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**Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	350.508	40.284	27.499	39.138	-	39.138	45.062	36.879	32.271	32.841	Continuing	Continuing
0718: <i>MATCAL S</i>	27.314	3.186	3.136	3.020	-	3.020	3.012	2.866	2.925	2.985	Continuing	Continuing
0993: <i>Carrier ATC</i>	207.908	17.377	9.897	10.560	-	10.560	8.957	9.068	9.221	9.368	Continuing	Continuing
1657: <i>ATC Improvement</i>	5.056	0.407	0.358	0.474	-	0.474	0.470	0.449	0.456	0.464	Continuing	Continuing
3372: <i>ATC Systems</i>	110.230	19.314	14.108	25.084	-	25.084	32.623	24.496	19.669	20.024	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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	38.863	27.499	0.000	-	0.000
Current President's Budget	40.284	27.499	39.138	-	39.138
Total Adjustments	1.421	0.000	39.138	-	39.138
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	1.950	0.000			
• SBIR/STTR Transfer	-0.529	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	39.138	-	39.138

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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy Date: April 2022

**Appropriation/Budget Activity**  
1319: *Research, Development, Test & Evaluation, Navy / BA 5: System Development & Demonstration (SDD)*

**R-1 Program Element (Number/Name)**  
PE 0604504N / *Air Control*

**Change Summary Explanation**

Schedule: 3372 AN/SPN-35D Block I program was terminated due to delays with Engineering Development Model (EDM) deliveries, and the impact on qualification testing subsequent production effort. It became evident that the AN/SPN-35D alterations would not be fully mature by the A-180 milestone for FY 2021 to FY 2023 planned installations.

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FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control				<b>Project (Number/Name)</b> 0718 / MATCALs			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
0718: MATCALs	27.314	3.186	3.136	3.020	-	3.020	3.012	2.866	2.925	2.985	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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> ASPARCS Improvements	0.590	0.602	0.614	0.000	0.614
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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.					
<b>FY 2022 Plans:</b> 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.					
<b>FY 2023 Base Plans:</b>					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2023 Navy **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0718 / MATCAL S
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>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.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 increase is due to inflation.</p>					
<p><b>Title:</b> Virtual Warfare Center Support</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> 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.</p> <p><b>FY 2022 Plans:</b> Continue to support integration and development of Designs of Experiment related to Marine Air Ground Task Force (MAGTF) IAMD capabilities. Provide event technical support for additional analysis events. Conduct and document analysis results for capabilities. Conduct and document analysis results for USMC stakeholders.</p> <p><b>FY 2023 Base Plans:</b> 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.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 increase is due to the required modeling and simulation efforts ramping up in FY 2023.</p>	2.596	1.534	2.000	0.000	2.000
	-	-	-	-	-
<p><b>Title:</b> Common Aviation Command and Control System (CAC2S)</p> <p align="right"><b>Articles:</b></p>	0.000	1.000	0.406	0.000	0.406
	-	1	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0718 / MATCALs

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<p><b>Description:</b> 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 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.</p> <p><b>FY 2022 Plans:</b> Integration of ATNAVICS and CAC2S, including the production of an MATC CAC2S prototype, developmental testing, field unit evaluation and certification.</p> <p><b>FY 2023 Base Plans:</b> Complete integration of ATNAVICS and CAC2S and field unit evaluation and certification.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 decrease is due to the effort winding down and completing in FY 2023.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	3.186	3.136	3.020	0.000	3.020

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<b>Line Item</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete Total Cost</b>
• OPN/2820: Ashore ATC Equipment/MATCALs	9.506	10.604	9.146	-	9.146	8.162	8.035	8.197	8.361	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. G/ATOR requires modification to achieve FAA flight certification and integrate with AN/TPN-31 ATNAVICS for Precision Approach Radar. The Marine Air Traffic Control (ATC) Working Group identified requirements to address obsolescence issues with ATC Expeditionary Towers. These requirements were

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**Exhibit R-2A, RDT&E Project Justification:** PB 2023 Navy **Date:** April 2022

<b>Appropriation/Budget Activity</b>	<b>R-1 Program Element (Number/Name)</b>	<b>Project (Number/Name)</b>
1319 / 5	PE 0604504N / <i>Air Control</i>	0718 / <i>MATCAL</i> S

