (MAGTF) Integrated Air and Missile Defense (IAMD) development.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	27.499	39.138	45.062	-	45.062
Current President's Budget	32.614	39.138	42.656	-	42.656
Total Adjustments	5.115	0.000	-2.406	-	-2.406
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	5.422	0.000			
• SBIR/STTR Transfer	-0.307	0.000			
• Program Adjustments	0.000	0.000	-2.819	-	-2.819
• Rate/Misc Adjustments	0.000	0.000	0.413	-	0.413

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 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604504N *I Air Control*

Change Summary Explanation

Schedule: 3372 AN/SPN-35 Block II Critical Design Review moved from FY 2023 to FY 2024 due to technical issues with Electromagnetic Interference (EMI) requirements.

Cost: 0718 Realignment of Virtual Warfare Center support for consolidation of funding to PE 0206313M, Marine Corps Communications Systems.

Cost: Added additional FY 2022 funds ($2.0M) to project 0993 for AN/SPN-50 primary hardware contract.

Cost: Added additional FY 2022 funds ($3.5M) to project 3372 for AN/SPN-35 Block II Upgrade ancillary hardware contract.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 0718 / *MATCALS*	

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
0718: *MATCALS*	22.523	3.108	3.020	1.063	-	1.063	0.878	0.938	0.998	1.059	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Marine Air Traffic Control and Landing Systems (MATCALS) program provides for continued development, integration, and testing of hardware and software to meet requirements for all-weather operations and improved flight safety of Air Traffic Control (ATC) and Landing Systems at Marine Corps expeditionary airfields. An Acquisition Decision Memorandum from Jan 2005 approved the use of the U.S. Army AN/TPN-31 Air Traffic Navigation, Integration, and Coordination System (ATNAVICS) to fulfill the Air Surveillance and Precision Approach Radar and Control System (ASPARCS) requirement for Jul 2006. The ATNAVICS will replace the legacy ATC Precision Approach Radar (PAR), Airport Surveillance Radar (ASR), and Command and Control Subsystem with a High Mobility Multipurpose Wheeled Vehicle based PAR, ASR and Command and Control Subsystem. The Marine Resource Oversight Committee Decision Memorandum 11-2005 of Dec 2004 outlines the evolutionary improvements required by Headquarters Marine Corps. This program works with the Marine ATC Working Group identifying the requirements to implement the preplanned program improvement (P3I) and evolutionary product improvements as required for Ground/Air Task Oriented Radar System (G/ATOR), ATNAVICS, Expeditionary ATC Towers, and Navigational Aids that support Marine Air Traffic Control Detachments.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: ASPARCS Improvements	0.602	0.614	1.063	0.000	1.063
Articles:	-	-	-	-	-
Description: Investigate and resolve obsolescence issues. Perform studies and analyses to implement P3I and other evolutionary improvements. Develop criteria for existing ASPARCS software to achieve Defense Information Infrastructure-Common Operating Environment Level 5 compliance, Information Assurance, Radar Range Extension and Mapping functionality, and enhanced simulation and training into the existing ASPARCS software. Perform Mode 5/S integration, operational functionality study and analyses with AN/TPN-31(V)7 ATNAVICS System.					
FY 2023 Plans: Continue to develop ECP's to mitigate obsolescence issues within the Precision Approach Radar and develop capability to meet the multiple touchdown point capability requirement. Perform operational functionality study and analysis regarding Expeditionary ATC tower capability improvements. Continue to prioritize integration of ATNAVICS and CAC2S, including the production of a MATC CAC2S prototype, developmental testing, field unit evaluation, and NAVAIR certification.					
FY 2024 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0718 / *MATCALS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continue to develop ECPs to mitigate obsolescence issues within the Precision Approach Radar and develop capability to meet the multiple touchdown point capability requirement. Perform operational functionality study and analysis regarding Expeditionary ATC tower capability improvements. Continue to prioritize integration of ATNAVICS and CAC2S, certification. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase due to ATNAVICS system integration and development of critical ECP's.					
Title: Virtual Warfare Center Support ***Articles:*** ***Description:*** Virtual Warfare Center (VWC) Support - This project supports fully interactive operator in the loop simulations in support of the Virtual Warfare Center (VWC) in order to quantify USMC Integrated Air and Missile Defense (IAMD) family of systems performance and how it impacts effectiveness in the IAMD mission area. ***FY 2023 Plans:*** Continue to support integration and development of Design of Experiments related to Marine Air Ground Task Force (MAGTF) IAMD capabilities. Provide event technical support for additional analysis events. Increase modeling and simulation to enable simulation capabilities to enable live and virtual military forces and military systems to interact with one another to create virtual war scenarios. Conduct and document analysis results for USMC stakeholders. ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease due to consolidation of effort to PE 0206313M, Marine Corps Communications Systems.	1.534 -	2.000 -	0.000 -	0.000 -	0.000 -
Title: Common Aviation Command and Control System (CAC2S) ***Articles:*** ***Description:*** Integrate ATNAVICS with the Common Aviation Command and Control System (CAC2S) to provide a coordinated and integrated modernization effort for the equipment of the Marine Air Command and	0.972 1	0.406 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0718 / *MATCALS*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Control System and provide enhanced Air Command and Control (AC2) capability for the Tactical Air Command Center, Tactical Air Operations Center, and Direct Air Support Center to support aviation employment in Joint, combined, and coalition operations. ***FY 2023 Plans:*** Complete integration of ATNAVICS and CAC2S and field unit evaluation and certification. ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease from FY23 to FY24 due to completion of integration of ATNAVICS and CAC2S and field unit evaluation and certification.					
Accomplishments/Planned Programs Subtotals	3.108	3.020	1.063	0.000	1.063

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/2820: *Ashore ATC Equipment/MATCALS*	9.650	9.284	13.930	-	13.930	9.250	9.455	9.648	9.127	Continuing	Continuing

Remarks

MATCALS is only a portion of OPN Line Item 2820.

