Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy

R-1 Program Element (Number/Name)

Date: February 2018

Appropriation/Budget Activity

1319: Research, Development, Test & Evaluation, Navy I BA 5: System

Development & Demonstration (SDD)

PE 0605217N I (U)Common Avionics

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COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	42.711	58.163	51.486	-	51.486	46.841	36.037	35.882	36.630	Continuing	Continuing
0572: JT Service/NV Std Avionics CP/SB	0.000	42.711	53.512	51.486	-	51.486	46.841	36.037	35.882	36.630	Continuing	Continuing
3425: Digital Warfare	0.000	0.000	4.651	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.651

#### Note

Navy

Digital Warfare (DW) efforts in FY19 and out have been consolidated and realigned into PE 0604027N Digital Warfare.

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

### A. Mission Description and Budget Item Justification

This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Such air combat electronics developments include communications and airborne networking, navigation and sensors, flight avionics, safety systems, and flight mission information systems for both forward fit and retrofit aircraft. These efforts continue to maintain federated systems while encouraging transition of procurements to support a modular system for enhanced performance and affordability. Consideration is given up front to reduce acquisition costs through larger procurement quantities that satisfy multi-aircraft customer requirements and that reduce life cycle costs in the areas of reliability, maintainability, and training.

Digital Warfare(DW) supports systems of systems requirements modeling and allocation, development of data technical baselines, digital architectures and data models, and provides data science for enterprise and warfare pilots in support of a composable, modular Navy. DW efforts in FY19 and out have been consolidated and realigned into PE 0604027N Digital Warfare.

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

PE 0605217N: (U)Common Avionics

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy

R-1 Program Element (Number/Name)

**Date:** February 2018

1319: Research, Development, Test & Evaluation, Navy I BA 5: System

PE 0605217N I (U)Common Avionics

Development & Demonstration (SDD)

Appropriation/Budget Activity

B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	54.599	58.163	62.003	-	62.003
Current President's Budget	42.711	58.163	51.486	-	51.486
Total Adjustments	-11.888	0.000	-10.517	-	-10.517
<ul> <li>Congressional General Reductions</li> </ul>	-	-			
<ul> <li>Congressional Directed Reductions</li> </ul>	-	-			
<ul> <li>Congressional Rescissions</li> </ul>	-	-			
<ul> <li>Congressional Adds</li> </ul>	-	-			
<ul> <li>Congressional Directed Transfers</li> </ul>	-	-			
<ul> <li>Reprogrammings</li> </ul>	-5.650	0.000			
<ul> <li>SBIR/STTR Transfer</li> </ul>	-1.130	0.000			
<ul> <li>Program Adjustments</li> </ul>	-3.000	0.000	-9.716	-	-9.716
<ul> <li>Rate/Misc Adjustments</li> </ul>	0.000	0.000	-0.801	-	-0.801
<ul> <li>Congressional General Reductions</li> </ul>	-0.021	-	-	-	-
Adjustments					
<ul> <li>Congressional Directed Reductions Adjustments</li> </ul>	-2.087	-	-	-	-

## **Change Summary Explanation**

Technical: Not applicable.

#### Schedule:

Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM): CH-53K Integration/Certification of 8.33 kHz, Mode S, Reduced Vertical Separation Minimums (RVSM), Required Navigation Performance/Area Navigation (RNP/RNAV), and Automatic Dependent Surveillance-Broadcast Out (ADS-B (Out)) effort slid to 1Q/18 due to FY17 Congressional adjustment. Evaluate ADS-BO technologies/develop solutions to support platform integrations and develop CNS/ATM Common Component to support RNP/RNAV developmental platform requirements extended to 4Q/23.

Tactical Communications: Extended Transmission Security (TRANSEC) and Crypto Modernization (Suite B) to 4Q/23. Added NSA Certification 5 to 3Q/23 and added OFP Software Production Milestone to 1Q/23. SATCOM S/W Development with Mobile User Objective System extended to 2Q/19 due to the additional qualification testing that is required for MUOS.

Ground Proximity Warning System/Terrain Awareness System (GPWS/TAWS II): Edits made to schedule to incorporate changes in schedule dates to align to both V-22 and H-60 platforms' schedules; extended H-60 TAWS II Software Development completion date to 4Q/17; added H-60 TAWS II IOC 2Q/19; shifted V-22 TAWS II Requirements Development from 1Q/18 to 2Q/19; added TAWS II Software Re-Architecture 1Q/18 to incorporate MIL-STD 882E Level 1

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
1319: Research, Development, Test & Evaluation, Navy I BA 5: System	PE 0605217N I (U)Common Avionics	
Development & Demonstration (SDD)		

requirements; Shifted V-22 TAWS II Software Development from 1Q/19 to 1Q/20; added V-22 Integration contract in 3Q/20; shifted V-22 TAWS II Developmental Test from 1Q/21 to 4Q/21.

Collaborative Warfare (CW): Naval Aviation Netted Sensors and Maritime Targeting Experimentation, Naval Aviation and Maritime Targeting Requirements and CONOPS, Standards and Architectures/Requirements Development all extended to 4Q/23.

Mid Air Collision Avoidance Capability: Budget realigned FY18-FY23 per the Office of the Chief of Naval Operations (OPNAV) direction. Added Analysis of Alternatives for 1Q/19, added DoD Architectural Framework Development 1Q/18, added Model Based Systems Engineering (MBSE) 1Q/18, extended Phase 2 Risk Reduction for Prototyping of Algorithms and Software extended to 4Q/23. MDD/ASR shifted from 2Q/18 to 4Q/22, RFP Release Decision shifted from 2Q/19 to 2Q/23, added Draft CDD Submitted for 2Q/22, added CDD Approved 2Q/23, Integrated Logistics Assessment shifted from 3Q/19 to 3Q/23, Milestone B shifted from 4Q/19 to 4Q/23. The following were deleted: SRB/SRR 1Q/19, Phase 2 Spec Development 1Q18, SFR 2Q/19, PDR 3Q/19, Software Design and Development 1Q/20, CDR 3Q/20, Platform Integration and Test Support 3Q/21, MH-60R/S DT 3Q/22, and TRR 3Q/22.

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

3425: Digital Warfare (DW) stood up separately within Program Element to set requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming starting 1QTR FY18 through the FYDP. DW efforts in FY19 and out have been consolidated and realigned into PE 0604027N Digital Warfare.

Project Unit 0572 JT Service/NV Std Avionics CP/SB: The FY 2019 funding request was reduced by \$2.500 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy								Date: Febr	ruary 2018				
Appropriation/Budget Activity 1319 / 5				_	am Elemen 7N / (U)Co	•	,	<b>Project (N</b> 0572 / JT 3		ne) Std Avionics	cs CP/SB Total		
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
0572: JT Service/NV Std Avionics CP/SB	0.000	42.711	53.512	51.486	-	51.486	46.841	36.037	35.882	36.630	Continuing	Continuing	
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-			

### Note

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

### A. Mission Description and Budget Item Justification

Joint Services/Navy Standard Avionics Components and Subsystems: This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Standard avionics capabilities under

development include the Joint Service Review Committee for Avionics Standardization (JSRC-AS), Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), Tactical Communications (TACCOM), Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II), Collaborative Warfare (CW), Avionics Component Improvement Program (AvCIP), Mid Air Collision Avoidance Capability (MCAC), and Avionics Architectures Team (AAT). Participation in Human Factors Quality Management Board ensures Navy safety upgrades and mandatory safety improvements for naval aircraft.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Joint Service Review Committee for Avionics Standardization (JSRC-AS)	0.462	0.995	0.995	0.000	0.995
Articles:	-	-	-	-	-
<b>Description:</b> The JSRC-AS program supports Congressional and Assistant Secretary of the Navy for Research, Development and Acquisition direction to control the growing proliferation of unique avionics and improve coordination among the services through the identification, development, and promotion of investigative and development efforts across the services and U.S. Coast Guard. The JSRC-AS supports the development, analysis and review of new avionics requirements with potential for joint service application. The JSRC-AS consists of an O-6 Level principal from each service and U.S. Coast Guard, as well as the appropriate staff, to support joint service working group efforts. The JSRC-AS reports to the O-7 level tri-service Aviation Common Systems Board who reports to the O-9 level Joint Aeronautical Commanders Group.					
FY 2018 Plans: Provide leadership in support of the Navy's interest to the Joint Services Review Committee for Avionics Standardization (JSRC-AS) tri-service committee promoting commonality and joint programs with focus on					

