Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603512N *I Carrier Systems Development*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	69.160	9.184	5.440	4.997	-	4.997	5.658	5.719	5.702	5.814	Continuing	Continuing
3216: *Tactical Support Center-Integration*	43.792	7.530	4.248	4.295	-	4.295	4.436	4.529	4.613	4.704	Continuing	Continuing
4005: *In-Service Carrier Systems Development*	25.368	1.654	1.192	0.702	-	0.702	1.222	1.190	1.089	1.110	Continuing	Continuing

A. Mission Description and Budget Item Justification

The FY 2020 funding request was reduced by $0.315 million to account for the availability of prior year execution balances.

This Program Element (PE) addresses all technology areas associated with Carrier systems development.

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. The program provides incremental development to deliver frequent capability updates to the Fleet, developing, testing, certifying, and fielding system upgrades and cyber-security patches. The program 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, Link-16 Track Data, Ship Self Defense System (SSDS) Track Data, 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, P-8, MQ-4C Triton, and future ASW/SUW aircraft.

Changes to the SSDS configurations/variants have driven changes to the previous CV-TSC Fleet Capability Release (FCR) nomenclature/numbering. There are now two different SSDS configuration/variants. The first is non-Product Line Architecture (non-PLA) and the second is Product Line Architecture (PLA) configuration/variant. To address these two different configurations/variants, the CV-TSC FCR nomenclature has been modified. FCR-3 is split into two FCRs, FCR-3 and FCR-4. FCR-3 supports SSDS PLA and FCR-4 supports SSDS non-PLA. What was previously shown as FCR-4 is now renamed to FCR-5, which reflects a planned SSDS configuration/variant reduction to a single configuration.

PROJECT 4005: The In-Service Carrier Systems Development Demonstration and Validation program exploits available technologies 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), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs (TOC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy					Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*			R-1 Program Element (Number/Name) PE 0603512N *I Carrier Systems Development*		
B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	9.296	5.440	5.401	-	5.401
Current President's Budget	9.184	5.440	4.997	-	4.997
Total Adjustments	-0.112	0.000	-0.404	-	-0.404
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.112	0.000			
• Program Adjustments	0.000	0.000	-0.315	-	-0.315
• Rate/Misc Adjustments	0.000	0.000	-0.089	-	-0.089

Change Summary Explanation

- FY 2020 decrease of $-0.404M included: $-0.315M to account for the availability of prior year execution balances, and $-0.089M for various rate adjustments.

SCHEDULE - PROJECT 3216: Nomenclature changes were driven by CV-TSC dependencies on being aligned with the SSDS program. Changes to the SSDS configurations/variants have driven changes to the previous CV-TSC FCR nomenclature/numbering. The CV-TSC FCR-3 and FCR-4 (previously part of FCR-3) schedule changes reflect the parallel development of both FCR-3 Product Line Architecture (PLA) and FCR-4 Non-PLA. The CV-TSC FCR-5 (previously FCR-4) schedule change reflects when the program transitions to a single architecture (PLA). The CV-TSC Independent Verification & Validation (IV&V) schedule changes reflect the required time to complete integration, testing and certification (lesson learned from FCR-1/2).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / *Carrier Systems Development*	Project (Number/Name) 3216 / *Tactical Support Center-Integration*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3216: *Tactical Support Center-Integration*	43.792	7.530	4.248	4.295	-	4.295	4.436	4.529	4.613	4.704	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The CV-TSC project delivers ASW and SUW combat capability to the Aircraft Carrier. CV-TSC integrates sensor data from Off-Board Aircraft, Organic Platform Sensors, Link-16 Track Data, SSDS Track Data, Global Command and Control System (GCCS) Over-the-Horizon Track Data, and Environmental and Threat Databases to assess the threat and assist the TAO and 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, P-8, MQ-4C Triton, and future ASW/SUW assets. 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.