D. Acquisition Strategy

An Acquisition Decision Memorandum was signed in Jan 2005 approving the procurement of the Army AN/TPN-31 ATNAVICS to fulfill the Air Surveillance and Precision Approach Radar and Control System requirement for July 2006. The MROC Decision Memorandum 11-2005 of December 2004 outlined the evolutionary improvements required by Headquarters Marine Corps. This program has joined with the Army to implement Pre-Planned Product Improvements and evolutionary product improvements. The Marine Air Traffic Control (ATC) Working Group identified requirements to address obsolescence issues with ATC Expeditionary Towers. These requirements were validated by APX-8 and a Decision Analysis Study was conducted by NAVAIR. Funding will address development of Expeditionary ATC Tower capability improvements via the Engineering Change Proposal process.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 0718 / *MATCALS*	

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
Primary HDW Develop - ASPARCS	WR	NAWCAD : Patuxent River, MD	3.266	0.000	Dec 2021	0.000	Dec 2022	0.301	Dec 2023	-		0.301	0.000	3.567	-
Primary HDW Develop - ASPARCS	C/BA	RAYTHEON : Largo, FL	0.000	0.134	Dec 2021	0.136	Dec 2022	0.000		-		0.000	0.000	0.270	-
Primary HDW Develop - ASPARCS	WR	NIWC : San Diego, CA	0.510	0.200	Dec 2021	0.204	Dec 2022	0.297	Dec 2023	-		0.297	0.000	1.211	-
Primary HDW Develop - ASPARCS	C/CPFF	TRANDES : San Diego, CA	1.783	0.000		0.000		0.000		-		0.000	0.000	1.783	1.783
		Subtotal	5.559	0.334		0.340		0.598		-		0.598	0.000	6.831	N/A

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
Software Development - G/ ATOR	WR	NSWC : Dahlgren, VA	2.575	0.000		0.000		0.000		-		0.000	0.000	2.575	-
Software Development - ASPARCS	WR	NAWCAD : Patuxent River, MD	4.572	0.200	Dec 2021	0.204	Dec 2022	0.288	Dec 2023	-		0.288	0.000	5.264	-
Engineering Support - VWC	TBD	NSMA : TBD	4.430	0.880	Dec 2021	0.898	Dec 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Software Development - VWC	C/BA	TBD : TBD	3.635	0.584	Dec 2021	1.005	Dec 2022	0.000		-		0.000	Continuing	Continuing	Continuing
Software Development - CAC2S	TBD	TBD : TBD	0.000	0.947	Dec 2021	0.406	Nov 2022	0.000		-		0.000	0.000	1.353	-
		Subtotal	15.212	2.611		2.513		0.288		-		0.288	Continuing	Continuing	N/A

Remarks

Effective FY24 VWC funding moved and consolidated under PE 0206313M, Marine Corps Communications Systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0718 / *MATCALS*

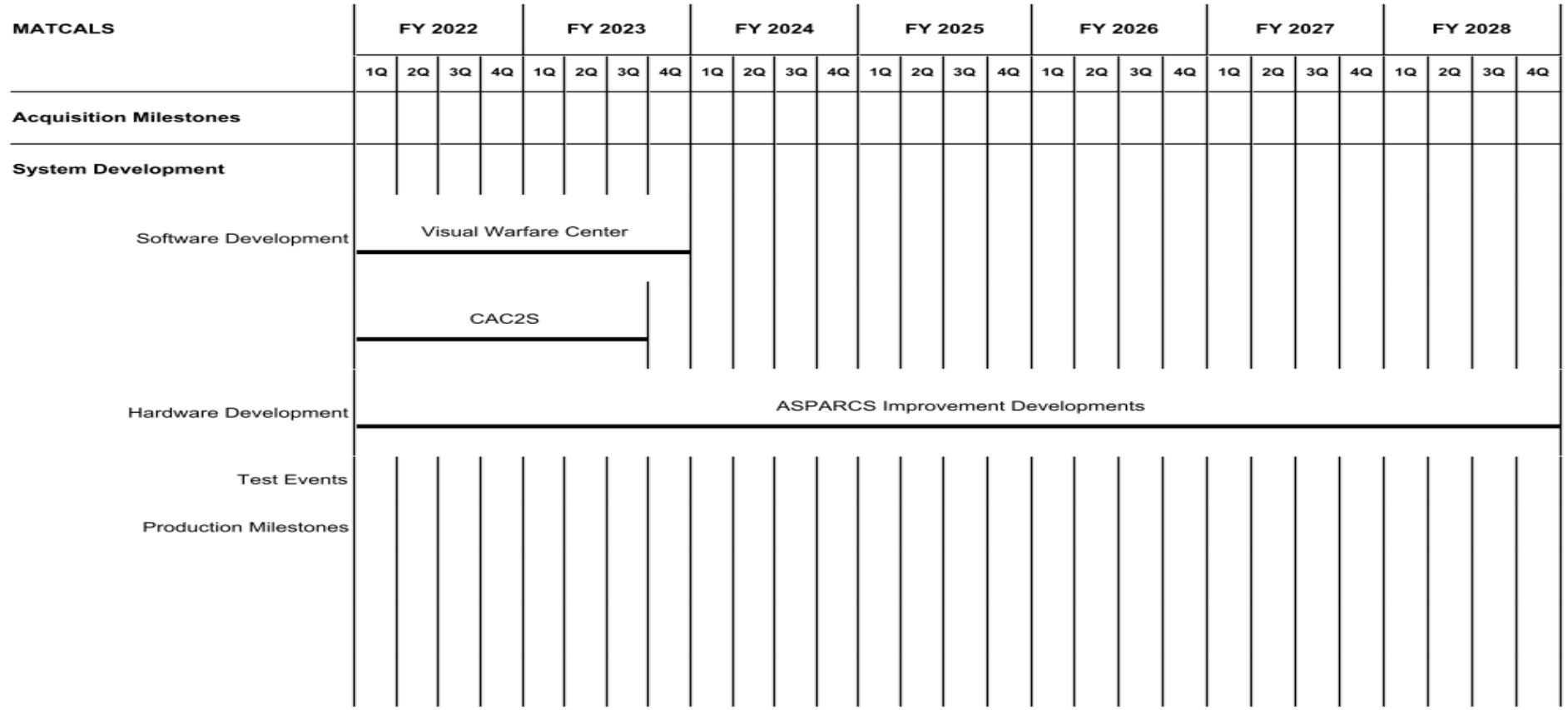
Management Services ($ in Millions)

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 Support	WR	NAWCAD : Patuxent River, MD	1.102	0.163	Dec 2021	0.167	Dec 2022	0.177	Nov 2023	-		0.177	Continuing	Continuing	Continuing
Program Management Support	WR	G/ATOR : PEO Land Systems	0.650	0.000		0.000		0.000		-		0.000	0.000	0.650	-
		Subtotal	1.752	0.163		0.167		0.177		-		0.177	Continuing	Continuing	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	22.523	3.108		3.020		1.063		-		1.063	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0718 / *MATCALS*



2024DON - 0604504N - 0718

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0718 / *MATCALS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MATCALS				
System Development: Software Development: Visual Warfare Center	1	2022	4	2023
System Development: Software Development: CAC2S	1	2022	3	2023
System Development: Hardware Development: ASPARCS improvements	1	2022	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 0993 / *Carrier ATC*	

