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

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</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
Total Program Element	78.344	5.388	4.997	7.559	-	7.559	7.393	9.654	7.951	5.857	Continuing	Continuing
3216: <i>Tactical Support Center-Integration</i>	51.322	4.201	4.295	6.335	-	6.335	6.203	8.568	6.845	4.729	Continuing	Continuing
4005: <i>In-Service Carrier Systems Development</i>	27.022	1.187	0.702	1.224	-	1.224	1.190	1.086	1.106	1.128	Continuing	Continuing

A. Mission Description and Budget Item Justification

This Program Element (PE) addresses technology areas associated with Command and Control (C2) of the MH-60R/S Seahawk Helicopter, as well as the development of other technologies and enhancements for Aircraft Carrier-based systems.

PROJECT 3216: The AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) program delivers Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) combat capability to the Aircraft Carrier. This Project provides incremental development to deliver frequent capability updates to the Fleet, developing, testing, certifying, and fielding system upgrades and cyber-security patches. The Project maintains interoperability with current and future interfaces; supports mission data exchange; improves track/sensor processing and analysis techniques; improves mission planning; improves data recording, reconstruction, and distribution; improves embedded simulation and training capabilities and implements cyber-security measures to effectively employ overall CVN self-defense capabilities. CV-TSC integrates sensor data from Off-Board Aircraft, Organic Platform Sensors, Minotaur Multi-Sensor Fused Track Data, Link-16 Track Data, Ship Self Defense System (SSDS) Track Data (non-Product Line Architecture (non-PLA) and Product Line Architecture (PLA), Global Command and Control System (GCCS) Over-the-Horizon Track Data, and Environmental and Threat Databases to assess the threat and assist the Tactical Action Officer (TAO) and Composite Warfare Commander (CWC) to effectively employ overall CVN self-defense capabilities. CV-TSC generates real-time ASW/SUW information and recommendations, tactical planning and employment of ASW/SUW assets, ASW/SUW sensor data processing and analysis, and distribution of tactically significant data. Aircraft supported include: MH-60R/S Seahawk, P-8 Poseidon, MQ-4C Triton, and future ASW/SUW systems.

PROJECT 4005: The In-Service Carrier Systems Development Demonstration and Validation Program develops new technology and enhancements to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), manpower requirements, Total Ownership Costs (TOC), as well as land-based and shipboard testing of new technologies to improve shipboard operations.

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	5.440	4.997	5.658	-	5.658
Current President's Budget	5.388	4.997	7.559	-	7.559
Total Adjustments	-0.052	0.000	1.901	-	1.901
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.052	0.000			
• Program Adjustments	0.000	0.000	1.750	-	1.750
• Rate/Misc Adjustments	0.000	0.000	0.151	-	0.151

Change Summary Explanation

FUNDING CHANGES SINCE PREVIOUS PRESIDENT'S BUDGET AT THE OVERALL PE LEVEL:

- FY 2021 net increase of \$+1.901M driven by a program adjustment to add and incorporate Minotaur Multi-Sensor Fused Track Data into the Project 3216 CV-TSC development program, as well as the incorporation of general and Navy Working Capital Fund (NWCF) specific rate adjustments against Projects 3216 and 4005.

PROJECT 3216 - FY 2020 TO FY 2021 BUDGET REQUEST INCREASE:

- FY 2020 (\$4.295M) to FY 2021 (\$6.335M) increase (\$+2.040M) primarily driven by the addition and incorporation of Minotaur Multi-Sensor Fused Track Data into the Project 3216 CV-TSC development program beginning in FY 2021. This addition provides increased battlespace awareness and accelerates the find, fix, track capability and Maritime Intelligence Surveillance and Reconnaissance & Targeting (MIS&RT) function in a communications-denied environment.

PROJECT 3216 - SCHEDULE CHANGES SINCE PREVIOUS PRESIDENT'S BUDGET:

- CV-TSC FCR-3 Integrated Shipboard Network System/Consolidated Afloat Network Enterprise System (ISNS/CANES), Platform Information Technology/Information Assurance (PIT/ATO), Element Certification, and Combat System Test (CST) completion moved from 1Q20 to 3Q20, due to SSDS and combat system test schedule changes, specifically to CVN-70.