This Project also provided development of Boundary Defense Capability (Cybersecurity) capabilities (funded from FY 2016 through FY 2018). The purpose of this effort was to define and develop enterprise Hull Mechanical & Electrical (HM&E) System cybersecurity solutions that would provide: protections from cyber-attacks such as boundary defense capabilities that will protect threats entering and leaving HM&E systems, physical protections, message authentication and encryption methods; Detection solutions for system anomalies and attacks at the boundaries, on hosts, networks and backplanes; and provide for operator awareness (e.g. malware detection, file integrity verification, etc.); Reaction solutions that will enable operator and system responses to an attacks; and Recovery methods that will enable for a system to quickly get back to a good known state. Planning will also commence for the integration of cyber solutions into specific HM&E control systems (e.g. Machinery Control, Steering Control, etc.).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: CV-TSC Development / Integration / Test / Certification	4.157	4.248	4.295	0.000	4.295
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: CV-TSC's evolutionary acquisition approach to developing, testing, certifying, and fielding system upgrades and cyber-security patches is implemented through phased Fleet Capability Releases (FCR). Changes to the SSDS configurations/variants have driven changes to the previous CV-TSC Fleet Capability Release (FCR) nomenclature/numbering. There are now two different SSDS configuration/variants. The first is non-Product Line Architecture (non-PLA) and the second is Product Line Architecture (PLA) configuration/ variant. To address these two different configurations/variants, the CV-TSC FCR nomenclature has been modified. FCR-3 is split into two FCRs, FCR-3 and FCR-4. FCR-3 supports SSDS PLA, and FCR-4 supports SSDS non-PLA. What was previously shown as FCR-4 is now renamed to FCR-5, which reflects a planned SSDS configuration/variant reduction to a single configuration. ***FY 2019 Plans:*** - Complete the development phase for FCR-3/4 (previously shown as FCR-3). - Initiate the requirements definition phase and development efforts for FCR-5 (previously shown as FCR-4). - Initiate certifications required for fielding, to include IA Accreditation, ISNS and CANES Certifications, PEO IWS Element Certification, and CST Certification for FCR-3/4 (previously shown as FCR-3). - Complete the Transition Information Assurance (IA) Accreditation to Risk Management Framework (RMF). Prioritize capability improvements to Public Key Enforcement (PKE) compliance, interoperability with multiple variants of SSDS PLA, and the Common Data Link System (CDLS) multilink. - Update Technical Review Action Plan (TRAP). ***FY 2020 Base Plans:*** - Complete certifications required for fielding, to include IA Accreditation, ISNS and CANES Certifications, PEO IWS Element Certification, and CST Certification for FCR-3/4 (previously shown as FCR-3). - Complete requirements definition phase for FCR-5 (previously shown as FCR-4). - Continue development effort for FCR-5 (previously shown as FCR-4). - Provide support for a third software baseline. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
The increase from FY 2019 to FY 2020 ($+0.047M) is in line with inflation associated with the RDT&EN appropriation.					
Title: NAVSEA Boundary Defense Capability (Cybersecurity) ***Articles:*** ***Description:*** The purpose of this effort is to define and develop enterprise Hull Mechanical & Electrical (HM&E) System cybersecurity solutions that will provide: protections from cyber-attacks such as boundary defense capabilities that will protect threats entering and leaving HM&E systems, physical protections, message authentication and encryption methods; Detection solutions for system anomalies and attacks at the boundaries, on hosts, networks and backplanes; and provide for operator awareness (e.g. malware detection, file integrity verification, etc.); Reaction solutions that will enable operator and system responses to an attacks; and Recovery methods that will enable for a system to quickly get back to a good known state. Planning will also commence for the integration of cyber solutions into specific HM&E control systems (e.g. Machinery Control, Steering Control, etc.). The development of a cyber-resilient HM&E architecture will include the integration of cybersecurity solutions and system engineering processes to individual HM&E Systems and their Components to ensure a consistent cyber security posture across the entire HM&E Enclave. Development of enterprise HM&E risk management processes will occur, to include the following: a vulnerability assessment and management process across the HM&E Enclave and a methodology to support the execution of the Risk Management Framework and Cybersafe Assessments. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	3.373 -	0.000 -	0.000 -	0.000 -	0.000 -
Accomplishments/Planned Programs Subtotals	7.530	4.248	4.295	0.000	4.295

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN/2176: *Undersea Warfare Support Equipment (N98/CV-TSC only)*	0.338	0.334	0.343	-	0.343	0.353	0.359	0.367	0.374	Continuing	Continuing

Remarks

D. Acquisition Strategy

CV-TSC Development/Integration:
- 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.