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
0993: *Carrier ATC*	225.285	11.825	10.560	8.655	-	8.655	8.773	8.945	9.125	9.594	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Shipboard Air Traffic Control systems, interfacing with versions of the AN/TPX-42A(V) Direct Altitude and Identity Readout (DAIR), allow shipboard Air Traffic Controllers to identify, marshal, and direct aircraft within a 50 Nautical Mile (NM) radius of the ship. In recent years, the top 25 percent of the AN/SPN-43C frequency band has been reallocated to the Fixed Wireless Access Community prohibiting Air Traffic Control (ATC) Air Search Radar (ASR) operation within 50NM of the coast. Because the Navy requires an air traffic control surveillance radar, this project unit will include engineering efforts to identify requirements and develop the AN/SPN-50(V)1 as an AN/SPN-43C replacement system. In addition, bridging Engineering Change Proposals (ECP) will be required to sustain the AN/SPN-43C capability until the AN/SPN-50(V)1 is completely fielded. Finally, the AN/TPX-42A(V) DAIR continues to undergo several phased upgrades that have resulted in a number of field changes/technology refresh/insertion efforts. System improvements include replacing militarized front-end equipment in the track processor with open architecture Commercial Off the Shelf technology, converting the operational program software to more commonly used and flexible "C" language, providing the "hooks" for potential interface with Mode 5 Identification Friend or Foe, and integrating a flat panel monitor into the controller work station. The ATC System Shipboard, AN/SYY-1(V) interfaces to emerging sensors as well as those currently in service to improve reliability to the fleet. The embedded training capability of the AN/TPX-42A(V) will carry on to the AN/SYY-1(V). This effort includes addressing broadened CyberSecurity requirements to remain compliant with software CyberSecurity directives and Information Assurance mandates.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: AN/SPN-50	6.412	5.563	3.859	0.000	3.859
Articles:	-	-	-	-	-
Description: This project funds the development of the AN/SPN-43C replacement program (AN/SPN-50), which was previously funded under AN/SPN-43C and is being broken out for greater clarity and justification. This system enables Air Traffic Controllers to assure the safe and expeditious movement of air traffic. This capability is an enabler in maintaining launch/recovery cycle times/sortie rates.					
FY 2023 Plans: Continued efforts to complete redesign and requalification efforts to achieve System Requirements Document (SRD) compliance. Tasking will include correcting deficiencies found during testing and support ongoing government test efforts.					
FY 2024 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Closeout of EMD contract and developing shipboard enclave environment, reduce cyber vulnerabilities of aviation land and launch systems and improve the ability to continue manned and unmanned aircraft flight operations in a cyber-contested battlespace ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease from FY23 to FY24 due to winding down of development efforts.					
Title: AN/SPN-43C	2.394	1.918	1.655	0.000	1.655
Articles:	-	-	-	-	-
Description: Funds development of sustainment Engineering Change Proposals (ECP) for the AN/SPN-43C. The sustainment effort will ensure the capabilities provided by the AN/SPN-43C remain available to CVN, LHA and LHD type ships until the replacement system is fielded. ***FY 2023 Plans:*** Continued sustainment ECPs for AN/SPN-43C. ***FY 2024 Base Plans:*** Continued Sustainment ECPs for AN/SPN-43C ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease from FY23 to FY24 due to winding down of development efforts.					
Title: AN/TPX-42	3.019	3.079	3.141	0.000	3.141
Articles:	-	-	-	-	-
Description: This project funds the ongoing modernization of the AN/TPX-42 system through engineering changes and technology refresh, to include CyberSecurity requirements and compliance. Specific engineering changes are: Development of an Air Traffic Control (ATC) Multi-Function Console (MFC) which will reduce operational costs, improve reliability, and provide common hardware for all ATC workstations. Additionally, MFC will provide interfaces for emerging/planned sensors. ***FY 2023 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continue sustainment ECPs for AN/TPX-42. Continue developing shipboard enclave environment, reduce cyber vulnerabilities of aviation land and launch systems and improve the ability to continue manned and unmanned aircraft flight operations in a cyber-contested battlespace. ***FY 2024 Base Plans:*** Continued Sustainment ECPs for Multi-function Console ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of .062 from FY23 to FY24 due to inflation					
Accomplishments/Planned Programs Subtotals	11.825	10.560	8.655	0.000	8.655

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/2830: *Afloat ATC*	34.327	56.536	67.249	-	67.249	65.908	67.104	73.955	33.731	Continuing	Continuing

Equipment: SATC / AN/SPN-50(V)1

Remarks

Carrier ATC related funding is only a portion of OPN Line Item 2830.

D. Acquisition Strategy

AN/TPX-42 Voice/Video recorder replacement, Joint Precision Approach and Landing System Interface, Shipboard trainer, and Air Traffic Control (ATC) Console are all in progress ECPs, with improvements being incorporated into the production of AN/SYY-1(V) upgrade kits.

AN/SPN-50 replacement program is an ACAT IVT program. All other projects are non-ACAT upgrades to existing systems. An evolutionary acquisition approach is being used to introduce these technology advancements that either satisfy user requirements, such as all weather operation, or address supportability and cost of ownership problems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

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
Primary HDW Develop-TPX-42	WR	NAWCAD : PAX River, MD	7.972	0.833	Nov 2021	0.849	Nov 2022	0.866	Nov 2023	-		0.866	Continuing	Continuing	Continuing
Primary HDW Develop - SPN-43	WR	NAWCAD : PAX River, MD	6.158	0.537	Nov 2021	0.501	Nov 2022	0.536	Nov 2023	-		0.536	Continuing	Continuing	Continuing
Primary HDW Develop - SPN-50(V)1 Pre-CDR Configuration EDM	C/CPIF	SAAB : Syracuse NY	11.317	0.000		0.000		0.000		-		0.000	0.000	11.317	11.317
Primary HDW Develop - SPN-50(V)1 Post-CDR Configuration EDM	C/CPIF	SAAB : Syracuse NY	5.681	0.207	Oct 2021	0.000		0.000		-		0.000	0.077	5.965	5.614
Primary HDW EMD - SPN-50(V)1	C/CPIF	SAAB : Syracuse NY	54.464	4.198	Oct 2021	0.095	Nov 2022	1.598	Nov 2023	-		1.598	1.211	61.566	44.507
Prior year Prod Dev no longer funded in the FYDP	Various	Various : TBD	17.998	0.000		0.000		0.000		-		0.000	0.000	17.998	-
Follow on ECP	C/CPIF	SAAB : Syracuse NY	0.000	0.000		0.000		0.575	Nov 2023	-		0.575	0.000	0.575	-
		Subtotal	103.590	5.775		1.445		3.575		-		3.575	Continuing	Continuing	N/A

Remarks

AN/SPN-50(V)1 Hardware engineering, manufacturing, and development (EMD) costs increase from FY23 to FY24 due to deferred work for EMD from FY22/23 based on latest cost and schedule analysis (C&SA) estimate at completion (EAC).
Follow on ECP line added to address obsolescence issues for hardware and software.