PE 0605217N: (U)Common Avionics

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priation/Budget Activity  perability, communications, navigation, Joint Services avionics obsolescence management, and update ore Avionics Master Plan.  Description of the Navy's interest to the JSRC-AS tri-service committee promoting monality and joint programs with focus on interoperability, communications, navigation, Joint Services ics obsolescence management, and update of the Core Avionics Master Plan.	Avionics FY 2017	0572 / JT S	Date: Februmber/Nan Service/NV	ne)	FY 2019 Total
perability, communications, navigation, Joint Services avionics obsolescence management, and update ore Avionics Master Plan.  19 Base Plans: de leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting nonality and joint programs with focus on interoperability, communications, navigation, Joint Services	Avionics FY 2017	0572 / JT S	Service/NV	Std Avionics FY 2019	FY 2019
perability, communications, navigation, Joint Services avionics obsolescence management, and update ore Avionics Master Plan.  1919 Base Plans:  de leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting nonality and joint programs with focus on interoperability, communications, navigation, Joint Services		FY 2018			
ore Avionics Master Plan.  1919 Base Plans:  de leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting nonality and joint programs with focus on interoperability, communications, navigation, Joint Services	of				
de leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting nonality and joint programs with focus on interoperability, communications, navigation, Joint Services					
019 OCO Plans:					
018 to FY 2019 Increase/Decrease Statement:					
Communication Navigation Surveillance/Air Traffic Management (CNS/ATM)  Artic	0.484 les: -	4 2.952	1.368 -	0.000	1.368 -
<b>ription:</b> This program will conduct and support CNS/ATM research, studies, development, integration, nstration, test and evaluation efforts for Naval aviation platforms in development. Platform integration of Select (S), 8.33 kHz, Reduced Vertical Separation Minimum (RVSM), Required Navigation Performance Navigation (RNP/RNAV) to include M Code, and Automatic Dependent Surveillance-Broadcast Out (ADIN) functional integration and certification efforts into Naval aircraft. Assist with insertion of communication, surveillance, and supporting technologies and conduct capability certification on developmental rms such as F-35, CH-53K, and Unmanned Air Systems. Capabilities include Mode S, 8.33 kHz, RVSM RNAV, ADS-BO, and other civil and military capabilities.	e S- on,				
t with insertion and integration of CNS/ATM technologies and certification of developmental platforms. ate technologies and develop solutions to support platform integrations. Develop CNS/ATM Common conents to support RNP RNAV developmental platform requirements. Continue integration/certification de Select, 8.33 kHz, RVSM, RNP/RNAV, and ADS-BO into CH-53K. Research and develop GPS incements to support CNS/ATM RNP/RNAV improvements. Research and develop Automatic Dependential Company of the Characteristic of the Characteri	he				
019 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: Febr	uary 2018	
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/ PE 0605217N / (U)Common Avio			umber/Nan Service/NV		s CP/SB
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities	es in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Assist with insertion and integration of Communication Navigation Surveilla ATM) technologies and certification of developmental platforms. Evaluate to support platform integrations. Develop CNS/ATM Common Components to platform requirements. Continue integration/certification of Mode Select, 8.3 Minimum (RVSM), RNP/RNAV, and ADS-B (Out) into CH-53K. Research a support CNS/ATM RNP RNAV improvements. Research and develop ADS-requirements as well as compatibility with the emerging GPS M Code and its	echnologies and develop solutions to support RNP/RNAV developmental 33 kHz, Reduced Vertical Separation and develop GPS enhancements to B (Out) System Design Assurance					
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:  Decrease between FY18 and FY19 is due to the contract that awarded in F hardware development contract for ADS-B (Out).	Y18 for the CH-53K primary					
Title: Tactical Communications (TACCOM)	Articles:	18.632 -	19.777 -	19.479 -	0.000	19.479 -
<b>Description:</b> This program will conduct research, studies, development, intervaluation efforts to ensure tactical communication systems and capabilities support naval aviation requirements. Perform tactical communication platfor determine technical and cost effective solutions across naval aviation. Develop tactical communications (and systems which have application across naval aviation. Support all necellegacy communications systems incorporating programmable Communication Transmission Security (TRANSEC) mandated National Security Agency (National Security Agency (National Security Voice (TSV) Suite B, Combat Net Radio (CNR) Variable Medof-Sight, Satellite Communication (SATCOM) Modernization including Mobil High Frequency, Second Generation Anti-Jam Tactical UHF Radio for NATiand data link into the ARC-210 system. Support for networking requirement Integrated Waveform (IW), Intelligence Broadcast System over modern Cocsatellite channels, Tactical Networks, Data Links, and Link 16.	s are developed and available to rm integration studies and activities to voice/data) requirements, concepts essary tasks to ensure evolution of on Security/Information Assurance, SA) Crypto Modernization initiatives, essage Format (VMF), Beyond Linele User Objective System (MUOS), O (SATURN) civil interoperability, as development and prototyping,					
FY 2018 Plans: Continue Satellite Communication (SATCOM) Software (S/W) development System (MUOS) capabilities. Continue Operational Flight Plan (OFP) S/W						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: Febr	uary 2018	
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/ PE 0605217N / (U)Common Avio		Project (Number/Name) 0572 / JT Service/NV Std Avionics CP			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantitie	s in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
integration for NSA and Information Assurance (IA) certification. Continue C SATURN waveform. Complete red-side provisioning options for the RT-2036 (TRANSEC) SATCOM Crypto Modernization in accordance with NSA direct (TSV) Suite B for interoperability.	6. Continue Transmission Security					
FY 2019 Base Plans: Continue SATCOM S/W development with MUOS capabilities. Complete cry Information Assurance (IA) certification. Continue Combat Net radio interope Continue TRANSEC SATCOM Crypto Modernization in accordance with NS interoperability.	erability with SATURN waveform.					
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Decrease between FY18 and FY19 is due to the finalization for the Operation efforts in FY18.	nal Flight Plan Software Integration					
Title: Ground Proximity Warning System/Terrain Awareness Warning Syste	m (GPWS/TAWS II)  Articles:	2.131	8.668	7.843 -	0.000	7.843
<b>Description:</b> This program will conduct research, studies, development, into evaluation efforts to meet naval aviation GPWS/TAWS II requirements. The modes and operational environments, to include Degraded Visual Environments platform integration studies and activities to determine technical and cost efforts aviation. Develop GPWS/TAWS II solutions tailored to platform performance Develop simulation models for use at Manned Flight Simulator (MFS) or other required for platform tailoring, including procurement of test article hardward models for suitability in GPWS/TAWS II development effort. Develop GPWS simulation environments as real-time hardware and pilot in the loop tool. Desinterfaces necessary for integration of the algorithm within platform host conference of the conference of the platforms.	ese requirements span all operational ent. Perform GPWS/TAWS II fective solutions across naval e and range of military operations. er simulation environments as e. Evaluate aircraft simulation G/TAWS II algorithms utilizing evelop and evaluate algorithm					
FY 2018 Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: Febr	uary 2018		
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/ PE 0605217N / (U)Common Avion		Project (Number/Name) 0572 / JT Service/NV Std Avionics Ca				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities i	n Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Complete Phase I & II DT on MH-60R/S. Conduct Milestone C and Fleet Releasystem (TAWS II) on MH-60R/S. Conduct TAWS II Software Re-Architecture.	se of Terrain Awareness Warning						
FY 2019 Base Plans: Fleet Release of TAWS II on MH-60R/S IOC. Complete TAWS II Software Re II Requirements Development.	-Architecture. Initiate V-22 TAWS						
FY 2019 OCO Plans: N/A							
FY 2018 to FY 2019 Increase/Decrease Statement:  Decrease between FY18 and FY19 is due to the finalization of the initial H-60	ΓAWS II Developmental Testing.						
Title: Collaborative Warfare (CW)	Articles:	0.204	0.240	0.244	0.000	0.244	
<b>Description:</b> The CW component is a Research & Development effort to ident the warfighting benefit of integrating networked capabilities into naval aircraft to component also addresses maritime targeting gaps for naval aircraft to operate military services. The following efforts are included: 1) Comprehensive naval a requirements that map fleet gaps and requirements to cross-platform naval aviand maritime targeting capability proof of concept prototype demonstrations let experimentation campaign. 3) Coordinating Naval Aviation requirements with the Future Naval Capability Enabling Capability for the Common Radio Enhancem Naval Aviation strategy with Intelligence Community (IC) efforts in the areas of Systems Integration, and National to Tactical Integration.	o fill those gaps. The CW e more effectively with other viation and maritime targeting ation solutions. 2) Netted sensors veraging the Navy's Fleet he Office of Naval Research ent (CoRE). 4) Coordination of						
FY 2018 Plans: Continue executing to Naval Aviation and Maritime Targeting Experimentation requirements, standards, and architectures in support of new and updated net Operations and capabilities.							
FY 2019 Base Plans: Continue executing to Naval Aviation and Maritime Targeting Experimentation requirements, standards, and architectures in support of new and updated net Operations and capabilities.	•						
FY 2019 OCO Plans:							