NAVSEA Boundary Defense Capability (Cybersecurity):
- Investigate, demonstrate, and implement multi-application, cross-platform cybersecurity solutions for HM&E control system enclaves, followed by engineering for CVN 68 Class integration. Execute non-recurring engineering efforts for HM&E Control Systems. Perform engineering and planning for Boundary Defense Capability Temporary Alterations.

E. Performance Metrics

CV-TSC Development/Integration:
- Achieve Configuration Control Board (CCB) certification for installation of CV-TSC Build 8.0 software version.
- Achieve Platform Information Technology (PIT) Information Assurance (IA) accreditation of CV-TSC Build 8.0 software version.
- Achieve Consolidate Afloat Network Enterprise System (CANES) interoperability certification of CV-TSC Build 8.0 software version.
- Achieve element certification of CV-TSC Build 8.0 software version.
- Achieve Combat System test certification of CV-TSC Build 8.0 software version.

NAVSEA Boundary Defense Capability (Cybersecurity):
- Define and develop cross-platform control system cybersecurity requirements.
- Define and develop cross-platform control system cybersecurity risk management processes.
- Define and develop a set of cross-platform control system cybersecurity boundary defense solutions.
- Define and develop a set of cross-platform, centralized, systems-level cybersecurity solutions.
- Define and develop a set of cross-platform, element-level cybersecurity protections.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	NAWC/Pax River : MD	0.975	0.140	Nov 2017	0.135	Dec 2018	0.138	Nov 2019	-		0.138	Continuing	Continuing	Continuing
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	NRL : DC	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	NSWC/Carderock : MD	2.650	0.000		0.000		0.000		-		0.000	0.000	2.650	-
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	NSWC/Dahlgren : VA	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	NUWC/Keyport : WA	23.018	2.766	Oct 2017	2.693	Nov 2018	2.662	Nov 2019	-		2.662	Continuing	Continuing	Continuing
CV-TSC Engineering / H/W & S/W Devel / Integration	C/CPFF	Adaptive Methods : VA	3.107	0.695	Dec 2017	0.400	Dec 2018	0.408	Dec 2019	-		0.408	Continuing	Continuing	Continuing
CV-TSC Engineering / H/W & S/W Devel / Integration	C/CPFF	JHU/APL : MD	0.250	0.000		0.000		0.000		-		0.000	0.000	0.250	-
CV-TSC Engineering / H/W & S/W Devel / Integration	WR	SPAWAR : CA	4.160	0.000		0.000		0.000		-		0.000	0.000	4.160	-
CV-TSC Engineering / H/W & S/W Development	C/CPFF	VAR* : VAR*	1.288	0.095	Dec 2017	0.503	Dec 2018	0.556	Dec 2019	-		0.556	Continuing	Continuing	Continuing
Boundary Defense Capability Design/ Development	WR	NSWC/Philadelphia : PA	2.526	1.520	Dec 2017	0.000		0.000		-		0.000	0.000	4.046	-
Boundary Defense Capability Design/ Development	C/CPFF	VAR* : VAR*	2.642	1.853	Jan 2018	0.000		0.000		-		0.000	0.000	4.495	-
		Subtotal	41.041	7.069		3.731		3.764		-		3.764	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / *Carrier Systems Development*	Project (Number/Name) 3216 / *Tactical Support Center-Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