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
Software Development-TPX-42	WR	NAWCAD : PAX River, MD	28.976	0.516	Nov 2021	0.526	Nov 2022	0.537	Nov 2023	-		0.537	Continuing	Continuing	Continuing
Integrated Logistics Support- TPX-42	WR	NAWCAD : PAX River, MD	2.727	0.200	Nov 2021	0.202	Nov 2022	0.206	Nov 2023	-		0.206	Continuing	Continuing	Continuing
Integrated Logistics Support-SPN-43	WR	NAWCAD : PAX River, MD	1.496	0.074	Nov 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support-SPN-50(V)1	WR	NAWCAD : PAX River, MD	2.256	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 0993 / *Carrier ATC*	

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
Studies & Analysis-SPN-50(V)1	WR	NAWCAD : PAX River, MD	4.591	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Software Development - SPN-50(V)1	WR	NAWCAD : PAX River, MD	11.527	0.071	Nov 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Studies & Analysis-SPN-43	WR	NAWCAD : PAX River, MD	2.112	0.023	Nov 2021	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Studies & Analysis-TPX-42	WR	NAWCAD : PAX River, MD	1.873	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering-SPN-50(V)1	WR	NAWCAD : PAX River, MD	17.804	0.000		2.507	Nov 2022	1.357	Nov 2023	-		1.357	0.208	21.876	-
Prior Year Support no longer funded in the FYDP	Various	Various : Various	13.393	0.000		0.000		0.000		-		0.000	0.000	13.393	-
Studies & Analysis SPN-50(V)1	WR	Variou : VA	0.402	0.000		0.000		0.000		-		0.000	0.000	0.402	-
		Subtotal	87.157	0.884		3.235		2.100		-		2.100	Continuing	Continuing	N/A

Remarks

AN/SPN-50(V)1 systems engineering decrease from FY 2023 to FY 2024 is due to the winding down of the development efforts.

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
Developmental Test & Evaluation (DT&E)	WR	NAWCAD : PAX River, MD	14.386	1.866	Nov 2021	1.425	Nov 2022	1.126	Nov 2023	-		1.126	Continuing	Continuing	Continuing
Operational Test & Evaluation (OT&E)	WR	OPTEVOR : Norfolk, VA	3.245	1.974	Nov 2021	3.106	Nov 2022	0.301	Nov 2023	-		0.301	2.336	10.962	-
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	WR	NAWCAD : PAX River	8.761	0.000		0.000		0.000		-		0.000	0.000	8.761	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 0993 / *Carrier ATC*	

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
Subtotal			26.392	3.840		4.531		1.427		-		1.427	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 Support	C/CPFF	DDG : California, MD	3.700	0.587	Jan 2022	0.597	Jan 2023	0.675	Dec 2023	-		0.675	Continuing	Continuing	Continuing
Program Management Support	WR	NAWCAD : PAX River, MD	3.512	0.689	Nov 2021	0.701	Nov 2022	0.821	Dec 2023	-		0.821	Continuing	Continuing	Continuing
Travel	WR	NAVAIRHQ : PAX River, MD	0.934	0.050	Nov 2021	0.051	Nov 2022	0.057	Dec 2023	-		0.057	Continuing	Continuing	Continuing
Subtotal			8.146	1.326		1.349		1.553		-		1.553	Continuing	Continuing	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	225.285	11.825		10.560		8.655		-		8.655	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