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Appropriation/Budget Activity 1319 / 5  B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  FY 2018 fo FY 2019   FY 2018   FY 2019   FY 2019   Base   OCO   Fotal N/A  FY 2018 to FY 2019 Increase/Decrease Statement: Increase between FY18 and FY19 is due to the inflation pricing factors for Systems Engineering efforts.  Title: Avionics Component Improvement Program (AvCIP)  Articles:  Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for felded systems and implementing life-cycle cost reduction inflitatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness (significant back-orders or impending sustainability falliures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost for proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Base Plans:  Address current fleet problem avionics systems	· · · · · · · · · · · · · · · · · · ·	JNCLASSIFIED						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  N/A  FY 2018 Increase Decrease Statement: Increase between FY18 and FY19 is due to the inflation pricing factors for Systems Engineering efforts.  Title: Avionics Component Improvement Program (AvCIP)  Articles:  Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system falling to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment acosts. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warrighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Base Plans:  Address current fleet problem avionics systems (top readiness	Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy			Date: Febr	uary 2018			
N/A  FY 2018 to FY 2019 Increase/Decrease Statement: Increase between FY18 and FY19 is due to the inflation pricing factors for Systems Engineering efforts.  Title: Avionics Component Improvement Program (AvCIP)  Articles:  Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Plans:  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss	Appropriation/Budget Activity 1319 / 5			, ,				
Increase between FY18 and FY19 is due to the inflation pricing factors for Systems Engineering efforts.  Title: Avionics Component Improvement Program (AvCIP)  Articles:  Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment cost. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Base Plans:  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	B. Accomplishments/Planned Programs (\$ in Millions, Article Quantitie	es in Each)	FY 2017	FY 2018			FY 2019 Total	
Increase between FY18 and FY19 is due to the inflation pricing factors for Systems Engineering efforts.  Title: Avionics Component Improvement Program (AvCIP)  Articles:  Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment costs from the Verticuring costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainament costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  **PY 2018 Plans:**  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).  **FY 2019 Base Plans:**  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	N/A							
Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Plans:  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).  FY 2019 Base Plans:  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	FY 2018 to FY 2019 Increase/Decrease Statement: Increase between FY18 and FY19 is due to the inflation pricing factors for S	Systems Engineering efforts.						
Description: Investigate high value Return On Investment component improvement candidate projects in support of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Plans:  Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	Title: Avionics Component Improvement Program (AvCIP)		4.403	4.572	4.872	0.000	4.872	
susport of NAVAIR Commander's focus areas of Readiness and Speed to the Fleet. Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Analysis shows under this program between 2006 and 2017 has enabled sustainment and procurement cost avoidances in excess of \$275M in cost for the \$62M of funding invested through 2017.  FY 2018 Plans: Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).		Articles:	-	-	-	-	-	
Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).  FY 2019 Base Plans: Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	sustainment cost growth by reducing costs for fielded systems and impleme initiatives as part of new systems development. This program positions resofast-track corrections to existing problematic systems. Projects address critiback-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing and top sustainment cost drivers (out of proportion annual maintenance or repair coand development of technology insertion and product redesign or replacements in objectives, or reduce overall sustainment costs. Candidate projects template, reviewed by a panel of Avionics professionals, and selected base contributions, breadth of application and scope of Return On Investment. Reengineering elements (including design and development, prototypes, platfor program management and associated logistics elements (including technical equipment, provisioning, and training). Analysis shows under this program sustainment and procurement cost avoidances in excess of \$275M in cost for through 2017.	enting life-cycle cost reduction burces for next year application to cal readiness issues (significant ag to support mission requirement), ests). Resources enable design ent to meet readiness goals, meet are submitted via a rigorous d upon urgency, warfighting esources cover non-recurring form integration, test and evaluation), all data preparation, support between 2006 and 2017 has enabled						
Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters).	<b>FY 2018 Plans:</b> Address current fleet problem avionics systems (top readiness degraders, c sustainability, capability loss, fleet head-hurters).	ost drivers, obsolescence-driven						
FY 2019 OCO Plans:	<b>FY 2019 Base Plans:</b> Address current fleet problem avionics systems (top readiness degraders, c sustainability, capability loss, fleet head-hurters).	ost drivers, obsolescence-driven						
	FY 2019 OCO Plans:							

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propriation/Budget Activity 19 / 5  R-1 Program Element (Number/Name) PE 0605217N / (U)Common Avionics 0572 / JT S				
Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  FY 2017 FY 2018  FY 2018  FY 2018  FY 2017 FY 2018  FY 2018  FY 2018  FY 2017 FY 2018  FY 2018  FY 2018  FY 2019 Increase/Decrease Statement:  The second of the Avcile Projects.  Articles:  Art	Date: Febru	: February 2018		
A 2018 to FY 2019 Increase/Decrease Statement:  Trease between FY18 and FY19 is due to increase in Primary Hardware Development for AVCIP projects.  The Mid Air Collision Avoidance Capability (MCAC)  Articles:		(Number/Name) T Service/NV Std Avionics CP/SE		
Particles:  Table 1: Mid Air Collision Avoidance Capability (MCAC)  Articles:	FY 2019 018 Base		FY 2019 Total	
the: Mid Air Collision Avoidance Capability (MCAC)  Articles:  2.856  2.108  Articles:  -  2.856  2.108  Articles:  -  Articles:  -  Articles:  -  Articles:  -  Articles:  -  Articles:  -  2.856  2.108  Articles:  -  -  -  Articles:  -  -  -  Articles:  -  -  -  2.856  2.108  Articles:  -  -  -  -  -  -  -  -  -  -  -  -  -				
**Secription:* This program will conduct research, studies, and development, integration, demonstration, test and aluation orts to meet Naval Aviation Mid Air Collision Avoidance Capability (MCAC) requirements. These requirements an all operational modes and operational environments, to include Degraded Visual Environment. Perform CAC) platform integration studies and activities to determine technical and cost effective solutions across evelop simulation models for use at Manned Flight Simulator (MFS) or other simulation environments as equired for platform tailoring, including procurement of test article hardware. Evaluate aircraft simulation models suitability in MCAC development effort. Develop MCAC solutions utilizing simulation environments as real-tee hardware and pilot in the loop tools. Develop and evaluate interfaces necessary for integration of MCAC thin platform host environment.  **Total Plans:** Implete documentation/efforts to support the program re-phase and commencement of an Analysis of ernatives (AoA) in FY19. Initiate MBSE methodology implementation for capturing systems requirements de degin Phase II Risk Reduction Prototyping to evaluate MCAC algorithm and software. Initiate the DoDAF velopment.  **Total Blase Plans:** Immencement of AoA. Continue MBSE methodology implementation for capturing systems requirements sed on initial AoA guidance/findings. Continue Phase II Risk Reduction Prototyping to evaluate MCAC porithm and software. Continue collaboration with other engineering competencies and platform PMAs to pitalize on existing development of related capabilities for potential adoption.  **Total OCO Plans:** A				
aluation orts to meet Naval Aviation Mid Air Collision Avoidance Capability (MCAC) requirements. These requirements an all operational modes and operational environments, to include Degraded Visual Environment. Perform CAC) platform integration studies and activities to determine technical and cost effective solutions across aval Aviation. Develop MCAC solutions tailored to platform performance and range of military operations. Evelop simulation models for use at Manned Flight Simulator (MFS) or other simulation environments as puired for platform tailoring, including procurement of test article hardware. Evaluate aircraft simulation models a suitability in MCAC development effort. Develop MCAC solutions utilizing simulation environments as real- tech hardware and pilot in the loop tools. Develop and evaluate interfaces necessary for integration of MCAC thin platform host environment.  Y 2018 Plans: Implete documentation/efforts to support the program re-phase and commencement of an Analysis of ternatives (AoA) in FY19. Initiate MBSE methodology implementation for capturing systems requirements d begin Phase II Risk Reduction Prototyping to evaluate MCAC algorithm and software. Initiate the DoDAF velopment.  Y 2019 Base Plans: Initiate AoA, Continue MBSE methodology implementation for capturing systems requirements used on initial AoA guidance/findings. Continue Phase II Risk Reduction Prototyping to evaluate MCAC porithm and software. Continue collaboration with other engineering competencies and platform PMAs to pitalize on existing development of related capabilities for potential adoption.  Y 2019 OCO Plans: A	108 3.500	3.500 0.000	3.500	
omplete documentation/efforts to support the program re-phase and commencement of an Analysis of the traditives (AoA) in FY19. Initiate MBSE methodology implementation for capturing systems requirements do begin Phase II Risk Reduction Prototyping to evaluate MCAC algorithm and software. Initiate the DoDAF velopment.  Y 2019 Base Plans:  Tommencement of AoA. Continue MBSE methodology implementation for capturing systems requirements seed on initial AoA guidance/findings. Continue Phase II Risk Reduction Prototyping to evaluate MCAC gorithm and software. Continue collaboration with other engineering competencies and platform PMAs to pitalize on existing development of related capabilities for potential adoption.  Y 2019 OCO Plans:  A				
ommencement of AoA. Continue MBSE methodology implementation for capturing systems requirements sed on initial AoA guidance/findings. Continue Phase II Risk Reduction Prototyping to evaluate MCAC gorithm and software. Continue collaboration with other engineering competencies and platform PMAs to pitalize on existing development of related capabilities for potential adoption.  7 2019 OCO Plans:  A				
A				
2018 to FY 2019 Increase/Decrease Statement:				