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

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-TSC Test and Certification	WR	NUWC//Keyport : WA	2.105	0.225	Oct 2017	0.314	Nov 2018	0.324	Nov 2019	-		0.324	Continuing	Continuing	Continuing
CV-TSC Test and Certification	WR	NUWC/Newport : RI	0.125	0.000		0.000		0.000		-		0.000	0.000	0.125	-
		Subtotal	2.230	0.225		0.314		0.324		-		0.324	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-TSC Program Management Support	C/CPAF	BAE Systems : MD	0.411	0.000		0.000		0.000		-		0.000	0.000	0.411	-
CV-TSC Program Management Support	C/CPIF	CGI Federal : VA	0.110	0.157	Nov 2017	0.144	Dec 2018	0.147	Dec 2019	-		0.147	Continuing	Continuing	Continuing
CV-TSC Program Management Support	C/CPFF	CACI : VA	0.000	0.055	Jan 2018	0.039	Dec 2018	0.040	Dec 2019	-		0.040	Continuing	Continuing	Continuing
CV-TSC Travel	Allot	NAVSEA PEO iWS5 : DC	0.000	0.024	Jan 2018	0.020	Jan 2019	0.020	Dec 2019	-		0.020	Continuing	Continuing	Continuing
		Subtotal	0.521	0.236		0.203		0.207		-		0.207	Continuing	Continuing	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	43.792	7.530		4.248		4.295		-		4.295	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603512N / *Carrier Systems Development*	Project (Number/Name) 3216 / *Tactical Support Center-Integration*	