- CV-TSC FCR-4 (supports SSDS Non-Product Line Architecture) ISNS/CANES, PIT/ATO, Element Certification, and CST completion moved from 1Q20 to 3Q20, due to SSDS and combat system test schedule changes, specifically to CVN-75.

- CV-TSC FCR-5 development completion extended from 2Q21 to 3Q22, Independent Verification & Validation (IV&V) shifted from 2Q21-4Q21 to 2Q22-4Q22, and ISNS/CANES, PIT/ATO, Element Certification, and CST completion moved from 4Q21 to 4Q22, all due to the addition of Minotaur Multi-Sensor Fused Track Data Phase I integration efforts to the development stroke.

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Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	
<p>- CV-TSC FCR-6 development shifted from 4Q21-1Q23 to 1Q23-3Q24, Independent Verification & Validation (IV&V) shifted from 1Q23-3Q23 to 2Q24-4Q24, and ISNS/CANES, PIT/ATO, Element Certification, and CST completion moved from 3Q23 to 1Q25, all due to the addition of Minotaur Multi-Sensor Fused Track Data Phase II integration efforts to the development stroke.</p> <p>PROJECT 4005 - FY 2020 TO FY 2021 BUDGET REQUEST INCREASE: - FY 2020 (\$0.702M) to FY 2021 (\$1.224M) increase (\$+0.522M) is due to an increase in the scope of work for the additive manufacturing and the Weapons Elevator Programmable Logic Controller (PLC) redesign projects.</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy										Date: February 2020		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>				Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>			
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
3216: <i>Tactical Support Center-Integration</i>	51.322	4.201	4.295	6.335	-	6.335	6.203	8.568	6.845	4.729	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AN/SQQ-34 Aircraft Carrier Tactical Support Center (CV-TSC) Project delivers Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) combat capability to the Aircraft Carrier. This Project provides incremental development to deliver frequent capability updates to the Fleet, developing, testing, certifying, and fielding system upgrades and cyber-security patches. The Project maintains interoperability with current and future interfaces; supports mission data exchange; improves track/sensor processing and analysis techniques; improves mission planning; improves data recording, reconstruction, and distribution; improves embedded simulation and training capabilities and implements cyber-security measures to effectively employ overall CVN self-defense capabilities. CV-TSC integrates sensor data from Off-Board Aircraft, Organic Platform Sensors, Minotaur Multi-Sensor Fused Track Data, Link-16 Track Data, Ship Self Defense System (SSDS) Track Data (non-Product Line Architecture (non-PLA) and Product Line Architecture (PLA)), Global Command and Control System (GCCS) Over-the-Horizon Track Data, and Environmental and Threat Databases to assess the threat and assist the Tactical Action Officer (TAO) and Composite Warfare Commander (CWC) to effectively employ overall CVN self-defense capabilities. CV-TSC generates real-time ASW/SUW information and recommendations, tactical planning and employment of ASW/SUW assets, ASW/SUW sensor data processing and analysis, and distribution of tactically significant data. Aircraft supported include: MH-60R/S Seahawk, P-8 Poseidon, MQ-4C Triton, and future ASW/SUW systems.

System development is accomplished through the following initiatives:

- 1) Maintaining interoperability with the local CVN warfare systems through current and future interfaces;
- 2) Continuing to support mission data exchange and tactical control with current and future ASW/SUW assets and their mission systems;
- 3) Improving track and sensor processing and analysis techniques as new track and sensor data becomes available;
- 4) Improving mission planning support for the ASW/SUW missions conducted from the CVN;
- 5) Improving data recording, reconstruct, and distribution to meet the decreasing timelines associated with getting tactically significant data to other end users both on and off platform;
- 6) Improving embedded simulation and training capabilities to enable operator proficiencies; and
- 7) Implementing cyber security measures.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: CV-TSC Development / Integration / Test / Certification	4.201	4.295	6.335	0.000	6.335
Articles:	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Description: CV-TSC's evolutionary acquisition approach to developing, testing, certifying, and fielding system upgrades and cyber-security patches is implemented through a series of phased Fleet Capability Releases (FCRs).</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Complete Independent Verification and Validation (IV&V) for FCR-3 and FCR-4. - Complete certifications required for fielding, to include Information Assurance (IA) Accreditation, Platform Information Technology (PIT) / Authorization to Operate (ATO), Integrated Shipboard Network System (ISNS) and Consolidated Afloat Network Enterprise System (CANES) Certifications, PEO IWS Element Certification, and Combat System Test (CST) Certification for FCR-3 and FCR-4. - Complete requirements definition phase for FCR-5. - Initiate Technical Insertion-16 (TI-16) Architecture changes specific to CVN-79. - Continue development effort for FCR-5. <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Continue development of FCR-5. - Integrate TI-16 hardware/software baseline specific for CVN-79. - Integrate with Ship Self Defense System (SSDS) Advanced Capability Build-20 (ACB-20) combat system. - Begin Minotaur Integration Phase I. Host Minotaur on CV-TSC, begin Electro-Optical/Infra-Red (EO/IR) sensor integration, and update track interface with SSDS. - Integrate, test, and demonstrate Minotaur Integration Phase I capability. <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <ul style="list-style-type: none"> - FY 2020 to FY 2021 increase (\$+2.040M) is driven by the addition and incorporation of Minotaur Multi-Sensor Fused Track Data into the CV-TSC development program beginning in FY 2021. This addition provides increased battlespace awareness and accelerates the find, fix, track capability and Maritime Intelligence Surveillance and Reconnaissance Targeting (MIS&RT) function in a communications-denied environment. 					
Accomplishments/Planned Programs Subtotals	4.201	4.295	6.335	0.000	6.335

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>			<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• OPN/2176: <i>Undersea Warfare Support Equipment (N98/CV-TSC only)</i>	0.334	0.343	0.150	-	0.150	4.348	2.371	1.666	0.381	Continuing	Continuing

Remarks

Funding profile represents the Department's CV-TSC portion of the Undersea Warfare (USW) Support Equipment budget (OPN BLI 2176, PE 0204112N).

D. Acquisition Strategy

- CV-TSC utilizes an incremental development approach that aims to deliver frequent capability updates to the Fleet. This approach allows required capability to be delivered to address emerging Fleet needs and provides frequent opportunities to ensure interoperability is synchronized with the Ship Self Defense System (SSDS) Advanced Capability Builds (ACBs). The acquisition strategy places heavy emphasis on the use of open architecture best practices to ensure ease of upgrades and to make developed products available to other platforms.

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-TSC Development / Integration	C/CPFF	Adaptive Methods : VA	3.802	0.400	Dec 2018	0.408	Dec 2019	0.712	Dec 2020	-		0.712	Continuing	Continuing	Continuing
CV-TSC Development / Integration	C/CPFF	JHU/APL : MD	0.250	0.000		0.000		0.000		-		0.000	0.000	0.250	-
CV-TSC Development / Integration	WR	NAWC/Pax River : MD	1.115	0.135	Dec 2018	0.138	Dec 2019	0.207	Nov 2020	-		0.207	Continuing	Continuing	Continuing
CV-TSC Development / Integration	WR	NRL : DC	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
CV-TSC Development / Integration	WR	NSWC/Carderock : MD	2.650	0.000		0.000		0.000		-		0.000	0.000	2.650	-
CV-TSC Development / Integration	WR	NSWC/Dahlgren : VA	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
CV-TSC Development / Integration	WR	NUWC/Keyport : WA	25.784	2.693	Nov 2018	2.662	Nov 2019	4.287	Nov 2020	-		4.287	Continuing	Continuing	Continuing
CV-TSC Development / Integration	WR	SPAWAR : CA	4.160	0.000		0.000		0.000		-		0.000	0.000	4.160	-
CV-TSC Development / Integration	C/CPFF	VAR* : VAR*	1.383	0.456	Dec 2018	0.556	Jan 2020	0.588	Dec 2020	-		0.588	Continuing	Continuing	Continuing
Boundary Defense Capability Design/ Development	WR	NSWC/Philadelphia : PA	4.046	0.000		0.000		0.000		-		0.000	0.000	4.046	-
Boundary Defense Capability Design/ Development	C/CPFF	VAR* : VAR*	4.495	0.000		0.000		0.000		-		0.000	0.000	4.495	-
Subtotal			48.110	3.684		3.764		5.794		-		5.794	Continuing	Continuing	N/A