AN/SPN-50 Program Schedule

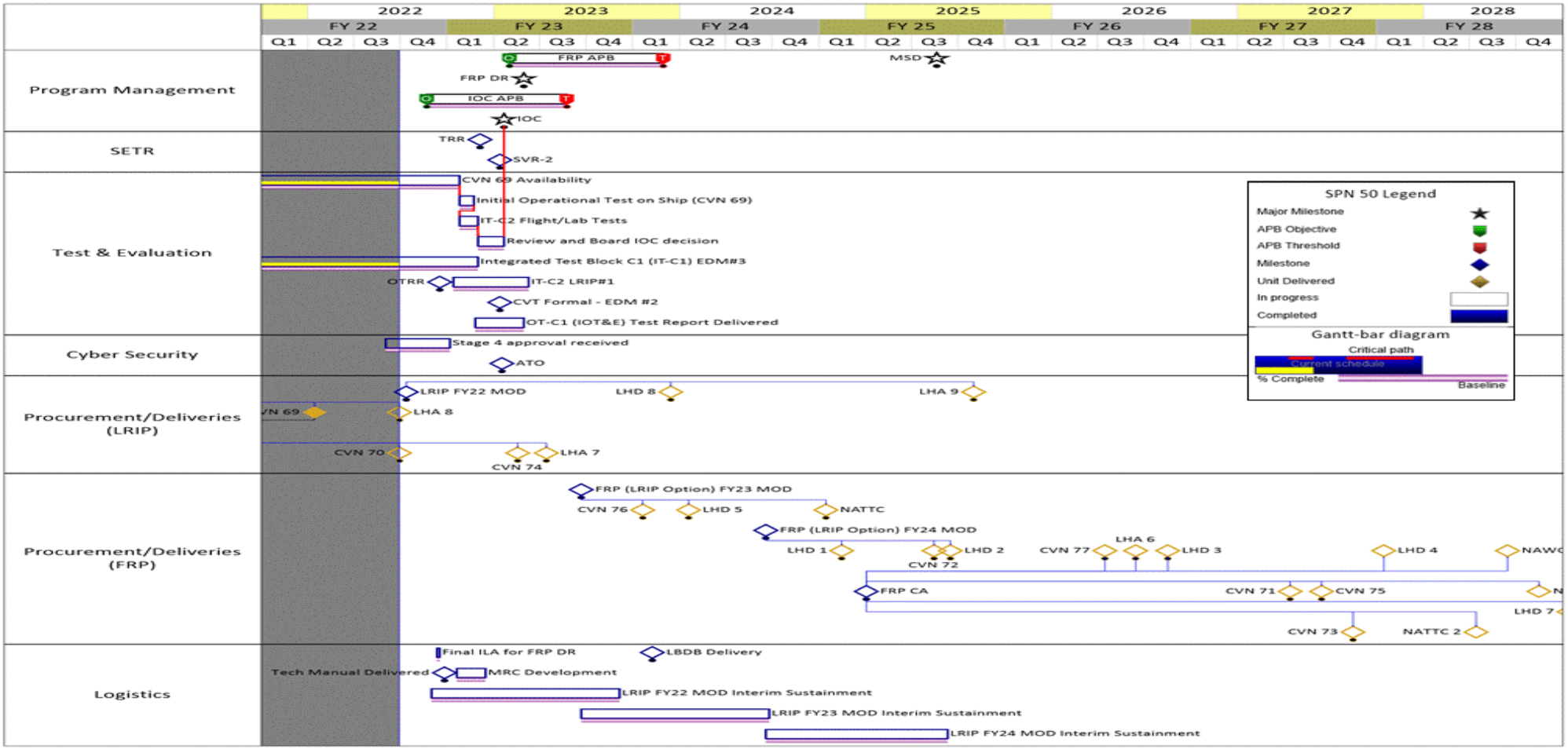


Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

AN/TPX-42 / AN/SPN-43 Schedule

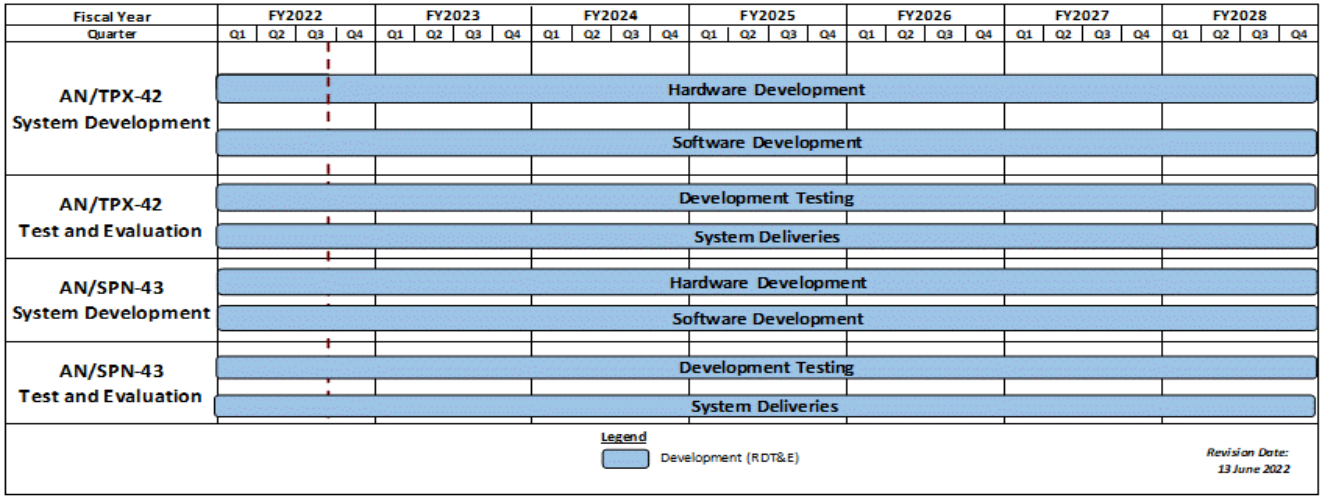


Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 0993 / *Carrier ATC*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Carrier ATC				
Acquisition Milestones: Milestones: AN/SPN-50(V)1 MSD	3	2025	3	2025
Acquisition Milestones: Milestones: AN/SPN-50(V)1 IOC	2	2023	2	2023
System Development: Hardware Development: AN/SPN-43C	1	2022	4	2027
System Development: Hardware Development: AN/TPX-42A(V)	1	2022	4	2027
System Development: Software Development: AN/SPN-43C	1	2022	4	2026
System Development: Software Development: AN/TPX-42A(V)	1	2022	4	2026
System Development: Reviews: Physical Configuration Audit (AN/SPN-50(V)1)	3	2022	3	2022
Test and Evaluation: Developmental Testing/Operational Testing (AN/SPN-50(V)1)	1	2022	1	2022
Test and Evaluation: Developmental Testing (AN/TPX-42A(V))	1	2022	4	2028
Test and Evaluation: Developmental Testing (AN/SPN-43C)	1	2022	4	2028
Deliveries: System Deliveries (TPX-42A(V))	1	2022	4	2028
Deliveries: System Deliveries (AN/SPN-43C)	1	2022	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 1657 / *ATC Improvement*	

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
1657: *ATC Improvement*	5.463	0.344	0.474	0.452	-	0.452	0.457	0.462	0.463	0.479	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides for engineering development, integration, adaptation, and testing of new and/or modernized Air Traffic Control (ATC) systems, air navigational aids, landing systems, and ATC communication systems for Naval and Marine Corps Air Stations (NAS/MCAS), Fleet ATC Systems, and remote tower improvements.. These systems are critical to Naval Aviation and provide for safe, efficient air operations. Additionally, the Federal Aviation Administration (FAA) is affecting major modernization of the National Airspace System (NAS). The Navy must maintain compatibility with FAA-developed ATC systems in order to ensure seamless interoperability within the NAS. NAS modernization initiatives in Project 1657 include the Visual Information Display System (VIDS) and follow-on Pre-Planned Product Improvements, with additional RDT&E efforts required for modified commercial-off-the-shelf ATC systems and equipment for modernization and recapitalization of these systems at our NAS, MCAS & Fleet Area Control & Surveillance Facilities (FACSFACs) worldwide.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: NAS MOD VIDS	0.167	0.185	0.157	0.000	0.157
Articles:	-	-	-	-	-
Description: Continue engineering development of pre-planned product improvements for the VIDS and initiate efforts to incorporate VIDS into the FACSFACs. Research display alternatives for Navy ATC systems, and evaluate alternatives for future communication and radar systems.					
FY 2023 Plans: Continue engineering development of Pre-Planned Product Improvement for VIDS to incorporate multiple weather source inputs. Continue STARS and VIDS engineering development for technology insertion. To include VIDs cyber integration efforts and continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system.					
FY 2024 Base Plans: Continue engineering development of Pre-Planned Product Improvement for VIDS to incorporate multiple weather source inputs. Continue STARS and VIDS engineering development for technology insertion. To include VIDs cyber integration efforts and continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system.					
FY 2024 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 1657 / *ATC Improvement*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease from FY23 to FY24 due to change in project funding.					
Title: Fleet ATC Systems	0.177	0.289	0.295	0.000	0.295
Articles:	-	-	-	-	-
Description: Research efforts to determine the best technical approach to integrate various data link and communication system upgrades into Navy/Marine Corps ATC Systems including, but not limited to, the Digital Airport Surveillance Radar (DASR) and the DoD Advanced Automation Systems (DAAS) into the Fleet Area Control and Surveillance Facilities. Evaluate alternative for future processor/display, sensor and communication systems. ***FY 2023 Plans:*** Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. Continue evaluation of future processor/display, sensor and communication systems. ***FY 2024 Base Plans:*** Continue engineering efforts to maintain interoperability with the FAA's next generation air traffic control system. Continue evaluation of future processor/display, sensor and communication systems. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase from FY23 to FY24 due to inflation.					
Accomplishments/Planned Programs Subtotals	0.344	0.474	0.452	0.000	0.452

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/2820: *Ashore ATC Equipment: NASMOD/Fleet ATC*	39.485	41.239	41.419	-	41.419	42.129	43.035	44.060	46.094	Continuing	Continuing

Remarks

ATC Improvement related funding is only a portion of OPN Line Item 2820.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 1657 / *ATC Improvement*

D. Acquisition Strategy

All projects are non-ACAT upgrades to existing systems. An evolutionary acquisition approach is being used to introduce technology advancements that either satisfy emergent requirements or address supportability and cost of ownership problems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 1657 / *ATC Improvement*