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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0718 / MATCAL S
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary HDW Develop - ASPARCS Mode 5/S	WR	NAWCAD : Patuxent River, MD	2.676	0.590	Dec 2020	0.000		0.000		-		0.000	0.000	3.266	-
Primary HDW Develop - ASPARCS	C/BA	NAWCAD : Patuxent River, MD	0.000	0.000		0.134	Dec 2021	0.136	Dec 2022	-		0.136	0.000	0.270	-
Primary HDW Develop - ASPARCS	WR	NIWC : San Diego, CA	0.510	0.000		0.200	Dec 2021	0.204	Dec 2022	-		0.204	0.000	0.914	-
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
<b>Subtotal</b>			4.969	0.590		0.334		0.340		-		0.340	0.000	6.233	N/A

<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
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	0.000		0.200	Dec 2021	0.204	Dec 2022	-		0.204	0.000	4.976	-
Software Development - Mode 5/S Dev - G/ATOR	SS/CPFF	Telephonics : Huntington Station, NY	7.977	0.000		0.000		0.000		-		0.000	0.000	7.977	Continuing
Engineering Support - VWC	TBD	NSMA : TBD	3.309	1.121	Dec 2020	0.880	Dec 2021	0.898	Dec 2022	-		0.898	Continuing	Continuing	Continuing
Software Development - VWC	C/BA	TBD : TBD	2.320	1.315	Dec 2020	0.584	Dec 2021	1.005	Dec 2022	-		1.005	Continuing	Continuing	Continuing
Software Development - CAC2S	TBD	TBD : TBD	0.000	0.000		0.975	Dec 2021	0.406	Nov 2022	-		0.406	0.000	1.381	-
<b>Subtotal</b>			20.753	2.436		2.639		2.513		-		2.513	Continuing	Continuing	N/A

**Remarks**  
FY 2022 to FY 2023 increase in Software Development for VWC is due to the required modeling and simulation efforts ramping up in FY 2023.



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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 0718 / <i>MATCAL</i> S
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<b>MATCAL</b>	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
<b>Acquisition Milestones</b>																												
<b>System Development</b>																												
Software Development																												
	Visual Warfare Center																											
Hardware Development																												
	ASPARCS Improvement Developments																											
Test Events																												
Production Milestones																												

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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 0718 / <i>MATCAL</i> S
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>MATCAL</b> S				
System Development: Software Development: Visual Warfare Center	1	2021	4	2027
System Development: Software Development: CAC2S	1	2022	3	2023
System Development: Hardware Development: ASPARCS improvements	1	2021	4	2027

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>				<b>Project (Number/Name)</b> 0993 / <i>Carrier ATC</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
0993: <i>Carrier ATC</i>	207.908	17.377	9.897	10.560	-	10.560	8.957	9.068	9.221	9.368	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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> AN/SPN-50	10.626	4.484	5.563	0.000	5.563
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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 administrative reasons. 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.					
<b>FY 2022 Plans:</b> Testing continues with IT-C2 and OT-C1 (IOT&E). Updating ILA in support of Initial Operational Capability (IOC).					
<b>FY 2023 Base Plans:</b> Closeout of EMD contract to include corrections of deficiencies found during test and support to ongoing government test efforts.					
<b>FY 2023 OCO Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0993 / Carrier ATC

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
N/A					
<p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 increase is due to additional government testing required for hardware obsolescence ECP.</p> <p><b>Title:</b> AN/SPN-43C</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> 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.</p> <p><b>FY 2022 Plans:</b> Continued sustainment ECPs for AN/SPN-43C.</p> <p><b>FY 2023 Base Plans:</b> Continued sustainment ECPs for AN/SPN-43C.</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 decrease is due to the ECP development efforts ramping down as the AN/SPN-43 system is replaced by AN/SPN-50(V)1 system in the fleet.</p>	2.341	2.394	1.918	0.000	1.918
	-	-	-	-	-
<p><b>Title:</b> AN/TPX-42</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> 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.</p> <p><b>FY 2022 Plans:</b> 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</p>	4.410	3.019	3.079	0.000	3.079
	-	-	-	-	-