Remarks
* Consists of multiple performing activities with funding for each not greater than \$1M per year.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0603512N / Carrier Systems Development				3216 / Tactical Support Center-Integration							
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-TSC Test / Certification	WR	NUWC//Keyport : WA	2.330	0.314	Nov 2018	0.324	Nov 2019	0.330	Nov 2020	-		0.330	Continuing	Continuing	Continuing
CV-TSC Test / Certification	WR	NUWC/Newport : RI	0.125	0.000		0.000		0.000		-		0.000	0.000	0.125	-
Subtotal			2.455	0.314		0.324		0.330		-		0.330	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support - Acquisition, Business & Finance	C/CPAF	BAE Systems : MD	0.411	0.000		0.000		0.000		-		0.000	0.000	0.411	-
Program Management Support - Acquisition, Business & Finance	C/CPFF	CACI : VA	0.055	0.039	Dec 2018	0.040	Jan 2020	0.000		-		0.000	0.000	0.134	-
Program Management Support - Acquisition, Business & Finance	C/CPFF	TBD (CACI Follow On) : TBD	0.000	0.000		0.000		0.041	Dec 2020	-		0.041	Continuing	Continuing	Continuing
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	CGI Federal : VA	0.267	0.144	Dec 2018	0.147	Jan 2020	0.000		-		0.000	0.000	0.558	-
Program Management Support - Systems Engineering and Technical Assistance (SETA)	C/CPFF	TBD (CGI Federal Follow On) : TBD	0.000	0.000		0.000		0.150	Dec 2020	-		0.150	Continuing	Continuing	Continuing
Program Office Travel	Allot	NAVSEA PEO IWS5 : DC	0.024	0.020	Jan 2019	0.020	Nov 2019	0.020	Dec 2020	-		0.020	Continuing	Continuing	Continuing
Subtotal			0.757	0.203		0.207		0.211		-		0.211	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy								Date: February 2020					
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>				Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>					
	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	51.322	4.201		4.295		6.335		-		6.335	Continuing	Continuing	N/A

Remarks

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

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>
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Project 3216	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
CV-TSC Build 8 Fleet Capability Release (FCR-3)	Development				IV&V																							
					ISNS/CANES PIT/ATO Element Certification CST																							
CV-TSC Build 8 Fleet Capability Release (FCR-4)	Development				IV&V																							
					ISNS/CANES PIT/ATO Element Certification CST																							
CV-TSC Build 8 Fleet Capability Release (FCR-5) w/Minotaur Integration (Phase I)					Development w/Minotaur Integration (Phase I)								IV&V															
													ISNS/CANES PIT/ATO Element Certification CST															
CV-TSC Build 8 Fleet Capability Release (FCR-6) w/Minotaur Integration (Phase II)																	Development w/Minotaur Integration (Phase II)				IV&V							
																					ISNS/CANES PIT/ATO Element Certification CST							
CV-TSC Build 8 Fleet Capability Release (FCR-7)																									Development			

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CV-TSC Build 8 FCR-3				
CV-TSC Build 8 FCR-3 Development	1	2019	3	2019
CV-TSC Build 8 FCR-3 IV&V	3	2019	1	2020
CV-TSC Build 8 FCR-3 ISNS / CANES Certification	3	2020	3	2020
CV-TSC Build 8 FCR-3 PIT/ATO	3	2020	3	2020
CV-TSC Build 8 FCR-3 Element Certification	3	2020	3	2020
CV-TSC Build 8 FCR-3 CST	3	2020	3	2020
CV-TSC Build 8 FCR-4				
CV-TSC Build 8 FCR-4 Development	1	2019	3	2019
CV-TSC Build 8 FCR-4 IV&V	3	2019	1	2020
CV-TSC Build 8 FCR-4 ISNS / CANES Certification	3	2020	3	2020
CV-TSC Build 8 FCR-4 PIT/ATO	3	2020	3	2020
CV-TSC Build 8 FCR-4 Element Certification	3	2020	3	2020
CV-TSC Build 8 FCR-4 CST	3	2020	3	2020
CV-TSC Build 8 FCR-5 w/Minotaur Integration (Phase I)				
CV-TSC Build 8 FCR-5 Development w/Minotaur Integration (Phase I)	1	2020	3	2022
CV-TSC Build 8 FCR-5 IV&V	2	2022	4	2022
CV-TSC Build 8 FCR-5 ISNS / CANES Certification	4	2022	4	2022
CV-TSC Build 8 FCR-5 PIT/ATO	4	2022	4	2022
CV-TSC Build 8 FCR-5 Element Certification	4	2022	4	2022
CV-TSC Build 8 FCR-5 CST	4	2022	4	2022
CV-TSC Build 8 FCR-6 w/Minotaur Integration (Phase II)				