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

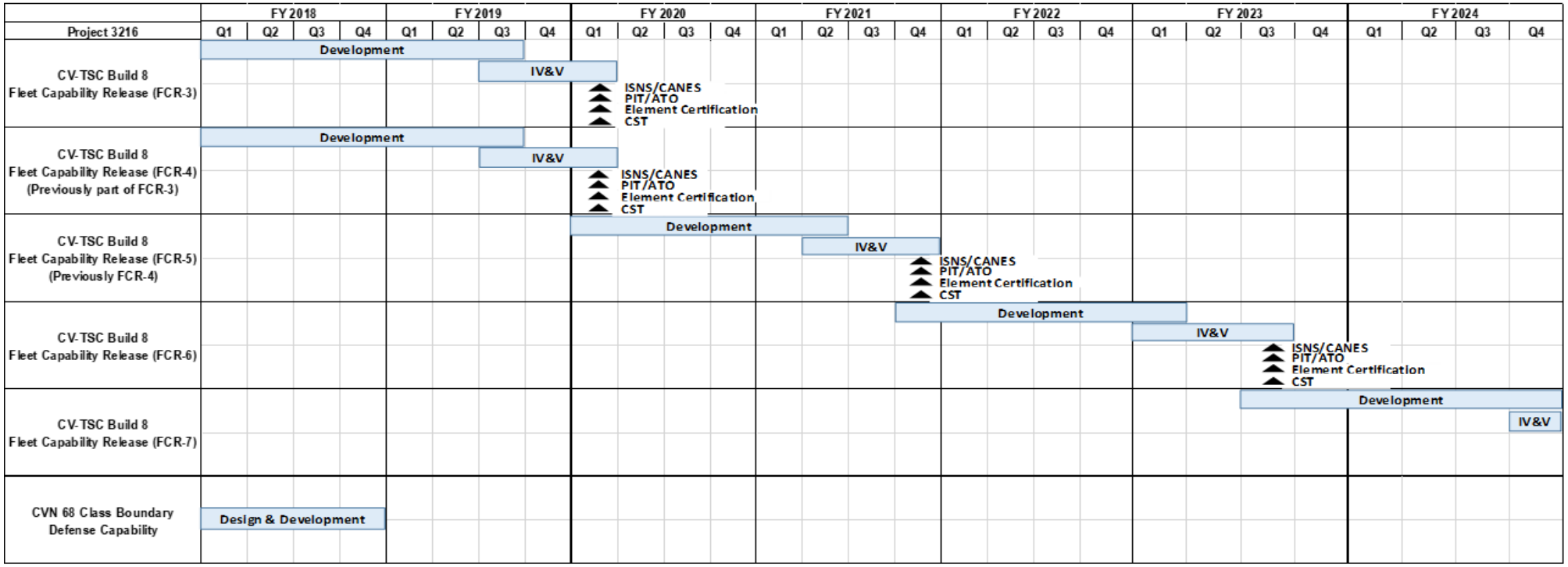

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV-TSC Build 8 FCR-3				
CV-TSC Build 8 FCR-3 Development	1	2018	3	2019
CV-TSC Build 8 FCR-3 IV&V	3	2019	1	2020
CV-TSC Build 8 FCR-3 PIT/ATO	1	2020	1	2020
CV-TSC Build 8 FCR-3 ISNS / CANES Certification	1	2020	1	2020
CV-TSC Build 8 FCR-3 Element Certification	1	2020	1	2020
CV-TSC Build 8 FCR-3 Combat System Test (CST)	1	2020	1	2020
CV-TSC Build 8 FCR-4 (previously part of FCR-3)				
CV-TSC Build 8 FCR-4 Development	1	2018	3	2019
CV-TSC Build 8 FCR-4 IV&V	3	2019	1	2020
CV-TSC Build 8 FCR-4 PIT/ATO	1	2020	1	2020
CV-TSC Build 8 FCR-4 ISNS / CANES Certification	1	2020	1	2020
CV-TSC Build 8 FCR-4 Element Certification	1	2020	1	2020
CV-TSC Build 8 FCR-4 Combat System Test (CST)	1	2020	1	2020
CV-TSC Build 8 FCR-5 (previously FCR-4)				
CV-TSC Build 8 FCR-5 Development	1	2020	2	2021
CV-TSC Build 8 FCR-5 IV&V	2	2021	4	2021
CV-TSC Build 8 FCR-5 PIT/ATO	4	2021	4	2021
CV-TSC Build 8 FCR-5 ISNS / CANES Certification	4	2021	4	2021
CV-TSC Build 8 FCR-5 Element Certification	4	2021	4	2021
CV-TSC Build 8 FCR-5 Combat System Test (CST)	4	2021	4	2021
CV-TSC Build 8 FCR-6				

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 3216 / *Tactical Support Center-Integration*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV-TSC Build 8 FCR-6 Development	4	2021	1	2023
CV-TSC Build 8 FCR-6 IV&V	1	2023	3	2023
CV-TSC Build 8 FCR-6 PIT/ATO	3	2023	3	2023
CV-TSC Build 8 FCR-6 ISNS / CANES Certification	3	2023	3	2023
CV-TSC Build 8 FCR-6 Element Certification	3	2023	3	2023
CV-TSC Build 8 FCR-6 Combat System Test (CST)	3	2023	3	2023
CV-TSC Build 8 FCR-7				
CV-TSC Build 8 FCR-7 Development	3	2023	4	2024
CV-TSC Build 8 FCR-7 IV&V	4	2024	4	2024
CVN 68 Class Boundary Defense Capability				
CVN 68 Class Boundary Defense Capability: CVN 68 Class Boundary Defense Capability Design & Development	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
4005: *In-Service Carrier Systems Development*	25.368	1.654	1.192	0.702	-	0.702	1.222	1.190	1.089	1.110	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The In-Service Carrier Systems Demonstration and Validation program exploits available technologies 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), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs as well as addressing equipment obsolescence issues. Initial technologies include the Uninterruptible Power Supply (UPS) Replacements, the Integrated Condition Assessment System, the On-Machine I/O development for LPAPs and LPAP air end redesign, Modular Refrigeration Unit (MRU). 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, Legacy Steering Interface upgrades, Passive countermeasures System (PCMS) alternate measurement capability, Additive Manufacturing efforts, and Weapons Elevators PLC redesign. Wireless systems, smart sensors, lighting systems, knowledge-based systems, automated casualty control, automated technology for workload reduction, linked smart devices, common software tools for interoperability, and self-healing network are technologies being considered for future applications including the following: Integrated Bridge control Data Logger, C4I Network Performance Modeling and Analysis, Network Data Logger Device, Portable Communication System (PCS) proof of concept, Ship Control System (SCS) Onboard trainer, CVN 78 class platform support for Joint Strike Fighter Integration, Development of a Standardized tool to be used to perform structural analyses to assess the adequacy of corroded and degraded structure.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: In-Service Carrier Systems Development	1.654	1.192	0.702	0.000	0.702
Articles:	-	-	-	-	-
FY 2019 Plans: Fiscal Year 2019 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 2020 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
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 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Decrease from FY19 to FY20 reflects completion of LPAP efforts in FY19. Additionally, the FY 2020 funding request was reduced by $(0.315) million to account for the availability of prior year execution balances.					
Accomplishments/Planned Programs Subtotals	1.654	1.192	0.702	0.000	0.702