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<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0993 / Carrier ATC
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
aircraft flight operations in a cyber-contested battlespace. Complete land based testing for AN/TPX-42 interface with Enterprise Air Surveillance Radar (EASR and AN/SPN-50).  <b>FY 2023 Base Plans:</b> 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.  <b>FY 2023 OCO Plans:</b> N/A  <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 increase is due to inflation.					
<b>Accomplishments/Planned Programs Subtotals</b>	17.377	9.897	10.560	0.000	10.560

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

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN/2830: <i>Afloat ATC</i>	40.100	35.856	61.653	-	61.653	65.906	64.269	65.516	66.858	Continuing	Continuing
<i>Equipment: SATC / AN/SPN-50(V)1</i>											

**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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0993 / Carrier ATC
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary HDW Develop-TPX-42	WR	NAWCAD : PAX River, MD	7.103	0.869	Dec 2020	0.833	Nov 2021	0.849	Nov 2022	-		0.849	Continuing	Continuing	Continuing
Primary HDW Develop - SPN-43	WR	NAWCAD : PAX River, MD	5.632	0.526	Dec 2020	0.537	Nov 2021	0.501	Nov 2022	-		0.501	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	5.478	0.203	Dec 2020	0.207	Oct 2021	0.000		-		0.000	0.077	5.965	5.614
Primary HDW EMD - SPN-50(V)1	C/CPIF	SAAB : Syracuse NY	48.525	5.939	Dec 2020	2.219	Oct 2021	0.095	Nov 2022	-		0.095	1.211	57.989	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	-
<b>Subtotal</b>			96.053	7.537		3.796		1.445		-		1.445	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software Development-TPX-42	WR	NAWCAD : PAX River, MD	26.876	2.100	Dec 2020	0.516	Nov 2021	0.526	Nov 2022	-		0.526	Continuing	Continuing	Continuing
Integrated Logistics Support- TPX-42	WR	NAWCAD : PAX River, MD	2.321	0.406	Dec 2020	0.200	Nov 2021	0.202	Nov 2022	-		0.202	Continuing	Continuing	Continuing
Integrated Logistics Support-SPN-43	WR	NAWCAD : PAX River, MD	1.373	0.123	Dec 2020	0.125	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support-SPN-50(V)1	WR	NAWCAD : PAX River, MD	2.063	0.193	Dec 2020	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Studies & Analysis-SPN-50(V)1	WR	NAWCAD : PAX River, MD	4.506	0.085	Dec 2020	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Software Development - SPN-50(V)1	WR	NAWCAD : PAX River, MD	11.315	0.212	Dec 2020	0.071	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 0993 / Carrier ATC
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<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Studies & Analysis-SPN-43	WR	NAWCAD : PAX River, MD	2.090	0.022	Dec 2020	0.023	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing
Studies & Analysis-TPX-42	WR	NAWCAD : PAX River, MD	1.623	0.250	Dec 2020	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering-SPN-50(V)1	WR	NAWCAD : PAX River, MD	17.287	0.517	Dec 2020	0.000		2.507	Nov 2022	-		2.507	0.208	20.519	-
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	-
<b>Subtotal</b>			83.249	3.908		0.935		3.235		-		3.235	Continuing	Continuing	N/A

**Remarks**  
AN/SPN-50(V)1 systems engineering increase from FY 2022 to FY 2023 is due to transition away from Prime Contractor support to government supported development efforts.

<b>Test and Evaluation (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test & Evaluation- TPX-42	WR	NAWCAD : PAX River, MD	5.483	0.785	Dec 2020	0.285	Nov 2021	0.291	Nov 2022	-		0.291	Continuing	Continuing	Continuing
Development Test & Evaluation - SPN-43	WR	NAWCAD : PAX River, MD	6.568	1.550	Dec 2020	1.581	Nov 2021	1.134	Nov 2022	-		1.134	Continuing	Continuing	Continuing
Operational Test & Evaluation-SPN-50(V)1	WR	OPTEVOR : Norfolk, VA	0.973	2.272	Dec 2020	1.974	Nov 2021	3.106	Nov 2022	-		3.106	2.336	10.661	-
Prior year T&E no longer funded in the FYDP	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Development Test & Evaluation SPN-50	WR	NAWCAD : PAX River	8.761	0.000		0.000		0.000		-		0.000	0.000	8.761	-
<b>Subtotal</b>			21.785	4.607		3.840		4.531		-		4.531	Continuing	Continuing	N/A

**Remarks**  
AN/SPN-50(V)1 OT&E increase from FY 2022 to FY 2023 is due to transition away from Prime Contractor support to government supported development efforts.