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0.	TOLAGOII ILD							
Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: Febr	uary 2018			
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/ PE 0605217N / (U)Common Aviol			t (Number/Name) JT Service/NV Std Avionics CP/SB				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities	in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total		
Increase between FY18 and FY19 is due to the initiation and execution of the capitalize on existing development of related capabilities for potential adoption	•							
Title: Avionics Architectures Team (AAT)	Articles:	13.539 -	14.200	13.185 -	0.000	13.18		
Description: The Avionics Architectures Team (AAT) provides hardware and and product line development and management for common HW/SW operating testable open architecture requirements in accordance with National Defense 801 Open Architecture language, DoD Directive 5000.1, N6/N7 Naval Open A 9010, Ser. N6N7/5U916276, and SECNAVINST 5000.2E. The Future Airborn Technical Standard is developed through Navy, Army, Air Force, Industry and accordance with Public Law 104-113. The Hardware Open Systems Technological developed through government and academia collaboration and will be provide efforts. The Functional Architecture for Strategic Reuse (FASTR) initiative will mission level capability decomposition to support product line development are Subject Matter Experts to define and architect a set of Open Architecture Star principles and guidance, development and integration tools, acquisition strategestimates. The results will enable Department of Defense (DoD) weapons systopen, modular and reconfigurable software architectures, reuse HW/SW and interoperable war fighting capabilities at a faster rate, reducing redundant development integration. Infrastructure components and frameworks built to these standar Navigation Surveillance/Air Traffic Management (CNS/ATM) capability upgrade enabling integration of common, non-proprietary applications. The AAT initiativole as Lead Systems Integrator, per the Weapons System Acquisition Reform effectively manage data rights for reuse across the DoD.	ag environments to establish Authorization Act (NDAA) Section rehitecture Requirements Letter e Capability Environment (FACE) Academia collaboration in agies (HOST) standard is being ed to industry for prototyping define a standard process for ad management. The AAT provides adards and product lines, design gy, contracting guidance and cost tems to systematically procure deliver scalable, portable and elopment costs and increasing ds will support Communication les on various platforms by wes enable the government's							

### FY 2018 Plans:

Navy

Provide development support, mission based engineering, systems engineering and program management for design and acquisition strategy implementation guidance. Generate revisions for future editions of the FACE Technical Standard based on issues identified by government and industry consortium and develop corresponding conformance tools. Research new hardware technologies and develop Tier 2 Hardware Open Systems Technologies (HOST) specifications to support widely adopted commercial technologies and platform requirements. Provide input to platforms developing Tier 3 HOST specifications. Assist platforms with strategies for modular functional architectures and implementation of FACE and HOST standards. Participate

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Exhibit R-2A, RDT&E Project Jus	stification: PB	2019 Navy							Date: Feb	ruary 2018	
Appropriation/Budget Activity 1319 / 5						<b>nent (Numb</b> e) Common Av			lumber/Nar Service/NV		s CP/SB
B. Accomplishments/Planned Pr	ograms (\$ in N	/lillions, Art	icle Quantit	ties in Each	)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
in international collaboration efforts strategies for a comprehensive oper implementation of Naval Aviation's integration and competitive source and HOST initiatives.	en architecture data model str	approach be ategy. Provi	etween Navy de subject M	/, Army and A latter Expert	Air Force. S support for	upport the platform	R				
Provide development support, miss for design and acquisition strategy the FACE Technical Standard base develop corresponding conformant specifications to support widely add to platforms developing Tier 3 HOS architectures and implementation to define comprehensive open architecture approach between Na model strategy. Provide subject Ma Academia prototyping and demonst	implementation and on issues idea on issues idea tools. Research to the commerce of FACE and Health and Army an	n guidance. entified by g irch new har sial technolo is. Assist pla OST standar gy. Generat ir Force. Su oport for plat	Generate re overnment a dware techniques and pla atforms with a rds. Participate alignment pport the imform integra	visions for fund industry and industry and industry and industry are strategies for ate in internation and complementation and complement ion and complement in industry and complement in industry and complement in industry in industry and industry in industry industry in industry i	ture editions consortium a develop Tie ements. Proving modular functional collabor a comprehe of Naval Appetitive sou	s of and r 2 HOST ride input nctional oration effort ensive open viation's data					
FY 2019 OCO Plans: N/A											
FY 2018 to FY 2019 Increase/Dec Decrease between FY18 and FY19 Development for prototyping efforts	is due to the s		stems Engir	neering to Pri	mary Hardv	are					
			Accomplis	hments/Pla	nned Progra	ıms Subtota	42.711	53.512	51.486	0.000	51.486
C. Other Program Funding Sumn	nary (\$ in Milli	ons)									
Line Item • APN/0577: Common Avionics Changes Remarks	<b>FY 2017</b> 144.838	FY 2018 123.507	FY 2019 Base 117.551	FY 2019 OCO -	FY 2019 Total 117.551	<b>FY 2020</b> 83.544	<b>FY 2021</b> 91.236	<b>FY 2022</b> 105.177	<b>FY 2023</b> 129.379	Cost To Complete 562.115	<u>Total Cos</u> 3,817.99 <sup>4</sup>

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605217N I (U)Common Avionics	Project (Number/Name) 0572 / JT Service/NV Std Avionics CP/SB
	· · · · · · · · · · · · · · · · · · ·	•

### D. Acquisition Strategy

Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) program is a system of systems. The program will encompass the integration of various systems which will be procured utilizing existing contracts for integration on forward-fit and retrofit platforms to provide CNS/ATM functionality. Tactical Communications (TACCOM) is utilizing a firm fixed price contract to Rockwell Collins for research and development of the ARC-210 Gen 5/6 and other Navy contract vehicles for integration studies. The Navy will integrate systems and components to satisfy platform requirements to achieve tactical communication capability as determined by analyses. Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) Software Modules will be developed by a Government Software Product Team in collaboration with Industry where required. Avionics Component Improvement Program (AvCIP) will annually review, compete and select candidate component improvement proposals according to urgency, criticality of warfighting contributions, technical risk, breadth of application, and scope of Return On Investment (ROI). Projects are selected by a panel of Avionics management experts, including representatives from OPNAV N98, NAVAIR, NAVICP, and the Fleet. Projects are executed by managers in platform or commodity offices that own the component. The AvCIP program management team manages project selection, allocates funds, monitors multiple project executions against proposed spend plans, and tracks solution performance and achievement of projected ROIs over time using Fleet maintenance and component performance databases. Cost avoidances are coordinated with OPNAV N98 to balance Flying Hour Program costs. Component improvement solutions include modular hardware, software and material upgrades. Resources cover engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Mid Air Collision Avoidance Capability (MCAC) is the capability umbrella which encompasses all systems designed and developed which aid in air-to-air collision avoidance. Systems include but are not limited to Traffic Collision Avoidance Systems and Mid Air Collision Avoidance Systems. MCAC Software Modules will be developed by a Government Software Product Team in collaboration with Industry where required. Avionics Architectures Team (AAT) will provide acquisition strategy guidance and support to platforms implementing open systems architectures to address open architecture requirements.

