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<b>Exhibit R-2, RDT&amp;E Budget Item Justification: PB 2021 Navy</b>											<b>Date:</b> February 2020	
<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 0604512N / <i>Shipboard Aviation Systems</i>							
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	1,073.157	13.530	14.632	9.593	-	9.593	12.963	12.975	12.547	12.798	Continuing	Continuing
2232: <i>CV/CVN Launch and Recover</i>	1,073.157	9.669	10.632	9.593	-	9.593	12.963	12.975	12.547	12.798	Continuing	Continuing
9999: <i>Congressional Adds</i>	0.000	3.861	4.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.861

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

The FY 2021 funding request was reduced by \$1.681 million to account for the availability of prior year execution balances.

CV Launch & Recover System - This Navy unique project addresses the System Development and Demonstration (SDD) of systems required to recover and launch Navy/Marine Corps Aircraft (Fixed/Rotary Wing and Vertical/Short Take Off and Landing) operating aboard aircraft carriers, amphibious assault ships, and air capable ships. This program element includes the following:

- (1) Aircraft Launch & Recovery Equipment Modernization
- (2) Aircraft Launch and Recovery Equipment Service Life Management program

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 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	13.710	10.632	11.026	-	11.026
Current President's Budget	13.530	14.632	9.593	-	9.593
Total Adjustments	-0.180	4.000	-1.433	-	-1.433
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	4.000	-	-	4.000
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-0.180	0.000	-	-	-0.180
• Program Adjustments	0.000	0.000	-1.595	-	-1.595
• Rate/Misc Adjustments	0.000	0.000	0.162	-	0.162

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<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 0604512N / <i>Shipboard Aviation Systems</i>
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**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 9999: *Congressional Adds*

Congressional Add: *Improving Aircraft Carrier Readiness*

Congressional Add: *Aircraft launch and recovery equipment software improvements*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	3.861	0.000
	0.000	4.000
	3.861	4.000
	3.861	4.000

**Change Summary Explanation**

Cost/Summary: AAG funding included under 0604512N in FY 2018 and prior. All costs FY 2019 and later are captured under PE: 0604530N, PU: 2367. The FY 2021 funding request was reduced by \$1.681 million to account for the availability of prior year execution balances

**Schedule:**

- No longer includes Advanced Arresting Gear (AAG).
- ALRE Modernization Schedule was updated to include ALRE Obsolescence Redesign starting in 1Q FY2021.
- Congressional Add C461: Improving Aircraft Readiness contract award moved from 4Q FY2019 to 2Q FY2020

**Technical:**

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Navy **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2232: <i>CV/CVN Launch and Recover</i>	1,073.157	9.669	10.632	9.593	-	9.593	12.963	12.975	12.547	12.798	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

PY article includes Advanced Arresting Gear (AAG) Jet Car Track Site and two Improved Manually Operated Visual Landing Aid System (IMOVLAS) production representative models. Service Life Management Program (SLMP) test articles refer to actual units (two units per ship set).

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

This Navy unique project addresses the System Development and Demonstration (SDD) of systems required to recover and launch Navy/Marine Corps Aircraft (Fixed/Rotary Wing and Vertical/Short Take-Off and Landing) operating aboard aircraft carriers (CVN), amphibious assault ships and air capable ships. This program includes the following systems under Project 2232, including the funding of production representative models for:

(1) Aircraft Launch & Recovery Equipment (ALRE) Modernization: ALRE Modernization encompasses efforts required to ensure continued functional performance, operational relevance, and cybersecurity accreditation for all product lines across the ALRE program. This includes efforts required to resolve emerging obsolescence issues (both hardware and software), implement fleet driven operational capability upgrades, and comply with cybersecurity requirements and computer task order requirements for security threat mitigation. Major categories include Visual Landing Aids (VLA), Information Systems, Launcher, Recovery and Aviation Data Management and Control System (ADMACS). There are 48 fielded subsystems that are included in the major categories.