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

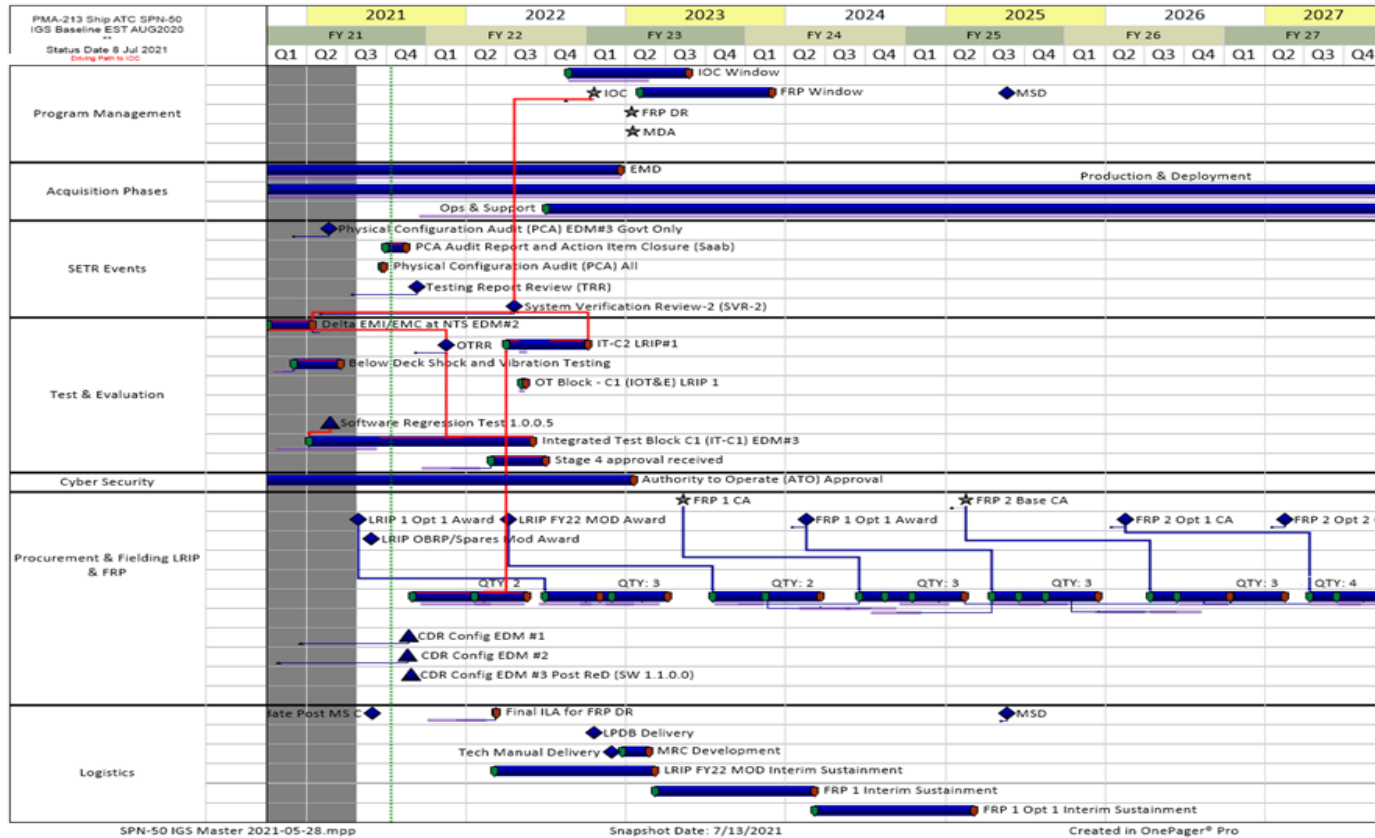
Date: April 2022

Appropriation/Budget Activity  
1319 / 5

R-1 Program Element (Number/Name)  
PE 0604504N / Air Control

Project (Number/Name)  
0993 / Carrier ATC

# AN/SPN-50(V)1 Program Schedule



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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 0993 / <i>Carrier ATC</i>
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**AN/TPX-42 / AN/SPN-43 Schedule**