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).

E. Performance Metrics

Successfully complete Ship Control System Governor Software Development, AC Plant Model Capacity Optimization, Uninterruptible Power Supply (UPS) Replacements, Advanced Damage Control System (ADCS) Software Improvements, Automatic Fire Sensing and Suppression System/Flooding and Casualty Control Software (AFSSS/FCCS) Software Development Test, Input/Output Controller (IOC) replacement demonstration, Tank Preservation models, Weapons Elevator Laser Positioning demonstration, Legacy Steering Interface Upgrades, CVN Integrated Topside Design (ITD) location option evaluation tool development, Antenna to Antenna coupling analysis tool development, Universal Portable Command and Control Unit (PCCU) development, Ship Control System (SCS) Trainer, Integrated Bridge Control Data Logger, Weapons Elevator Control Accumulator Replacement,C4I Network Performance Requirements Modeling and Analysis, On-Machine I/O development for LPAPs and LPAP air end redesign, and Modular Refrigeration Unit (MRU) development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ship Integration	WR	NAVSEA : Phil	2.863	0.727	Nov 2017	0.537	Nov 2018	0.227	Nov 2019	-		0.227	0.000	4.354	-
Ship Integration	WR	NAVSEA : Dahlgren	0.197	0.000		0.000		0.000		-		0.000	0.000	0.197	-
Ship Integration	WR	NAVSEA : Carderock	0.225	0.100	Nov 2017	0.100	Nov 2018	0.050	Nov 2019	-		0.050	0.000	0.475	-
		Subtotal	3.285	0.827		0.637		0.277		-		0.277	0.000	5.026	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development	WR	NAVSEA : Phil	8.332	0.054	Nov 2017	0.050	Nov 2018	0.050	Nov 2019	-		0.050	0.000	8.486	-
Program Management Support	WR	NAVSEA : Phil	3.277	0.150	Nov 2017	0.100	Nov 2018	0.050	Nov 2019	-		0.050	0.000	3.577	-
Training Development	WR	NAVSEA : Phil	1.365	0.050	Nov 2017	0.050	Nov 2018	0.050	Nov 2019	-		0.050	0.000	1.515	-
Integrated Logistics Support	WR	NAVSEA : Phil	1.654	0.100	Nov 2017	0.085	Nov 2018	0.050	Nov 2019	-		0.050	0.000	1.889	-
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	0.100	0.050	Nov 2017	0.050	Nov 2018	0.050	Nov 2019	-		0.050	0.000	0.250	-
		Subtotal	15.353	0.404		0.335		0.250		-		0.250	0.000	16.342	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total 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	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NAVSEA : Phil	6.022	0.423	Nov 2017	0.220	Nov 2018	0.175	Nov 2019	-		0.175	Continuing	Continuing	Continuing
Developmental Test & Evaluation	WR	NAVSEA : Dahlgren	0.261	0.000		0.000		0.000		-		0.000	0.000	0.261	-
		Subtotal	6.722	0.423		0.220		0.175		-		0.175	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DAWF	Various	Various : Various	0.008	0.000		0.000		0.000		-		0.000	0.000	0.008	-
		Subtotal	0.008	0.000		0.000		0.000		-		0.000	0.000	0.008	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	25.368	1.654		1.192		0.702		-		0.702	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
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