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 3216 / <i>Tactical Support Center-Integration</i>

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CV-TSC Build 8 FCR-6 Development w/Minotaur Integration (Phase II)	1	2023	3	2024
CV-TSC Build 8 FCR-6 IV&V	2	2024	4	2024
CV-TSC Build 8 FCR-6 ISNS / CANES Certification	1	2025	1	2025
CV-TSC Build 8 FCR-6 PIT/ATO	1	2025	1	2025
CV-TSC Build 8 FCR-6 Element Certification	1	2025	1	2025
CV-TSC Build 8 FCR-6 CST	1	2025	1	2025
CV-TSC Build 8 FCR-7				
CV-TSC Build 8 FCR-7 Development	3	2024	4	2025

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>				Project (Number/Name) 4005 / <i>In-Service Carrier Systems Development</i>			
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
4005: <i>In-Service Carrier Systems Development</i>	27.022	1.187	0.702	1.224	-	1.224	1.190	1.086	1.106	1.128	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The In-Service Carrier Systems Demonstration and Validation Program develops new technology and enhancements for 11 nuclear powered Aircraft Carriers with nearly 300 systems onboard each vessel. These systems are a combination of historical and new initiatives that deliver an affordable, robust, operator-friendly automated control environment. In order to deter threats and properly integrate all of the systems, the Demonstration and Validation Program segments the testing and upgrades into four areas: system architecture, requirements/specification development, technology selection, and software development. The Demonstration and Validation Program also focuses on the Total Ownership Costs of each system and any equipment obsolescence issues. Initial technologies include the Uninterruptible Power Supply (UPS) Replacements, the Integrated Condition Assessment System (ICAS), the On-Machine I/O development for Low Pressure Air Plants (LPAP) and LPAP air end redesign. Demonstration technologies include Advanced Damage Control System (ADCS) software improvements, Input / Output Controller (IOC) Replacement, Fleet wireless Personal Digital Assistant (PDA), Weapons Elevator Laser Positioning System (WELPS), Legacy Steering Interface (LSI) upgrades, Passive Countermeasures System (PCMS) alternate measurement capability, additive manufacturing efforts, and Weapons Elevators Programmable Logic Controller (PLC) redesign.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: In-Service Carrier Systems Development	1.187	0.702	1.224	0.000	1.224
Articles:	-	-	-	-	-
FY 2020 Plans: Fiscal Year 2020 plans include continued support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives as well as addressing equipment obsolescence issues.					
FY 2021 Base Plans: Fiscal Year 2021 plans include continued support to Aircraft Carrier technologies. Modifications, upgrades and development of systems and software will be ongoing in support of In-Service aircraft carrier modernization initiatives and TOC reduction initiatives as well as addressing equipment obsolescence issues.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 4005 / <i>In-Service Carrier Systems Development</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The increase from FY 2020 to FY 2021 in the amount of \$0.522 million, is due to an increase in work for the additive manufacturing and the Weapons Elevator PLC redesign projects.					
Accomplishments/Planned Programs Subtotals	1.187	0.702	1.224	0.000	1.224