(2) Aircraft Launch & Recovery Equipment (ALRE) Service Life Management Program (SLMP): The ALRE SLMP for Launcher and Recovery is required to sustain carrier aviation operations of higher energy aircraft launch and recoveries that are increasing loads on the ALRE systems, and that are affecting availability, maintainability and cost. This program will consist of service life assessment and extension initiatives and will establish the design foundation (structural, reliability, and maintainability analyses), permit appropriate assessment, track and focus design changes where most needed. Two SLMP prototypes were procured in FY 2018.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<b>Title:</b> Aircraft Launch & Recovery Equipment Modernization	0.980	0.000	0.742	0.000	0.742
<b>Articles:</b>	-	-	-	-	-
<b>Description:</b> ALRE Modernization encompasses efforts required to ensure continued functional performance, operational relevance, and cybersecurity accreditation for all product lines across the ALRE program. This includes efforts required to resolve emerging obsolescence issues (both hardware and software), implement fleet driven operational capability upgrades, and comply with cybersecurity requirements and computer task order requirements for security threat mitigation. Major categories include Visual Landing Aids (VLA),					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Navy	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Information Systems, Launcher, Recovery and Aviation Data Management and Control System (ADMACS). There are 48 fielded subsystems that are included in the major categories.</p> <p><b>FY 2020 Plans:</b> N/A</p> <p><b>FY 2021 Base Plans:</b> Provides for developmental enhancements to resolve known and emerging capability shortfalls within the major categories of ALRE to include: VLA, Information Systems, Launcher, Recovery and ADMACS. These major subsystems include 48 fielded Aircraft Launch and Recovery Systems. These efforts support various Air Capable Ships, Amphibious Assault Ships, and Aircraft Carrier Fleet.</p> <p><b>FY 2021 OCO Plans:</b> N/A</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> The increase from FY 2020 to FY 2021 is to support developmental enhancements within the Aircraft Launch and Recovery (ALRE) System program.</p>					
<p><b>Title:</b> Aircraft Launch &amp; Recovery Equipment (ALRE) Service Life Management Program (SLMP)</p> <p align="right"><b>Articles:</b></p> <p><b>FY 2020 Plans:</b> Conduct land-based testing of the Mk7 Crosshead and Fixed Sheave prototypes. Continue the analysis, design, development and testing of the C13 Catapult, Mk7 Arrest Gear, and Aircraft Ship Integrated Secure and Transfer (ASIST) components and subcomponents. Continue the Recovery Assist, Securing and Traversing (RAST) service life assessment. Start analysis and development of testing for Jet Blast Deflector (JBD) service life assessment. Conduct life testing of the ASIST Rapid Securing Device (RSD) components.</p> <p><b>FY 2021 Base Plans:</b> Begin the development of the Replacement Purchase Cable. Conduct land-based testing of the Mk7 Main Engine Cylinder prototype. Continue analysis, design, development and testing of the Aircraft Ship Integrated Secure and Transfer (ASIST) and Recovery Assist, Securing and Traversing (RAST) components and subcomponents.</p> <p><b>FY 2021 OCO Plans:</b> N/A</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b></p>	8.689	10.632	8.851	0.000	8.851
	-	-	-	-	-

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2021 Navy	<b>Date:</b> February 2020
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<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The decrease from FY 2020 to FY 2021 is to complete the analysis, design, development and testing of the Aircraft Ship Integrated Secure and Transfer (ASIST) and Recovery Assist, Securing and Traversing (RAST) components and subcomponents.					
<b>Accomplishments/Planned Programs Subtotals</b>	9.669	10.632	9.593	0.000	9.593

<b>C. Other Program Funding Summary (\$ in Millions)</b>										
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete Total Cost</u>
• OPN/4213: <i>Aircraft Launch &amp; Recovery Equipment-Aircraft Launch &amp; Recovery Equipment</i>	105.693	187.926	187.758	60.217	247.975	214.070	334.429	184.828	145.928	Continuing Continuing

**Remarks**  
OPN 4213 includes a portion of line item funding for ALRE.

**D. Acquisition Strategy**  
Aircraft Launch & Recovery Equipment Modernization: This program ensure continued functional performance, operational relevance, and cybersecurity accreditation for all product lines across the ALRE program. Programs include Visual Landing Aids (VLA), Information Systems, Launcher, Recovery and Aviation Data Management and Control System (ADMACS). There are 48 fielded subsystems that are included in the major categories.