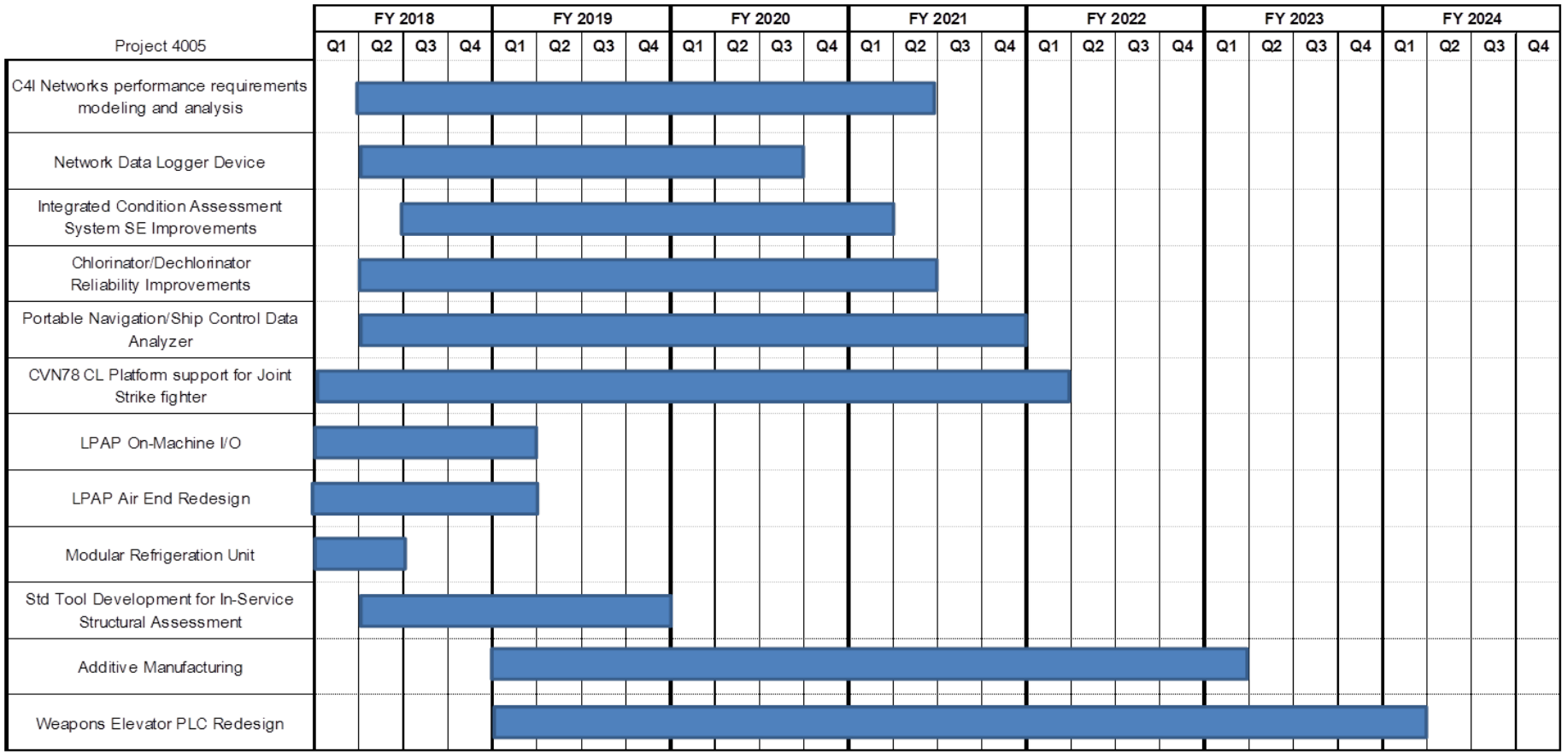

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603512N / *Carrier Systems Development*	**Project (Number/Name)** 4005 / *In-Service Carrier Systems Development*

Schedule Details

	Start		End	
Events by Sub Project	**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	1	2019
Modular Refrigeration Unit: 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	1	2023
Weapons Elevator PLC Redesign: Weapons Elevator PLC Redesign	1	2019	1	2024