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

N/A

Remarks

D. Acquisition Strategy

Investigate, demonstrate, and implement available technologies to deliver a robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment to reduce workload, manpower requirements, and Total Ownership Costs (TOC). Deliver affordable operational upgrades onboard each platform through comparative initiatives and analysis without sacrificing schedule, performance, or requirements.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0603512N / Carrier Systems Development				4005 / In-Service Carrier Systems Development							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Ship Integration	WR	NAVSEA : Phil	3.590	0.537	Nov 2018	0.227	Nov 2019	0.482	Nov 2020	-		0.482	0.000	4.836	-
Ship Integration	WR	NAVSEA : Dahlgren	0.197	0.000		0.000		0.000		-		0.000	0.000	0.197	-
Ship Integration	WR	NAVSEA : Carderock	0.325	0.100	Nov 2018	0.050	Nov 2019	0.000		-		0.000	0.000	0.475	-
Subtotal			4.112	0.637		0.277		0.482		-		0.482	0.000	5.508	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAVSEA : Phil	8.386	0.050	Nov 2018	0.050	Nov 2019	0.100	Nov 2020	-		0.100	0.000	8.586	-
Program Management Support	WR	NAVSEA : Phil	3.427	0.100	Nov 2018	0.050	Nov 2019	0.100	Nov 2020	-		0.100	0.000	3.677	-
Training Development	WR	NAVSEA : Phil	1.415	0.050	Nov 2018	0.050	Nov 2019	0.100	Nov 2020	-		0.100	0.000	1.615	-
Integrated Logistics Support	WR	NAVSEA : Phil	1.754	0.085	Nov 2018	0.050	Nov 2019	0.100	Nov 2020	-		0.100	0.000	1.989	-
Software Development	WR	NAVSEA : Dahlgren	0.308	0.000		0.000		0.000		-		0.000	0.000	0.308	-
Program Management Support	WR	NAVSEA : Dahlgren	0.317	0.000		0.000		0.000		-		0.000	0.000	0.317	-
Program Management Support	WR	NAVSEA : Carderock	0.150	0.050	Nov 2018	0.050	Nov 2019	0.037	Nov 2020	-		0.037	0.000	0.287	-
Subtotal			15.757	0.335		0.250		0.437		-		0.437	0.000	16.779	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	SPAWAR : Atlantic	0.214	0.000		0.000		0.000		-		0.000	0.000	0.214	-
Developmental Test & Evaluation	WR	NAVSEA : Carderock	0.225	0.000		0.000		0.000		-		0.000	0.000	0.225	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy

Date: February 2020

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0603512N / Carrier Systems
Development

Project (Number/Name)
4005 / In-Service Carrier Systems
Development

In-Service Carrier Systems Development

Project 4005	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025																																					
	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																																		
C4I Networks performance requirements modeling and analysis	█																																																													
Network Data Logger Device	█																																																													
Integrated Condition Assessment System SE Improvements	█																																																													
Chlorinator/Dechlorinator Reliability Improvements	█																																																													
Portable Navigation/Ship Control Data Analyzer	█																																																													
CVN78 CL Platform support for Joint Strike fighter	█																																																													
LPAP On-Machine I/O	█																																																													
LPAP Air End Redesign	█																																																													
PCMS alternate measurement capability	█																																																													
Std Tool Development for In-Service Structural Assessment	█																																																													
Additive Manufacturing	█																																																													
Weapons Elevator PLC Re-design	█																																																													

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / <i>Carrier Systems Development</i>	Project (Number/Name) 4005 / <i>In-Service Carrier Systems Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4005				
C4I Networks performance requirements modeling and analysis: C4I Networks performance requirements modeling and analysis	2	2018	2	2021
Network Data Logger Device: Network Data Logger Device	2	2018	3	2020
Integrated Condition Assessment System SE Improvements: Integrated Condition Assessment System SE Improvements	3	2018	1	2021
Chlorinator/Dechlorinator Reliability Improvements: Chlorinator/Dechlorinator Reliability Improvements	2	2018	2	2021
Portable Navigation/Ship Control Data Analyzer: Portable Navigation/Ship Control Data Analyzer	2	2018	4	2021
CVN78 CL Platform support for Joint Strike Fighter: CVN78 CL Platform support for Joint Strike fighter	1	2018	1	2022
LPAP On-Machine I/O: LPAP On-Machine I/O	1	2018	1	2019
LPAP Air End Redesign: LPAP Air End Redesign	1	2018	4	2021
LPAP Air End Redesign: Modular Refrigeration Unit	1	2018	2	2018
Std Tool Development for In-Service Structural Assessment: Std Tool Development for In-Service Structural Assessment and risk definition	2	2018	4	2019
Additive Manufacturing: Additive Manufacturing	1	2019	4	2025
Weapons Elevator PLC Redesign: Weapons Elevator PLC Redesign	1	2019	1	2024