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
Primary HDW Develop - VIDS	WR	SPAWAR Systems Command : Charleston, SC	2.783	0.167	Dec 2021	0.185	Dec 2022	0.157	Dec 2023	-		0.157	Continuing	Continuing	Continuing
Primary HDW Develop - Fleet ATC	WR	SPAWAR Systems Center : Charleston, SC	1.744	0.177	Dec 2021	0.289	Dec 2022	0.295	Dec 2023	-		0.295	Continuing	Continuing	Continuing
		Subtotal	4.527	0.344		0.474		0.452		-		0.452	Continuing	Continuing	N/A

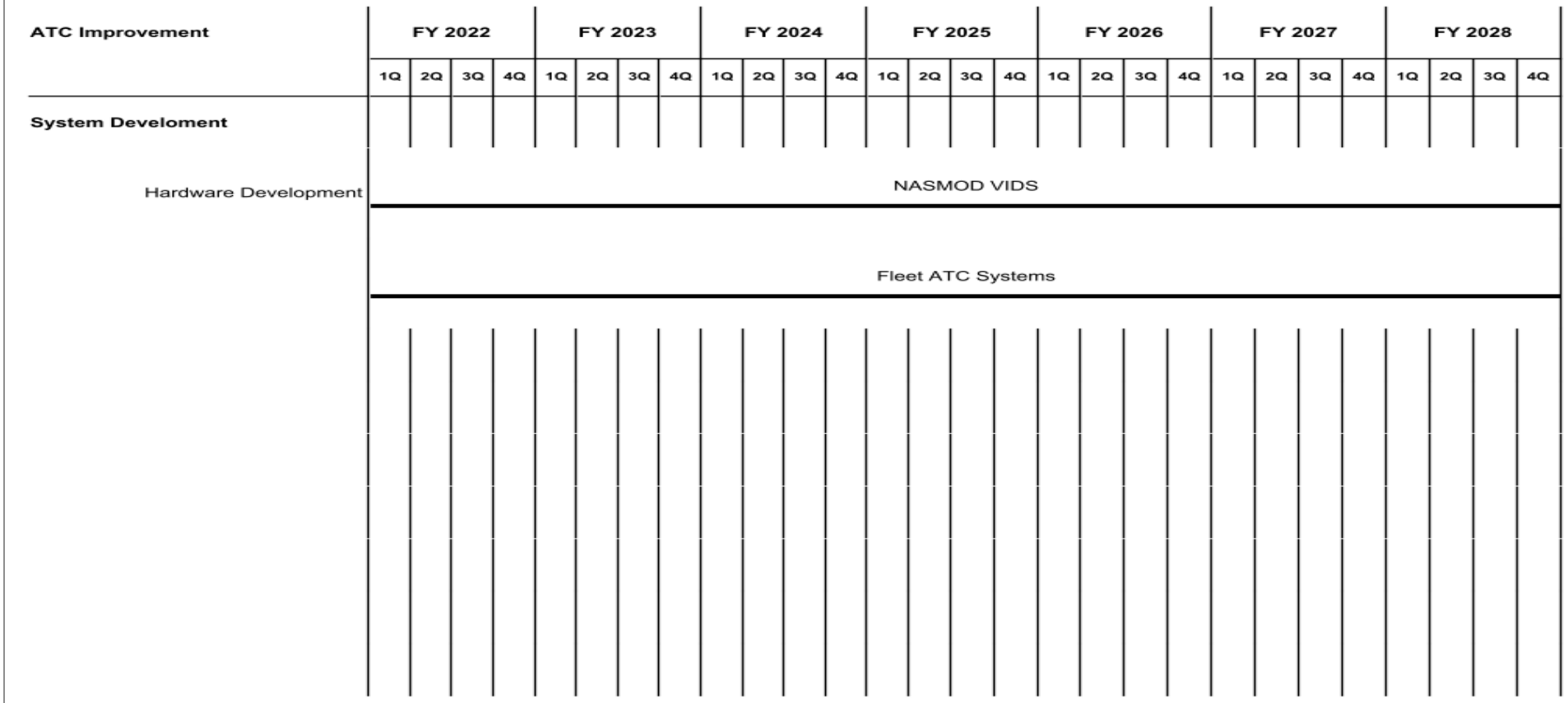
Support ($ in Millions)

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	WR	SPAWAR Systems Center : Charleston, SC	0.936	0.000		0.000		0.000		-		0.000	0.000	0.936	-
		Subtotal	0.936	0.000		0.000		0.000		-		0.000	0.000	0.936	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	5.463	0.344		0.474		0.452		-		0.452	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 1657 / *ATC Improvement*



2024DON - 0604504N - 1657

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 1657 / *ATC Improvement*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ATC Improvement				
System Develoment: Hardware Development: NASMOD VIDS	1	2022	4	2028
System Develoment: Hardware Development: Fleet ATC Systems	1	2022	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy											Date: March 2023	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604504N / *Air Control*				Project (Number/Name) 3372 / *ATC Systems*			
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**
3372: *ATC Systems*	129.544	17.337	25.084	32.486	-	32.486	24.527	19.732	20.136	20.832	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Landing System Upgrade Program (LSUP) is essential to retain the United States Navy's capability to perform safe and expeditious aircraft landings aboard CVN and LHA/D class vessels during adverse weather and night conditions, and in contested environments. The Navy's Precision Approach and Landing Capability requirements necessitate Life Cycle Extension upgrades to all three legacy precision landing systems; AN/SPN-35, AN/SPN-41 and AN/SPN-46. The LSUP program modernizes obsolete technology developed and fielded over 30 years ago. Without these upgrades, the Navy estimates complete loss of Automatic Carrier Landing System capability within 5 years. Cyber Security requirements drive increased efforts to remain compliant with software CyberSecurity directives and Information Assurance mandates across the portfolio; maintaining compliance is critical to retaining authorization to operate for Fleet users.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: AN/SPN-46 Blk IV Upgrade	0.114	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: The AN/SPN-46 Blk IV program targets aging and obsolete components within the carrier landing systems and replaces them with modernized and sustainable components. Blk IV consists of antenna pedestal upgrades, replacement of obsolete circuit cards, addresses transmitter obsolescence issues, and Cybersecurity ***FY 2023 Plans:*** N/A ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A					
Title: AN/SPN-35 Blk I Upgrade	0.689	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: This program provides for the development, upgrade, redesign, integration, and testing of the AN/SPN-35C Block I upgrade required to extend the service life and ensure Fleet availability of the system until 2040. AN/SPN-35C is the Precision Approach Radar aboard LHA/LHD class ships and is provides Mode III aircraft recovery capability, ensuring the safe approach and landing of all embarked aircraft during adverse weather & night conditions. The AN/SPN-35C Block I upgrade provides engineering efforts to upgrade,					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 3372 / *ATC Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
redesign, replace, and support common failure items and obsolete components Subsystem upgrades include but are not limited to the Receiver, Radar Processing Controller (RPC), Main Input/output Processor (MIOP), and Control-Indicators. ***FY 2023 Plans:*** N/A ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A					
Title: AN/SPN-46 Blk V Upgrade ***Articles:***	4.364 -	5.666 -	3.618 -	0.000 -	3.618 -
Description: The AN/SPN-46 Block V upgrade targets aging and obsolete hardware and software components within the carrier landing system and replaces them with modernized components to improve system performance in contested environments and improve system supportability. Blk V consists of a major operational software upgrade along with a refresh of numerous Commercial Off The Shelf (COTS) equipment subassemblies. These changes improve reliability issues caused by outdated bus systems and IP based substructures, and provide an overall system hardening to mitigate external interference issues. Refresh subassemblies include replacing the radar's obsolete processor circuit card assemblies (CCAs) with new generation CCAs; upgrading the radar's Real Time Operating System (RTOS) with a current and supportable RTOS; and optimizing and reconfiguring the radar's software into a logical, modular format. This architecture redesign and optimization will increase modularity and operational efficiency and resolve cyber security related issues inherent with the legacy system. Additionally, hardware changes improve system reliability by modernizing those hardware components with less complex and more reliable solutions. Specifically this program upgrading the radar's top two hardware reliability degraders, the Radar Alignment Mast (RAM) pole and the TS-3098 test set. Rapid increase of CCA failures forced prioritization of imminent obsolescence issues; Block V efforts divided into two phases to allow faster fielding of critical items. Phase 1 upgraded the radar's obsolete processor CCAs with new generation CCAs, to include updating the radar's RTOS. Phase 2 upgrades the Maintenance Local Area Network (LAN) hardware and implements Risk Management Framework Cyber-Security controls. These upgrades are required to keep the system supportable/operational through 2040 to support legacy fleet aircraft precision landing requirements.					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 3372 / *ATC Systems*