#### **E. Performance Metrics**

Joint Services Review Committee for Avionics (JSRC-AS) - Provide leadership in support of the Navy's interest to the JSRC tri-service committee promoting commonality and joint programs with focus on interoperability, communications, Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), Joint Services avionics obsolescence

management and the update of the Core Avionics Master Plan. Support and participate in Naval Aviation Requirements Group panels, Operational Advisory Group, and Human Factors Quality Management Board.

Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) - Successfully complete platform integration, test, and certifications.

Tactical Communications (TACCOM) - Achieve Joint Interoperability Test Command and National Security Agency certifications on system developmental efforts to meet operational requirements.

Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) - Develop algorithm and software to meet platform specific requirements, successfully complete flight test, and deliver product on schedule. Successfully complete Milestone C, and Fleet Release.

Collaborative Warfare (CW) - Identify collaborative warfighting capability gaps and ensure the development of the most intelligent, cost effective, and timely solutions to fill those gaps.

Avionics Component Improvement Program (AvCIP) - Successful project competition and selection, execution of allocated funds, fielding of solutions, and documentation of component performance enhancement and benefits.

Mid Air Collision Avoidance Capability (MCAC) - Achieve program acquisition milestones on cost and schedule meeting platform requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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Avionics Architectures Team (AAT) - Provide leadership in support of the Navy in technical and business working groups within the FACE Consortium to foste Successfully functionally decompose, prototype and demonstrate FACE conforms specifications for Hardware Open System Technologies (HOST). Prototype and	r solutions that promote interoperable and integrated mant applications and FACE compatible operating en	warfighting capability for all services.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy

Appropriation/Budget Activity

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R-1 Program Element (Number/Name)
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PE 0605217N / (U)Common Avionics
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Product Developmen	nt (\$ in M	illions)		FY 2	2017	FY :	2018	FY 2 Ba	2019 ise	FY 2		FY 2019 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	Total Cost	Target Value of Contract
Primary Hardware Dev CNS/ATM	SS/CPFF	Sikorsky : Stratford, CT	0.000	0.000		1.750	Dec 2017	0.000		-		0.000	0.000	1.750	1.750
Primary Hardware Dev	Various	Various : Various	0.000	2.999	Mar 2017	3.841	Jan 2018	5.504	Jan 2019	-		5.504	Continuing	Continuing	Continuing
Primary Hardware Dev GPWS/TAWS II	WR	NAWCAD : Patuxent River, MD	0.000	0.000	Jan 2017	1.359	Oct 2017	1.630	Dec 2018	-		1.630	Continuing	Continuing	Continuin
Aircraft Integration TACCOM	SS/FFP	Rockwell Collins : Cedar Rapids, IA	0.000	6.080	Nov 2016	8.453	May 2018	11.724	Jan 2019	-		11.724	0.000	26.257	26.257
Aircraft Integration GPWS/ TAWS II	SS/CPIF	Lockheed Martin : Owego, NY	0.000	0.000		2.936	Dec 2017	1.764	Dec 2018	-		1.764	0.000	4.700	4.700
Aircraft IntegrationTACCOM	C/CPFF	Rockwell Collins : Cedar Rapids, IA	0.000	4.291	Aug 2017	3.000	Nov 2017	0.000		-		0.000	0.000	7.291	7.291
Aircraft Integration	Various	Various : Various	0.000	0.159	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering AAT	MIPR	DTIC : Fort Belvior, VA	0.000	7.027	Jan 2017	7.144	Jan 2018	4.895	Jan 2019	-		4.895	Continuing	Continuing	Continuin
Systems Engineering TACCOM	WR	NAWCAD : Patuxent River, MD	0.000	2.083	Dec 2016	1.091	Dec 2017	1.022	Nov 2018	-		1.022	Continuing	Continuing	Continuin
Systems Engineering	Various	Various : Various	0.000	3.339	Mar 2017	2.802	Jan 2018	2.730	Dec 2018	-		2.730	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	0.000	0.100	Dec 2016	2.372	Dec 2017	2.215	Nov 2018	-		2.215	Continuing	Continuing	Continuin
Systems Engineering MCAC	WR	NAWCAD : Patuxent River, MD	0.000	1.396	Dec 2016	0.000		1.191	Dec 2018	-		1.191	Continuing	Continuing	Continuin
	•	Subtotal	0.000	27.474		34.748		32.675		-		32.675	Continuing	Continuing	N/A

Support (\$ in Millions	s)			FY 2	2017	FY 2	2018	FY 2 Ba	2019 ise	FY 2	2019 CO	FY 2019 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	Total Cost	Target Value of Contract
Software Development TACCOM	SS/FFP	Rockwell : Cedar Rapids, IA	0.000	0.000		3.009	Mar 2018	3.021	Mar 2019	-		3.021	0.000	6.030	6.030
Integrated Logistics Support	WR	NAWCAD : Patuxent River, MD	0.000	0.578	Mar 2017	1.188	Nov 2017	1.041	Nov 2018	-		1.041	Continuing	Continuing	Continuing
Software Development	Various	Various : Various	0.000	0.687	Nov 2016	0.000		0.000		-		0.000	0.000	0.687	-

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Exhibit R-3, RDT&E	Project C	ost Analysis: PB 2	019 Navy	'								Date:	February	2018	
Appropriation/Budge 1319 / 5	et Activity	<i>'</i>							umber/Na on Avionic			(Number T Service	r/ <b>Name)</b> e/NV Std A	Avionics (	CP/SB
Support (\$ in Million	s)			FY 2	017	FY 2	2018	FY 2 Ba		FY 2		FY 2019 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
<u> </u>		Subtotal	0.000	1.265		4.197		4.062		-		4.062	Continuing	Continuing	N/A
Test and Evaluation	(\$ in Milli	ions)		FY 2	017	FY 2	2018	FY 2 Ba		FY 2	2019 CO	FY 2019 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 and Evaluation	Various	Various : Various	0.000	1.519	Mar 2017	0.000		0.221	Mar 2019	-		0.221	Continuing	Continuing	Continuing
Developmental Test and Evaluation	WR	NAWCAD : Patuxent River, MD	0.000	1.429	Mar 2017	1.293	Nov 2017	1.775	Nov 2018	-		1.775	Continuing	Continuing	Continuing
		Subtotal	0.000	2.948		1.293		1.996		-		1.996	Continuing	Continuing	N/A
Management Service	es (\$ in M	lillions)		FY 2	017	FY 2	2018	FY 2		FY 2		FY 2019 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	Total Cost	Target Value of Contract
									Jan 2019	_			· ·	Continuing	
Contractor Engineering Support	Various	Various : Various	0.000	3.801	Apr 2017	3.311	Jan 2018	2.879	Jan 2013	_		2.075	Continuing		
	Various  C/CPFF	Various : Various  Precise : Lexington Park, MD	0.000		Apr 2017 Dec 2016		Jan 2018 Dec 2017		Dec 2018	-		1.812	0.000	4.878	4.958
Support  Contactor Engineering		Precise : Lexington		1.329		1.737		1.812						4.878 5.447	4.958 5.739
Support Contactor Engineering Support TACCOM Contractor Engineering	C/CPFF	Precise : Lexington Park, MD Precise : Lexington	0.000	1.329	Dec 2016	1.737	Dec 2017	1.812	Dec 2018	-		1.812	0.000	5.447	5.739
Support  Contactor Engineering Support TACCOM  Contractor Engineering Support AAT  Government Engineering	C/CPFF	Precise : Lexington Park, MD  Precise : Lexington Park, MD  NAWCAD : Patuxent	0.000	1.329 1.533 0.331	Dec 2016  Dec 2016	1.737 1.889 0.807	Dec 2017 Dec 2017	1.812 2.025 0.466	Dec 2018  Dec 2018	-		1.812	0.000	5.447	5.739
Support  Contactor Engineering Support TACCOM  Contractor Engineering Support AAT  Government Engineering Support  Government Engineering	C/CPFF C/CPFF WR	Precise : Lexington Park, MD  Precise : Lexington Park, MD  NAWCAD : Patuxent River, MD  NAWCAD : Patuxent	0.000 0.000 0.000	1.329 1.533 0.331 1.776	Dec 2016  Dec 2016  Mar 2017	1.737 1.889 0.807 2.467	Dec 2017  Dec 2017  Nov 2017	1.812 2.025 0.466 2.641	Dec 2018  Dec 2018  Nov 2018	-		1.812 2.025 0.466 2.641	0.000 0.000 Continuing	5.447 Continuing 6.884	5.739 Continuing
Support  Contactor Engineering Support TACCOM  Contractor Engineering Support AAT  Government Engineering Support  Government Engineering Support AAT  Program Management	C/CPFF C/CPFF WR WR	Precise: Lexington Park, MD  Precise: Lexington Park, MD  NAWCAD: Patuxent River, MD  NAWCAD: Patuxent River, MD  NAWCAD: Patuxent River, MD	0.000 0.000 0.000 0.000	1.329 1.533 0.331 1.776 2.146	Dec 2016  Dec 2016  Mar 2017  Dec 2016	1.737 1.889 0.807 2.467	Dec 2017  Dec 2017  Nov 2017  Dec 2017  Nov 2017	1.812 2.025 0.466 2.641 2.844	Dec 2018  Dec 2018  Nov 2018  Dec 2018	-		1.812 2.025 0.466 2.641 2.844	0.000 0.000 Continuing 0.000	5.447 Continuing 6.884 Continuing	5.739 Continuing