Fiscal Year	FY2021				FY2022				FY2023				FY2024				FY2025				FY2026				FY2027			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>AN/TPX-42</b> System Development	Hardware Development																											
	Software Development																											
<b>AN/TPX-42</b> Test and Evaluation	Development Testing																											
	System Deliveries																											
<b>AN/SPN-43</b> System Development	Hardware Development																											
	Software Development																											
<b>AN/SPN-43</b> Test and Evaluation	Development Testing																											
	System Deliveries																											
<p align="center"><b>Legend</b>  <span style="display: inline-block; width: 15px; height: 10px; background-color: #ADD8E6; border: 1px solid black;"></span> Development (RDT&amp;E)</p> <p align="right"><i>Revision Date:</i> 30 Mar 2022</p>																												

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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 0993 / <i>Carrier ATC</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Carrier ATC</b>				
Acquisition Milestones: Milestones: AN/SPN-50(V)1 MSD	3	2025	3	2025
Acquisition Milestones: Milestones: AN/SPN-50(V)1 IOC	1	2023	1	2023
System Development: Hardware Development: AN/SPN-43C	1	2021	4	2027
System Development: Hardware Development: AN/TPX-42A(V)	1	2021	4	2027
System Development: Software Development: AN/SPN-43C	1	2021	4	2026
System Development: Software Development: AN/TPX-42A(V)	1	2021	4	2026
System Development: Reviews: Physical Configuration Audit (AN/SPN-50(V)1)	3	2021	3	2021
Test and Evaluation: Developmental Testing/Operational Testing (AN/SPN-50(V)1)	1	2021	1	2021
Test and Evaluation: Developmental Testing (AN/TPX-42A(V))	1	2021	4	2027
Test and Evaluation: Developmental Testing (AN/SPN-43C)	1	2021	4	2027
Deliveries: System Deliveries (TPX-42A(V))	1	2021	4	2027
Deliveries: System Deliveries (AN/SPN-43C)	1	2021	4	2027

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>				<b>Project (Number/Name)</b> 1657 / <i>ATC Improvement</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
1657: <i>ATC Improvement</i>	5.056	0.407	0.358	0.474	-	0.474	0.470	0.449	0.456	0.464	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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> NAS MOD VIDS	0.203	0.181	0.185	0.000	0.185
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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.					
<b>FY 2022 Plans:</b> 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.					
<b>FY 2023 Base Plans:</b> 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.					
<b>FY 2023 OCO Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 1657 / ATC Improvement

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
N/A					
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY22 to FY23 increase is due to inflation.					
<b>Title:</b> Fleet ATC Systems	0.204	0.177	0.289	0.000	0.289
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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.					
<b>FY 2022 Plans:</b> 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.					
<b>FY 2023 Base Plans:</b> 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.					
<b>FY 2023 OCO Plans:</b> N/A					
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 increase is due to increased engineering efforts to maintain interoperability with the FAA's systems.					
<b>Accomplishments/Planned Programs Subtotals</b>	0.407	0.358	0.474	0.000	0.474

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPN/2820: Ashore ATC Equipment: NASMOD/Fleet ATC	37.072	39.485	40.585	-	40.585	41.172	41.680	42.515	0.000	Continuing	Continuing

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 1657 / <i>ATC Improvement</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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**Remarks**

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

**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.



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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 1657 / <i>ATC Improvement</i>
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<b>ATC Improvement</b>	<b>FY 2021</b>				<b>FY 2022</b>				<b>FY 2023</b>				<b>FY 2024</b>				<b>FY 2025</b>				<b>FY 2026</b>				<b>FY 2027</b>				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
<b>System Development</b>																													
Hardware Development	NASMOD VIDS																												
	Fleet ATC Systems																												