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: Begin development and integration of Maintenance LAN hardware. Begin environmental, Electromagnetic Interference (EMI) and shock qualification of the phase 2 configuration. ***FY 2024 Base Plans:*** Continue environmental, Electromagnetic Interference (EMI) and shock qualification of the phase 2 configuration. Complete cyber security Risk Management Framework (RMF) controls implementation and begin RMF controls requirements verification testing. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease of $2.048M from FY 2023 to FY 2024 is due to engineering efforts ramping down for development of modernization upgrades.					
Title: AN/SPN-35 Blk II Upgrade	12.170	19.418	28.868	0.000	28.868
Articles:	-	-	-	-	-
Description: This program provides for the development, upgrade, redesign, integration, and testing of the AN/SPN-35C Block II upgrade required to extend the service life and ensure Fleet availability of the system until 2040. AN/SPN-35C is the Precision Approach Radar aboard LHA/LHD class ships and provides Mode III aircraft recovery capability, ensuring the safe approach and landing of all LH-class embarked aircraft during adverse weather & night conditions. The AN/SPN-35C Block II upgrade provides engineering efforts to develop an Active Electronically Steered Array (AESA) to replace the existing receiver-transmitter, pedestal, and antenna group, and to incorporate digital stabilization. Additionally, this effort includes the research and development of the AESA antenna's application to other existing precision approach and landing systems with the intent of improving commonality and reducing the logistics footprint of the inventory of current shipboard radar-guided precision approach and landing systems. ***FY 2023 Plans:*** Continue development of AESA to include First Article Delivery, prototype AESA fabrication, and AESA integration. Complete System Integration Lab (SIL) setup. ***FY 2024 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 3372 / *ATC Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Complete Critical Design Review (CDR). Continue development of AESA, and AESA integration; deliver System Integration Lab (SIL) trailer and enclosure; perform design adjustments revealed during two-panel subarray test/ demo; begin planning for Deport Source of Repair (DSOR)/Logistics/Supportability. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase of $9.450M from FY 2023 to FY 2024 is due to the continued engineering efforts including CDR, design adjustments, and planning for DSOR.					
Accomplishments/Planned Programs Subtotals	17.337	25.084	32.486	0.000	32.486

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/2830: *Afloat ATC Equipment/ACLS*	27.399	23.055	23.476	-	23.476	28.235	40.464	33.770	78.229	Continuing	Continuing

Remarks

ATC Systems related funding is only a portion of OPN Line Item 2830.

D. Acquisition Strategy

Landing System Upgrade Program consists of lifecycle extension upgrades to the AN/SPN-35C Precision Approach Radar, AN/SPN-41B Instrument Control Landing Systems and AN/SPN-46 Automatic Carrier Landing Systems, all of which support Air Traffic Control (ATC) operations on board CVN, LHA, and/or LHD-class ships. This effort includes numerous commercial off-the-shelf (COTS) component refresh updates which are urgently needed to sustain the operational viability of these Naval ATC systems supporting fleet air operations until at least 2040, until the next generation ATC system is fully implemented. This COTS refresh will include analysis and upgrade of key system components critical to overall system operation but which have become increasingly difficult to maintain over the past several years. Recent adjustments in the direction and scope of Naval ATC systems necessitated a re-evaluation of the long-term viability and sustainability of the current Fleet ATC equipment.

The Resources and Requirements Review Board approved the DON Precision Approach and Landing Capability (PALC) Roadmap per Decision Memorandum (DM) Ser: N8B/13U141053 dtd 03 July 2013. This PALC Roadmap re-scoped Joint Precision Approach and Landing System (JPALS) into a single increment and deferred JPALS capability from legacy fleet aircraft. Per Enclosure 1 of the above DM, the Landing Systems Upgrade Program will be comprised of upgrades to the AN/SPN-46, AN/SPN-35C, and AN/SPN-41B. Each SPN upgrade will go through separate Systems Engineering Technical Review (SETR) processes. The current SPN systems need to be sustained through 2040.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 3372 / *ATC Systems*

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
Primary Hardware Development - AN/SPN-46 Blk IV Upgrade	WR	NAWCAD : Patuxent River, MD	31.440	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Ancillary Hardware Development - AN/SPN-46 Blk IV Upgrade	C/CPFF	Sierra Nevada Corp (SNC) : Reno, NV	23.562	0.000		0.000		0.000		-		0.000	0.000	23.562	23.562
Primary Hardware Development - AN/SPN-35 Blk I Upgrade	WR	NAWCAD : Patuxent River, MD	12.290	0.328	Nov 2021	0.000		0.000		-		0.000	0.000	12.618	-
Ancilliary Hardware Development - AN/SPN-35 Blk I Upgrade	WR	NAWCAD : Patuxent River, MD	19.293	0.000		0.000		0.000		-		0.000	0.000	19.293	-
Primary Hardware Development - AN/SPN - 46 Blk V Upgrade	C/CPFF	Sierra Nevada Corp (SNC) : Reno, NV	7.710	2.002	Nov 2021	3.147	Nov 2022	1.369	Nov 2023	-		1.369	1.056	15.284	15.214
Ancilliary Hardware Development - AN/SPN-46 Blk V Upgrade	WR	NAWCAD : Patuxent River, MD	7.737	1.166	Nov 2021	1.214	Nov 2022	0.900	Nov 2023	-		0.900	Continuing	Continuing	Continuing
Primary Hardware Development - AN/SPN-35 Blk II Upgrade	WR	NAWCAD : Patuxent River, MD	1.000	2.500	Nov 2021	4.653	Nov 2022	5.219	Nov 2023	-		5.219	Continuing	Continuing	Continuing
Ancilliary Hardware Development - AN/SPN-35 Blk II Upgrade	C/CPFF	GTRI : Atlanta, GA	2.997	8.755	Nov 2021	13.581	Nov 2022	21.306	Nov 2023	-		21.306	Continuing	Continuing	Continuing
		Subtotal	106.029	14.751		22.595		28.794		-		28.794	Continuing	Continuing	N/A