PE 0605217N: *(U)Common Avionics* Navy

Date: February 2018 Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy

Appropriation/Budget Activity R-1 Program Element (Number/Name) Project (Number/Name)

1319 / 5 PE 0605217N I (U)Common Avionics 0572 I JT Service/NV Std Avionics CP/SB

Management Serv	ices (\$ in M	lillions)		FY 2	2017	FY	2018	FY 2 Ba		FY 2	2019 CO	FY 2019 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
		Subtotal	0.000	11.024		13.274		12.753		-		12.753	Continuing	Continuing	N/A

#### Remarks

CES - TAWS II is going through a software re-architecture to meet MLSTD 882-E Level I. TAWS II V-22 effort starting system safety functional hazard assessment in FY18.

	Prior Years	FY 201	7 FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	42.711	53.512	51.486	-	51.486	Continuing	Continuing	N/A

#### Remarks

(U) Common Avionics schedule FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

Exhibit R-4, RDT&E Schedule Prof	ile: l	PB 2	2019	Nav	'y																			Date	<b>e:</b> Fe	brua	ry 20	18
Appropriation/Budget Activity 1319 / 5																	umb on A			<del>!</del> )					er/Na ce/N			onics (
COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MGMT (CNS/ATM)		FY 2	2017			FY 2	2018			FY 2	2019			FY 2	2020			FY:	2021			FY:	2022			FY	2023	
	1Q	2Q	ЗQ	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	ЗQ	4Q	1Q	2Q	3Q	4Q
Acquisition Milestones																								<u> </u>				
Systems Development																												
						Ev	alua	ite Al	DS-E	3O te	chno	ologi	es/de	evelo	p sol	ution	s to	supp	ort pl	latfor	m int	egra	tions	:				
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				Dev	elop	CNS	S/AT	МС	mm	on C	omp	oner	nt to :	supp	ort R	NP F	RNA	/ dev	elop	ment	tal pla	atforr	n rec	quire	ment	s		
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Test and Evaluation																								l	1			Ιļ
								CN	IS/A	TM te	echn	olog	ies/c	ertific	atior	n of c	devel	opme	ental	platf	orms							
Integration/Certification of 8.33 kHz, MODE S, Reduced Vertical Separation Minimums (RVSM), RNP/RNAV, and ADS-B (Out)								СН-	53K																			
Production Milestones																												
Deliveries																												
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Appropriation/Budget Activity 319 / 5														ent ( Comi										er/Na e/NV			onics	CP/S
TACTICAL COMMUNICATIONS (TACCOM)			2017			<b>/</b> 201			Y 20					2020				2021				2022				2023		
Acquisition Milestones	1Q	2Q	3Q	4Q 1	Q 20	30	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Systems Development	+-	╢		$\dashv$	+	┤─	┤─		╂╌╏	$\dashv$		$\vdash \vdash$			$\vdash$		$\vdash$	<del> </del>			$\dashv$		$\vdash$		$\vdash$		┤┤┤	
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	Оре	erati	ional F Integ			s/w																						
				Cry	pto E	ngine	Integ	ration					MIL S	tanda	ard E	volut	tion	(VMF	)		İ							
				Tac	tical A	nti-J	am (S	aturn)				İΙ								İİ	j		İΪ		İ		İΪ	
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Test and Evaluation	+-	╁		H		$\neg$	]																				$\sqcap$	
			JITC Cert ▼		NS. Ce	rt	JITC Cert ▼				NSA Cert		JITC Cert ▼			NSA Cert ▼		JITC Cert ▼				NSA Cert				NSA Cert ▼		
Production Milestones		-	]		-	-	-	<u> </u>	$\frac{1}{1}$	$\dashv$					Н			<u> </u>			$\dashv$						$\left\  \cdot \right\ $	
	OFP S/W							MUOS S/W ▼						OFP S/W ▼										OFP S/W ▼				
Deliveries	$\dagger$	╁		$\dashv$	+	_			┧─┤	$\dashv$		$\Box$			H		$\vdash$	-			$\dashv$		H		┧		-	
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Exhibit R-4, RDT&E Schedule Prof	file:	: PB	3 20°	19 Na	avy																	Dat	e: Fe	ebru	ary	2018	3
Appropriation/Budget Activity 1319 / 5															(Number nmon Avio								er/N ice/N			vion	ics CP/SB
GROUND PROXIMITY WARNING SYSTEM/TERRAIN AWARENESS WARNING SYSTEM (GPWS/TAWS)		FY	201	7	F	Y 20	18			FY 2	019			F	Y 2020		F	Y 20	021		FY	202	22		FY 2	023	
	1Q	2Q	3 G	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q   40	Q 10	Q   20	3   3C	4Q	1Q	2Q	3Q	4Q
Acquisition Milestones														ļ				ļ	ļ	-	ļ	ļ					
Milestones							H-60 TAWS II MS C			H-60 TAWS II IOC					V-22 Integration Contract												
Systems Development	╁	╁	╁─	╁	l	╁	i	╁─	╁		i—		i—i	一		╁		╁		╁	╁	┪╴	╁	╁	i <del>i</del>		⊣
	l	Sof	TAW twar lopm	е																							
	l		1		TAWS II	Soft	ware R	e-A	rchit	ecture				V-2	22 TAWS I	ISΛ	N D∈	ev									
					V-22 Integration Study (Contract Award)																						
Test and Evaluation	i	İΤ	i	i		i	i	i	i		i		it	寸		m	٦.	寸	┪	┪	┪	i–	┪	İ	i	T	Ti .
Developmental Testing	  -	- H-60	(TA)	WS II and	DT (Phase II)	e I								ĺ				ĺ	_	_		· /-22	TAW	s II	DT		_
Production Milestones													<u>                                     </u>	Ţ				Ţ	Tj_			$\neg$					
Deliveries																						]					

2019DON - 0605217N - 0572

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19 <i>l</i> 5											2E 0	605	21/1	1/(	U)C	ommo	on A	vioni	cs		05	721	JI S	ervic	:e/IV	v Sta	d Avid	onics															
COLLABORATIVE WARFARE		FY	2017	,		FY 2	2018			FY 2	019			FY 2	2020			FY 2	2021			FY:	2022	:		FY	2023																
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q															
cquisition Milestones																																											
							Na	aval A	viati	on N	ette	d Se	nsor	s an	d Ma	ritim	e Tai	rgetir	ng Ex	perin	nenta	ation																					
	CONOPS, Standards and Architectures/Requirements Development																																										
CONOPS, Standards and Architectures/Requirements Development  Naval Aviation and Maritime Targeting Requirements  Systems Development																																											
															Systems Development																												
																				Ι,	Cana	bility	for th	e Co	omm	on F	Padir.	Ent	anc	eme	nt												
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Test and Evaluation		<u> </u>	<u> </u>	<u> </u>	<u> </u>				_	_							ļ	<u> </u>	ļ			<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>																
Production Milestones	_ _		<u> </u>	<u> </u>	<u> </u>	<u> </u>			_		[													<u> </u>	<u> </u>	<u> </u>	<u> </u>																
Deliveries																																											
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appropriation/Budget Activity 319 / 5																		vioni		)		oject 72 / J						nics	CP/SE
AVIONICS COMPONENT IMPROVEMENT PROGRAM (AVCIP)		FY 2	2017			FY 2	Y 2018 FY			FY 2	2019 FY 2020				FY 2021		2021		FY 20		FY 2022				FY:	2023			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Acquisition Milestones																													
Funding Allocation	▼				▼				•				•				•				▼				•				
Proposal Collection			-						_		-																-		
Proposal Evaluation		•		İ		•				•				•				•				•				•			
Proposal Prioritization and Selection			•				•				•				•				•				•				•		
Contract Establishment & Execution Plan			_								_				_				_								_		
Systems Development				]																								П	
Test and Evaluation																													
Production Milestones																													
Deliveries																													