2023DON - 0604504N - 1657

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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 1657 / <i>ATC Improvement</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>ATC Improvement</i></b>				
System Development: Hardware Development: NASMOD VIDS	1	2021	4	2027
System Development: Hardware Development: Fleet ATC Systems	1	2021	4	2027

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 1319 / 5					<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>				<b>Project (Number/Name)</b> 3372 / <i>ATC Systems</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
3372: <i>ATC Systems</i>	110.230	19.314	14.108	25.084	-	25.084	32.623	24.496	19.669	20.024	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)**

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
<b>Title:</b> AN/SPN-46 Blk IV Upgrade	3.515	0.114	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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					
<b>FY 2022 Plans:</b> Complete flight testing. Complete development of the AN/SPN-46 Blk IV upgrade.					
<b>FY 2023 Base Plans:</b> N/A					
<b>FY 2023 OCO Plans:</b> N/A					
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Decrease of \$0.114M is due to the completion of the AN/SPN-46 Blk IV development and test activities.					
<b>Title:</b> AN/SPN-35 Blk I Upgrade	4.540	0.689	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> 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					

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**Exhibit R-2A, RDT&E Project Justification:** PB 2023 Navy **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 3372 / ATC Systems
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**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>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 &amp; night conditions. The AN/SPN-35C Block I upgrade provides engineering efforts to upgrade, 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.</p> <p><b>FY 2022 Plans:</b> Complete flight testing. Complete development of the AN/SPN-35 Blk I upgrade.</p> <p><b>FY 2023 Base Plans:</b> N/A</p> <p><b>FY 2023 OCO Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Decrease of \$0.689M is due to the completion of the AN/SPN-35 Blk I development and test activities.</p>					
<p><b>Title:</b> AN/SPN-46 Blk V Upgrade (CCAs, RTOS, software, RAM pole, TS-3098)</p> <p align="right"><b>Articles:</b></p> <p><b>Description:</b> 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.</p>	7.262	4.594	5.666	0.000	5.666
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 3372 / ATC Systems
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
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**FY 2022 Plans:**  
Complete the development of SW re-architecture efforts, Real Time Operating System (RTOS) updates and Radar Processor Single Board Computer upgrades. Integrate and begin qualification testing of upgrades with maintenance Local Area Network (LAN).

**FY 2023 Base Plans:**  
Complete functional testing of the Blk V Radar Processor and Maintenance LAN Hardware. Begin environmental, Electromagnetic Interference (EMI) and shock qualification of the BLK V configuration. Complete cyber security RMF controls implementation and begin RMF controls requirements verification testing.

**FY 2023 OCO Plans:**  
N/A

**FY 2022 to FY 2023 Increase/Decrease Statement:**  
Increase of \$1.072M is due inflation and to the increased engineering efforts for environmental, EMI and shock qualification testing.

<b>Title:</b> AN/SPN-35 Blk II Upgrade	3.997	8.711	19.418	0.000	19.418
<b>Articles:</b>	-	-	-	-	-

**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.

**FY 2022 Plans:**  
Continue development of AESA to include completion of initial evaluation of subarray. Follow-on fabrication of a full array. Increased development efforts contain significant engineering events such as system Preliminary Design Review (PDR) in 2nd quarter.

**FY 2023 Base Plans:**  
Complete Critical Design review (CDR). Continue development of to include First Article Delivery, prototype AESA fabrication, and AESA integration. Complete System Integration Lab (SIL) setup.