Remarks

FY 2024 increase in AN/SPN-35 Blk II due to significant engineering events such as CDR, continued development, radar and prototype integration, software development, AESA integration, and prototype proof of concept efforts for the AESA integrated system.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 3372 / *ATC Systems*	

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
Integrated Logistics Support (ILS)	WR	NAWCAD : Patuxent River, MD	5.516	0.474	Nov 2021	0.495	Nov 2022	0.509	Nov 2023	-		0.509	Continuing	Continuing	Continuing
Systems Engineering Support	WR	NAWCAD : Patuxent River, MD	7.127	0.535	Nov 2021	0.559	Nov 2022	0.583	Nov 2023	-		0.583	Continuing	Continuing	Continuing
		Subtotal	12.643	1.009		1.054		1.092		-		1.092	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
Developmental Test & Evaluation (DT&E)	WR	NAWCAD : Patuxent River, MD	4.853	0.830	Nov 2021	0.656	Nov 2022	1.680	Nov 2023	-		1.680	Continuing	Continuing	Continuing
		Subtotal	4.853	0.830		0.656		1.680		-		1.680	Continuing	Continuing	N/A

Remarks

FY 2024 increase in AN/SPN-46 Blk V is due to completion of functional testing, EMI and shock qualification.
FY 2024 increase in AN/SPN-35 Blk II is due to radar software integrating testing.

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 (PM) Support	WR	NAWCAD : Patuxent River, MD	4.293	0.487	Nov 2021	0.509	Nov 2022	0.645	Nov 2023	-		0.645	Continuing	Continuing	Continuing
PM Support - MSS	C/CPAF	Amelex : Patuxent River, MD	1.201	0.000		0.000		0.000		-		0.000	0.000	1.201	1.201
PM Support - MSS	C/CPAF	DDG : Patuxent River, MD	0.525	0.260	Jan 2022	0.270	Jan 2023	0.275	Nov 2023	-		0.275	Continuing	Continuing	Continuing
		Subtotal	6.019	0.747		0.779		0.920		-		0.920	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604504N / *Air Control*	Project (Number/Name) 3372 / *ATC Systems*	

	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	129.544	17.337		25.084		32.486		-		32.486	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 3372 / *ATC Systems*

LSUP (Landing System Upgrade Program) Schedule

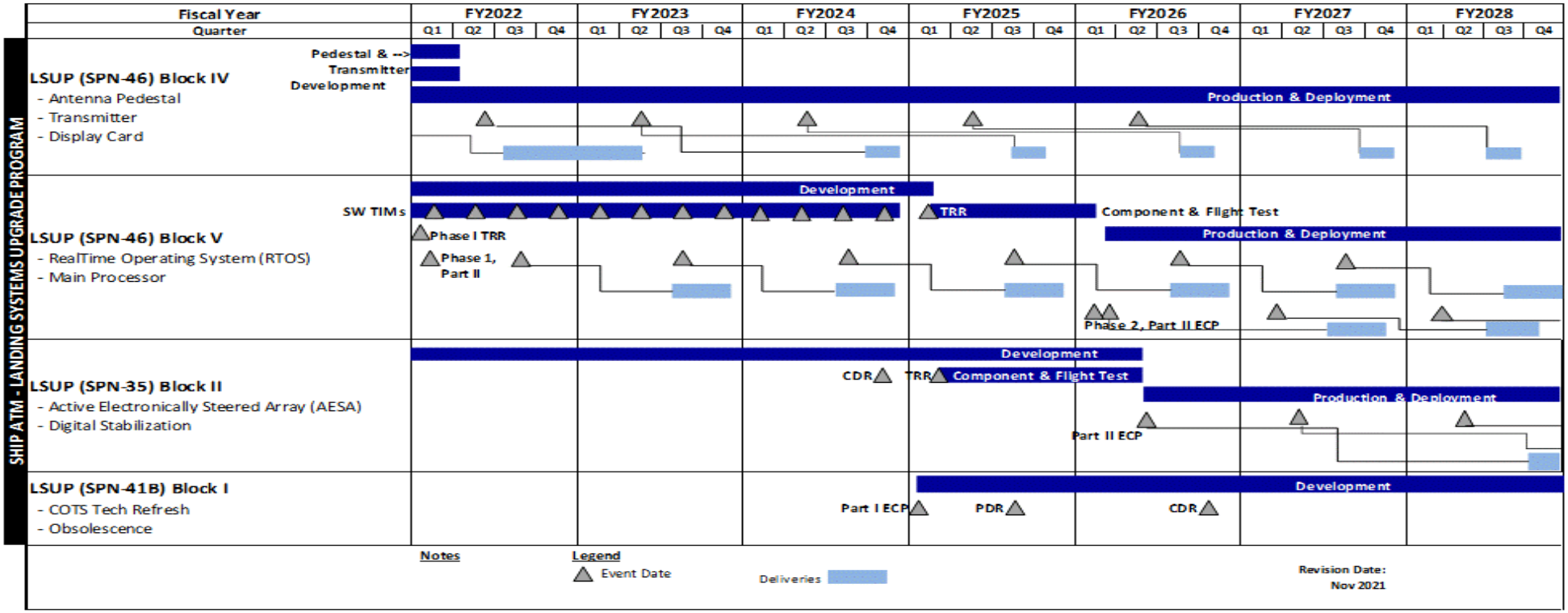


Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604504N / *Air Control*	**Project (Number/Name)** 3372 / *ATC Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3372				
Reviews: AN/SPN-46 Blk V Technical Interchange Meeting (TIM) Quarterly	1	2022	4	2024
Reviews: AN/SPN-35 Blk II Critical Design Review (CDR)	4	2024	4	2024
Reviews: AN/SPN-41 Blk I Preliminary Desgin Review (PDR)	3	2025	3	2025
Reviews: AN/SPN-41 Blk I Critical Design Review (CDR)	4	2026	4	2026
Reviews: AN/APN-41 Blk I Hardware and Software Development	1	2025	1	2028
Test and Evaluation: AN/SPN-46 Blk V Test Readiness Review (TRR)	1	2025	1	2025
Test and Evaluation: AN/SPN-35 Blk II Test Readiness Review (TRR)	1	2025	1	2025