2019DON - 0605217N - 0572

Exhibit R-4, RDT&E Schedule Prof	ile:	PB 2	2019	9 Na	vy																	I	Date	e: Februar	y 20	18	
Appropriation/Budget Activity 1319 / 5											<b>R-1</b> PE (									Name) nics		roject (Nu 572 / JT S				onics	CP/SB
MID AIR COLLISION AVOIDANCE (MCAC)		FY:			J	Y 201			Y 20				2020			Y 20				FY	2022	2		FY 202	23		
Acquisition Milestones	1Q	10 20 30 40 10				2Q 30	4Q	1Q :	2Q 30	9 40	1Q	2Q	3Q	4Q	1Q   2	2Q   3	3Q   4	IQ	1Q	2Q	3Q	4Q	1Q	2Q RFP	3Q	4Q	
									Ana	llysis										Draft CDD		MDD/ASR ▲		Release Decision CDD Approved	ILA	MS B	
Systems Development			_						Alte	nau	ves	$\exists$			_	_	_	_		Submitted ▼				•	_		
	Ris for	velop k Re Prot Algor	educ toty;	tion		DoD Architectural Framework Development  Model Based Systems Engineering																					
	İ									Р	hase	2 R	Risk I	Red	uctic	n fo	r Pr	otot	ypi	ng of Algo	rithn	ns & SW					
Test and Evaluation			_			$\Box$	]_	$\Box$	$\Box$	ightharpoonup			$\Box$		$\Box$	$\Box$	$\blacksquare$	7	$\Box$								
Production Milestones  Deliveries			   	   		-				-							+										
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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018		
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1319 / 5	PE 0605217N I (U)Common Avionics	0572 <i>I JT S</i>	Service/NV Std Avionics CP/SB

# Schedule Details

	Sta	art	End		
Events by Sub Project	Quarter	Year	Quarter	Year	
COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MGMT (CNS/ATM)					
Systems Development: Evaluate ADS-B (Out) technologies/develop solutions to support platform integrations	1	2017	4	2023	
Systems Development: Develop CNS/ATM Common Component to support RNP RNAV developmental platform requirements	1	2017	4	2023	
Test and Evaluation: CNS/ATM technologies/certification of developmental platforms	1	2017	4	2023	
Test and Evaluation: Integration/Certification of 8.33 kHz, MODE S, Reduced Vertical Separation Minimums (RVSM), RNP/RNAV, and ADS-B (Out): for CH-53K	1	2018	4	2019	
TACTICAL COMMUNICATIONS (TACCOM)					
Systems Development: GEN5 Integrated Waveform Satellite Communications (SATCOM) S/W Development	1	2017	2	2019	
Systems Development: Operational Flight Plan	1	2017	3	2018	
Systems Development: Crypto Engine Integration	1	2017	4	2019	
Systems Development: MIL Standard Evolution (VMF)	1	2020	4	2021	
Systems Development: Tactical Anti-Jam (Saturn)	1	2017	4	2019	
Systems Development: Transmission Security (TRANSEC) & Crypto Modernization w/ Tactical Secure Voice (TSV) Suite B	1	2018	4	2023	
Test and Evaluation: NSA Cert 1	1	2021	1	2021	
Test and Evaluation: JITC Cert 1	3	2017	3	2017	
Test and Evaluation: NSA Cert 2	2	2018	2	2018	
Test and Evaluation: JITC Cert 2	4	2018	4	2018	
Test and Evaluation: NSA Cert 3	4	2019	4	2019	
Test and Evaluation: JITC Cert 3	2	2020	2	2020	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy

Appropriation/Budget Activity

1319 / 5

R-1 Program Element (Number/Name)
PE 0605217N / (U)Common Avionics

PE 0605217N / (U)Common Avionics

Date: February 2018

R-1 Program Element (Number/Name)
0572 / JT Service/NV Std Avionics CP/SB

	Sta	art	End		
Events by Sub Project	Quarter	Year	Quarter	Year	
Test and Evaluation: JITC Cert 4	3	2021	3	2021	
Test and Evaluation: NSA Cert 4	3	2022	3	2022	
Test and Evaluation: NSA Cert 5	3	2023	3	2023	
Production Milestones: OFP S/W 1	1	2017	1	2017	
Production Milestones: MUOS S/W	1	2019	1	2019	
Production Milestones: OFP S/W 2	3	2020	3	2020	
Production Milestones: OFP S/W 3	1	2023	1	2023	
GROUND PROXIMITY WARNING SYSTEM/TERRAIN AWARENESS WARN SYSTEM (GPWS/TAWS)	IING				
Acquisition Milestones: Milestones: H-60 TAWS II MS C	3	2018	3	2018	
Acquisition Milestones: Milestones: H-60 TAWS II IOC	2	2019	2	2019	
Acquisition Milestones: Milestones: V-22 Integration Contract	3	2020	3	2020	
Systems Development: H-60 TAWS II Software Development	1	2017	4	2017	
Systems Development: V-22 TAWS II Requirements Development	2	2019	4	2019	
Systems Development: TAWS II Software Re-Architecture	1	2018	2	2019	
Systems Development: V-22 TAWS II Software Development	1	2020	3	2021	
Systems Development: V-22 CFIT Integration Study	1	2018	1	2018	
Test and Evaluation: Developmental Testing: H-60 TAWS II DT (Phase I and	d II) 1	2017	2	2018	
Test and Evaluation: Developmental Testing: V-22 TAWS II DT	4	2021	4	2023	
COLLABORATIVE WARFARE					
Acquisition Milestones: Naval Aviation Netted Sensors and Maritime Targeti Experimentation	ng 1	2017	4	2023	
Acquisition Milestones: Netted Sensors CONOPS, Standards and Architectu Requirements Development	ıres/ 1	2017	4	2023	
Acquisition Milestones: Naval Aviation and Maritime Targeting Requirement	s 1	2017	4	2023	
Systems Development: Capability for the Common Radio Enhancement (Co	RE) 1	2018	4	2020	

PE 0605217N: *(U)Common Avionics* Navy

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018			
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	Number/Name)		
1319 / 5	PE 0605217N I (U)Common Avionics	0572 <i>I JT</i> 3	Service/NV Std Avionics CP/SB		

	Sta	art	End		
Events by Sub Project	Quarter	Year	Quarter	Year	
Acquisition Milestones: Funding Allocation: Funding Allocation1	1	2017	1	2017	
Acquisition Milestones: Funding Allocation: Funding Allocation2	1	2018	1	2018	
Acquisition Milestones: Funding Allocation: Funding Allocation3	1	2019	1	2019	
Acquisition Milestones: Funding Allocation: Funding Allocation4	1	2020	1	2020	
Acquisition Milestones: Funding Allocation: Funding Allocation5	1	2021	1	2021	
Acquisition Milestones: Funding Allocation: Funding Allocation6	1	2022	1	2022	
Acquisition Milestones: Funding Allocation: Funding Allocation7	1	2023	1	2023	
Acquisition Milestones: Proposal Collection: Proposal Collection1	1	2017	2	2017	
Acquisition Milestones: Proposal Collection: Proposal Collection2	1	2018	2	2018	
Acquisition Milestones: Proposal Collection: Proposal Collection3	1	2019	2	2019	
Acquisition Milestones: Proposal Collection: Proposal Collection4	1	2020	2	2020	
Acquisition Milestones: Proposal Collection: Proposal Collection5	1	2021	2	2021	
Acquisition Milestones: Proposal Collection: Proposal Collection6	1	2022	2	2022	
Acquisition Milestones: Proposal Collection: Proposal Collection7	1	2023	2	2023	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation1	2	2017	2	2017	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation2	2	2018	2	2018	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation3	2	2019	2	2019	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation4	2	2020	2	2020	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation5	2	2021	2	2021	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation6	2	2022	2	2022	
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation7	2	2023	2	2023	
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection1	3	2017	3	2017	
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection2	3	2018	3	2018	
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection3	3	2019	3	2019	