**FY 2023 OCO Plans:**

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Navy		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 3372 / <i>ATC Systems</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
N/A					
<b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> Increase of \$10.707M is due to the continued engineering efforts including CDR, prototype AESA fabrication and ring out, software development, AESA integration, and beginning proof of concept efforts for the integrated system.					
<b>Accomplishments/Planned Programs Subtotals</b>	19.314	14.108	25.084	0.000	25.084

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

<b>Line Item</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPN/2830: <i>Afloat ATC Equipment/ACLS</i>	17.528	31.199	25.825	-	25.825	27.558	32.028	43.763	41.592	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.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 3372 / ATC Systems
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware Development - AN/SPN-46 Blk IV Upgrade	WR	NAWCAD : Patuxent River, MD	29.422	2.018	Nov 2020	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	Nov 2020	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	10.054	2.236	Nov 2020	0.328	Nov 2021	0.000		-		0.000	0.000	12.618	-
Ancillary Hardware Development - AN/SPN-35 Blk I Upgrade	WR	NAWCAD : Patuxent River, MD	17.754	1.539	Nov 2020	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	4.211	3.499	Nov 2020	2.232	Nov 2021	3.147	Nov 2022	-		3.147	1.056	14.145	15.214
Ancillary Hardware Development - AN/SPN-46 Blk V Upgrade	WR	NAWCAD : Patuxent River, MD	5.153	2.584	Nov 2020	1.166	Nov 2021	1.214	Nov 2022	-		1.214	Continuing	Continuing	Continuing
Primary Hardware Development - AN/SPN-35 Blk II Upgrade	WR	NAWCAD : Patuxent River, MD	0.000	1.000	Nov 2020	2.500	Nov 2021	4.653	Nov 2022	-		4.653	Continuing	Continuing	Continuing
Ancillary Hardware Development - AN/SPN-35 Blk II Upgrade	C/CPFF	GTRI : Atlanta, GA	0.000	2.997	Nov 2020	5.296	Nov 2021	13.581	Nov 2022	-		13.581	Continuing	Continuing	Continuing
<b>Subtotal</b>			90.156	15.873		11.522		22.595		-		22.595	Continuing	Continuing	N/A

**Remarks**  
 FY 2023 increase in AN/SPN-46 Blk V is due to functional testing of the Blk V Radar Processor and Maintenance LAN Hardware.  
 FY 2023 increase in AN/SPN-35 Blk II due to significant engineering events such as CDR, prototype AESA fabrication and ring-out, software development, AESA integration, and prototype proof of concept efforts for the AESA integrated system.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / Air Control	<b>Project (Number/Name)</b> 3372 / ATC Systems
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<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Logistics Support (ILS)	WR	NAWCAD : Patuxent River, MD	4.504	1.012	Nov 2020	0.474	Nov 2021	0.495	Nov 2022	-		0.495	Continuing	Continuing	Continuing
Systems Engineering Support	WR	NAWCAD : Patuxent River, MD	6.357	0.770	Nov 2020	0.535	Nov 2021	0.559	Nov 2022	-		0.559	Continuing	Continuing	Continuing
<b>Subtotal</b>			10.861	1.782		1.009		1.054		-		1.054	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/SPN-46 Blk IV Upgrade	WR	NAWCAD : Patuxent River, MD	2.933	0.162	Nov 2020	0.055	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing
AN/SPN-35 Blk I Upgrade	WR	NAWCAD : Patuxent River, MD	0.682	0.572	Nov 2020	0.147	Nov 2021	0.000		-		0.000	0.000	1.401	1.254
AN/SPN-46 Blk V Upgrade	WR	NAWCAD : Patuxent River, MD	0.312	0.192	Nov 2020	0.497	Nov 2021	0.519	Nov 2022	-		0.519	Continuing	Continuing	Continuing
AN/SPN-35 Blk II Upgrade	WR	NAWCAD : Patuxent River, MD	0.000	0.000		0.131	Nov 2021	0.137	Nov 2022	-		0.137	Continuing	Continuing	Continuing
<b>Subtotal</b>			3.927	0.926		0.830		0.656		-		0.656	Continuing	Continuing	N/A