Aircraft Launch & Recovery Equipment Service Life Management Program (SLMP): This program will consist of Service Life Assessment and Extension initiatives and will establish the design foundation (structural, reliability and maintainability analyses), permit appropriate assessment, track and focus design changes where most needed.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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<b>Product Development (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 HW Dev - ALRE Mod	WR	NAWCAD : Lakehurst, NJ	0.723	0.980	Dec 2018	0.000		0.742	Nov 2020	-		0.742	Continuing	Continuing	Continuing
Primary HW Dev-SLMP	WR	NAWCAD : Lakehurst, NJ	16.427	1.559	Dec 2018	2.246	Nov 2019	2.931	Nov 2020	-		2.931	Continuing	Continuing	Continuing
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	904.203	0.000		0.000		0.000		-		0.000	0.000	904.203	-
<b>Subtotal</b>			921.353	2.539		2.246		3.673		-		3.673	Continuing	Continuing	N/A

**Remarks**  
The increase from FY 2020 to FY 2021 is to support the development of the Replacement Purchase Cable to support the Service Life Management Program (SLMP) and to support developmental enhancements within the Aircraft Launch and Recovery (ALRE) System program.

<b>Support (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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-SLMP	WR	NAWCAD : Lakehurst, NJ	17.732	3.257	Dec 2018	3.296	Nov 2019	3.885	Nov 2020	-		3.885	Continuing	Continuing	Continuing
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	27.231	0.000		0.000		0.000		-		0.000	0.000	27.231	-
<b>Subtotal</b>			44.963	3.257		3.296		3.885		-		3.885	Continuing	Continuing	N/A

**Remarks**  
The increase from FY 2020 to FY 2021 is to support the development of the Replacement Purchase Cable to support the Service Life Management Program (SLMP).

<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Materials/Validation Testing-SLMP	WR	NAWCAD : Lakehurst, NJ	14.612	3.873	Dec 2018	5.090	Nov 2019	2.035	Nov 2020	-		2.035	Continuing	Continuing	Continuing
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	88.996	0.000		0.000		0.000		-		0.000	0.000	88.996	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
<b>Subtotal</b>			103.608	3.873		5.090		2.035		-		2.035	Continuing	Continuing	N/A

**Remarks**  
The decrease from FY 2020 to FY 2021 is to support the completion of Jet Blast Deflector (JBD) testing to support the Service Life Management Program (SLMP).

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Prior Year Cost No Longer Funded in FYDP	Various	Various : Various	3.233	0.000		0.000		0.000		-		0.000	0.000	3.233	-
<b>Subtotal</b>			3.233	0.000		0.000		0.000		-		0.000	0.000	3.233	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	1,073.157	9.669	10.632	9.593	-	9.593	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2021 Navy		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>

## ALRE Modernization Schedule

FY 19				FY 20				FY 21				FY 22				FY 23				FY 24				FY 25																							
O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
<b>System Development</b>				ALRE Obsolescence Redesign																																											
IMOVLAS Obsolescence Redesign																																															

 SDD    
  SETR/Other Milestone

a/o 190625



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**Exhibit R-4A, RDT&E Schedule Details:** PB 2021 Navy **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 2232 / <i>CV/CVN Launch and Recover</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>ALRE SERVICE LIFE MANAGEMENT PROGRAM (SLMP)</b>				
Systems Development: Hardware/Software Development: System Development	1	2019	4	2025
Test & Evaluation: Technical Evaluation: Test & Evaluation	1	2019	4	2025
<b>ALRE MODERNIZATION</b>				
Systems Development: Hardware/Software Development: IMOVLAS Obsolescence Redesign Development and Testing	1	2019	2	2019
Systems Development: Hardware/Software Development: Obsolescence Redesign Development and Testing	1	2021	1	2025

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**Exhibit R-2A, RDT&E Project Justification:** PB 2021 Navy **Date:** February 2020

Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604512N / Shipboard Aviation Systems				Project (Number/Name) 9999 / Congressional Adds			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
9999: Congressional Adds	0.000	3.861	4.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.861
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

Congressional Add. Program Increase to Improve Aircraft Carrier Readiness.