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy

Appropriation/Budget Activity
1319 / 5

R-1 Program Element (Number/Name)
PE 0605217N / (U)Common Avionics
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	Sta	art	Eı	nd
Events by Sub Project	Quarter	Year	Quarter	Year
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection4	3	2020	3	2020
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection5	3	2021	3	2021
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection6	3	2022	3	2022
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection7	3	2023	3	2023
Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan1	3	2017	4	2017
Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan2	3	2018	4	2018
Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan3	3	2019	4	2019
Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan4	3	2020	4	2020
Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan5	3	2021	4	2021
Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan6	3	2022	4	2022
Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan7	3	2023	4	2023
MID AIR COLLISION AVOIDANCE (MCAC)			1	
Acquisition Milestones: MDD/ASR	4	2022	4	2022
Acquisition Milestones: RFP Release Decision	2	2023	2	2023
Acquisition Milestones: CDD Approved	2	2023	2	2023
Acquisition Milestones: Integrated Logistics Assessment	3	2023	3	2023
Acquisition Milestones: MS B	4	2023	4	2023
Acquisition Milestones: Draft CDD Submitted	2	2022	2	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy	Date: February 2018		
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (N	umber/Name)
1319 / 5	PE 0605217N I (U)Common Avionics	0572 I JT S	Service/NV Std Avionics CP/SB

	St	art	End		
Events by Sub Project	Quarter	Year	Quarter	Year	
Acquisition Milestones: Analysis of Alternatives	1	2019	2	2020	
Systems Development: Spec Development & Risk Reduction for Prototyping of Algorithms & SW	1	2017	4	2017	
Systems Development: DoD Architectural Framework Development	1	2018	2	2023	
Systems Development: Model Based Systems Engineering	1	2018	4	2023	
Systems Development: Phase 2 Risk Reduction for Prototyping of Algorithms & SW	1	2018	4	2023	

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy												
Appropriation/Budget Activity 1319 / 5		_		t (Number/ mmon Avior	, ,	<b>Number/Name)</b> gital Warfare						
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3425: Digital Warfare	0.000	0.000	4.651	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.651
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

### A. Mission Description and Budget Item Justification

Assessed States and Alberta de Branca de Constitución de Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución Constitución

The Chief of Naval Operations concurred with the Task Force Netted Navy recommendation to stand up the Digital Warfare (DW) project to set requirements, prioritize resources, and lead efforts on information interoperability and human/machine teaming.

NAVAIR, NAVSEA, SPAWAR, associated Program Executive Offices, warfare and system centers and University Affiliated Research Centers/Federally Funded Research and Development Centers will support the Model Based Engineering, Technical Design, and Requirements branches in the new Digital Warfare effort under OPNAV N2N6. In order to develop capability from the top down, the Digital Warfare will develop requirements for the system of systems to include all of the associated interoperability requirements. Due to the complexity of this work, Digital Warfare will evolve the traditional requirements development methodology to a model based systems engineering environment that will include associated model extensions, reports, views, configuration management, help desk support, and documentation. This work will be completed by a series of teams, each focused on a separate threat domain, and made up of system modelers, fleet representatives, program of record representatives, architecture and interoperability experts, etc. The products generated by these teams will include data technical baselines for domain areas with individual profiles for each program of record, coordinated requirements recommendations, and potential areas for S&T and experimentation to fill gaps. Digital Warfare will also explore emerging digital technologies including human/machine teaming.

Each SYSCOM will be involved in creating Data Technical Baseline (DTB) profiles specific for each program of record. DTBs may consist of interfaces, protocols, content, information quality, architectural aspects, and knowledge base frameworks. SYSCOMs will exercise technical authority to assess Program of Record compliance to DTBs and Key Performance Parameters in support of gate reviews and system engineering technical reviews.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)			FY 2019	FY 2019	FY 2019
	FY 2017	FY 2018	Base	oco	Total
Title: DIGITAL WARFARE	0.000	4.651	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2018 Plans: Provide Subject Matter Expert (SME) support for the domain functional decomposition based on prioritized mission areas. Support the analytical agenda from OPNAV N81 and N9I for the specific mission area capabilities. Provide modeling and documentation support for Joint Capability Integration Development System (JCIDS), OPNAV Program Objective Memorandum (POM) process, and ASN (RD&A) Acquisition Process. Coordinate and work across the SYSCOMs and PEOs on the OPNAV Model Based Systems Engineering (MBSE) requirements allocation process.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018	
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1319 / 5 PE 000521	PE 0605217N I (U)Common Aviol					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Participate in the definition of MBSE tool functionality and views based on Echelon I stakehold Collaboratively develop tool extensions to complement JCIDS and POM processes. Supportross-SYSCOM Modeling Standards and Policies for Science and Technology and Program models in the modeling environment.	t development of					
Provide SME support for data science teams in data exploration and analysis, information a extraction techniques, and application to mission area data requirements.  Provide engineering inputs to and review Navy Integrated Capability Concepts for data arch consistencies. Explore Machine Learning techniques to support human/machine teaming for	itecture					
Develop an overarching Data Technical Baseline (DTB) and DTB profiles for Program of R SYSCOM cognizance. Assess PORs against their DTB profile during all Systems Engineeri events and gate reviews.						
Provide common infrastructure for MBSE and DTB environments, to include access manag management, and help desk support.	ement, configuration					
FY 2019 Base Plans: Digital Warfare efforts in FY19 and out have been consolidated and realigned into PE 0604	027N Digital Warfare.					
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:  Decrease from FY 2018 to FY 2019 reflects Digital Warfare standing up as a separate Prog Warfare efforts in FY19 and out have been consolidated and realigned into PE 0604027N D						
Accomplishments/Planned	Programs Subtotals	0.000	4.651	0.000	0.000	0.000

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

N/A

**Remarks** 

# D. Acquisition Strategy

Procurement strategy is determined by market survey and cooperative opportunities.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605217N I (U)Common Avionics	Project (Number/Name) 3425 / Digital Warfare
E. Performance Metrics	. ,	
Digital Warfare will set requirements, prioritize resources, and lead efforts or is trained in new systems engineering and modeling concepts and tools. It was model extensions, reports, views, and configuration management and in the interoperability.	will also result in development of a requirement	s modeling environment to include associated

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Exhibit R-3, RDT&E F		•	-														
Appropriation/Budget Activity 1319 / 5							ogram Ele 5217N / ((	•		•	Project (Number/Name) 3425 / Digital Warfare						
Support (\$ in Millions	rt (\$ in Millions)			FY 2	2017	1 1 2 2 3 3		=		FY 20 OC		FY 2019 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		
Digital Warfare Office Support	WR	Naval Air War : Patuxent River, MD	0.000	0.000		1.201	Oct 2017	0.000		-		0.000	0.000	1.201	-		
								1						'			
		Subtotal	0.000	0.000		1.201		0.000		-		0.000	0.000	1.201	N/A		
Management Service	s (\$ in M		0.000	0.000 FY 2		1.201 FY 2	2018	0.000 FY 2 Ba		FY 2	2019 CO	0.000 FY 2019 Total	0.000	1.201	N/A		
Management Service	Contract Method		0.000 Prior Years				2018 Award Date	FY 2		FY 2		FY 2019	Cost To	Total Cost	Target Value of		
	Contract	illions) Performing	Prior	FY 2	2017 Award	FY 2	Award	FY 2 Ba	se Award	FY 2	CO Award	FY 2019 Total	Cost To Complete	Total	Target Value of		
Cost Category Item	Contract Method & Type	illions)  Performing Activity & Location	Prior Years	FY 2	2017 Award	FY 2	Award Date Dec 2017	FY 2 Ba Cost	se Award	FY 2	CO Award	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract		
Cost Category Item	Contract Method & Type	Performing Activity & Location Various : Various	Prior Years 0.000	FY 2  Cost  0.000	2017 Award Date	FY 2  Cost  3.450	Award Date Dec 2017	FY 2 Ba Cost	Award Date	FY 2 OC Cost	Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost 3.450	Value of Contract		

Remarks

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Exhibit R-4, RDT&E Sched		le: P	PB 2	019	Nav	у																					2018	
Appropriation/Budget Activity 1319 / 5											R-1 Program Element (Number/Name) PE 0605217N I (U)Common Avionics									ļ	Project (Number/Name) 3425 / Digital Warfare							
Proj 3425 FY 2			FY 2017 FY 2018 FY						FY:	Y 2019 FY 2020						FY 2021				FY 2022				FY 2023				
		1Q	2Q	3Q	4Q	1Q	2Q 3	Q 4	Q 1Q	2Q	3Q	4Q	1Q	2Q 3	3Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	2 40	10	2 20	Q 3	Q 40	
	Support													D	igital	Offic	e Su	ppor	t									
2019PB - 0605217N - 3425																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018	
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1319 / 5	PE 0605217N I (U)Common Avionics	3425 I Digi	ital Warfare

# Schedule Details

	St	art	Eı	nd
Events by Sub Project	Quarter	Year	Quarter	Year
Proj 3425				
Support: DWO Support	1	2018	4	2023

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