**Remarks**

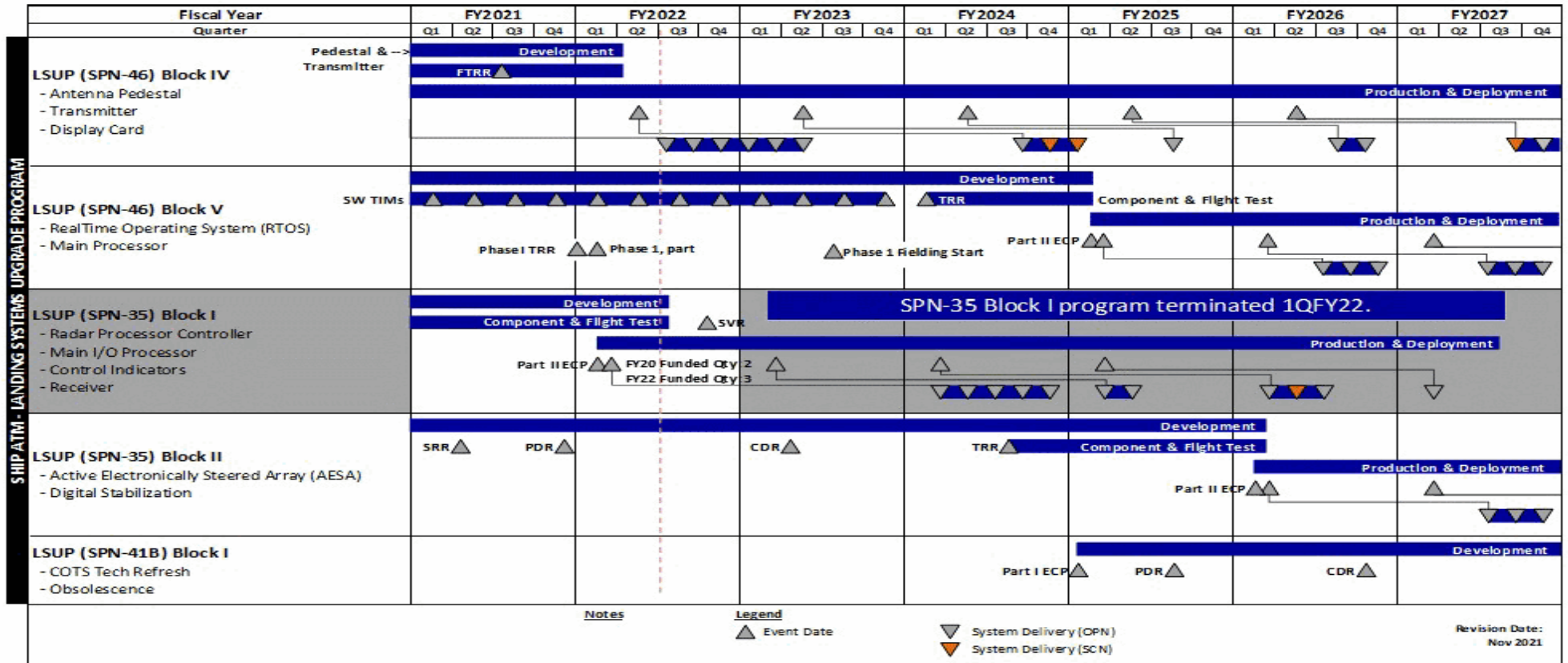
Decrease from FY2022 to FY2023 is due to the completion of testing for AN/SPN-46 Blk IV and AN/SPN-35 Blk I.

<b>Management Services (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management (PM) Support	WR	NAWCAD : Patuxent River, MD	3.816	0.477	Nov 2020	0.487	Nov 2021	0.509	Nov 2022	-		0.509	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	0.269	0.256	Jan 2021	0.260	Jan 2022	0.270	Jan 2023	-		0.270	Continuing	Continuing	Continuing





# LSUP (Landing System Upgrade Program) Schedule



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

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604504N / <i>Air Control</i>	<b>Project (Number/Name)</b> 3372 / <i>ATC Systems</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Proj 3372</i></b>				
Reviews: AN/SPN-46 Blk V Technical Interchange Meeting (TIM) Quarterly	1	2021	4	2023
Reviews: AN/SPN-35 Blk II System Requirements Review (SRR)	2	2021	2	2021
Reviews: AN/SPN-35 Blk II Preliminary Design Review (PDR)	2	2022	2	2022
Reviews: AN/SPN-35 Blk II Critical Design Review (CDR)	2	2023	2	2023
Test and Evaluation: AN/SPN-46 Blk V Test Readiness Review (TRR)	1	2024	1	2024
Test and Evaluation: AN/SPN-35 Blk II Test Readiness Review (TRR)	3	2024	3	2024