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

Congressional Add. Program Increase to Improve Aircraft Carrier Readiness.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2019	FY 2020
<b>Congressional Add:</b> Improving Aircraft Carrier Readiness	3.861	0.000
<b>FY 2019 Accomplishments:</b> Funding will support Real-time Aircraft Launch and Recovery Equipment (ALRE) systems Check (REACH) system efforts to improve aircraft carrier readiness.		
<b>FY 2020 Plans:</b> N/A		
<b>Congressional Add:</b> Aircraft launch and recovery equipment software improvements	0.000	4.000
<b>FY 2019 Accomplishments:</b> N/A		
<b>FY 2020 Plans:</b> Funding will support Aircraft Launch and Recovery Equipment (ALRE) software to support the ALRE Cyber Test & Operations Range (ACTOR) platform.		
<b>Congressional Adds Subtotals</b>	3.861	4.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

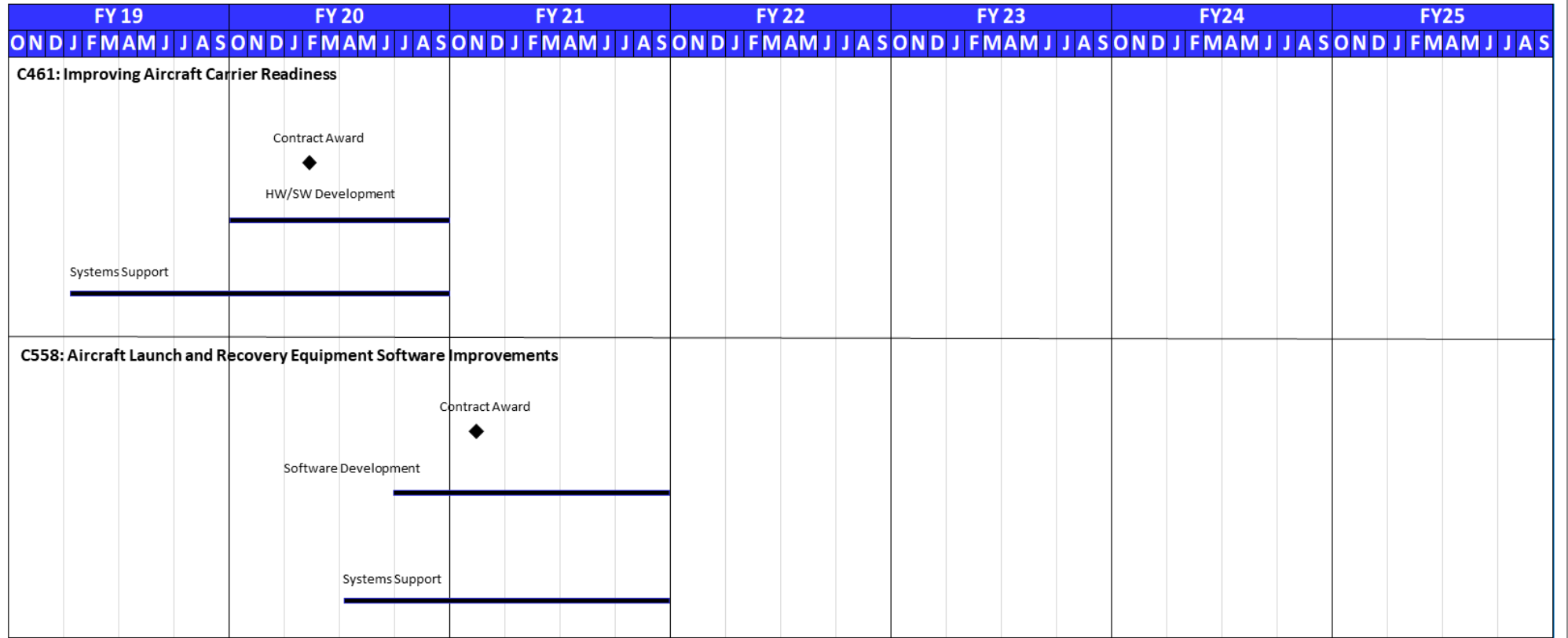


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**Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 9999 / <i>Congressional Adds</i>
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**Proj: 9999 Congressional Add**



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**Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604512N / <i>Shipboard Aviation Systems</i>	<b>Project (Number/Name)</b> 9999 / <i>Congressional Adds</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 9999</b>				
C461: Improving Aircraft Carrier Readiness: Hardware/Software Development	2	2020	2	2020
C461: Improving Aircraft Carrier Readiness: Hardware Software Development	1	2020	4	2020
C461: Improving Aircraft Carrier Readiness: Systems Support	2	2019	4	2020
C558: Aircraft Launch and Recovery Equipment Software Improvements: SW Development	1	2021	1	2021
C558: Aircraft Launch and Recovery Equipment Software Improvements: Software Development	1	2020	3	2021
C558: Aircraft Launch and Recovery Equipment Software Improvements: Systems Support	3	2020	4	2021