Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0605414N *I Unmanned Carrier Aviation (UCA)*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	270.039	503.989	649.055	266.970	-	266.970	232.719	219.719	137.898	140.688	Continuing	Continuing
3278: *MQ-25 Air System (AS)*	270.039	446.638	590.925	215.614	-	215.614	186.989	185.596	120.882	123.324	Continuing	Continuing
3279: *Unmanned Carrier Aviation Mission Control System*	0.000	57.351	58.130	51.356	-	51.356	45.730	34.123	17.016	17.364	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** P462												

Note

PE 0605414N Unmanned Carrier Aviation (UCA) is comprised of two separated programs:
PU 3278 MQ-25 Development is directly related to the MQ-25 Air System (AS) development ACAT I Program.
PU 3279 UMCS is directly related to the Unmanned Carrier Aviation Mission Control System (UMCS) ACAT II program. UMCS develops the control station and integrates it with the MQ-25 AS along with multiple networks and systems both afloat and on shore.

MQ-25 PU 3278 execution is dependent upon the success of UMCS PU 3279 execution. This submission for PU 3278 has been coordinated with UMCS PU 3279.

The prime contractor for MQ-25 development declared a loss on the MQ-25 contract in Oct 2018 and thereby invoked Federal Acquisition Regulation clause 32.503-6(g). Per the loss contract clause, a loss ratio factor must be applied to all progress payments to protect the government by ensuring the amount of unliquidated progress payments does not exceed the fair value of undelivered work. The reduced progress payments will prevent the program from meeting expenditure benchmarks in the near years.

In January 2016, PE 0605414N PU 3278 was established as the principal budget line for MQ-25. In January 2018, PU 3279 was established for the Unmanned Carrier Aviation (UCA) Mission Control System (UMCS).

A. Mission Description and Budget Item Justification

The MQ-25 program, PU 3278, rapidly develops an unmanned capability to embark on Carrier Vessel, Nuclear (CVN) as part of the Carrier Air Wing (CVW) to conduct aerial refueling as a primary mission and provide Intelligence, Surveillance, Reconnaissance (ISR) capability for a secondary mission. MQ-25 extends CVW mission effectiveness range, partially mitigates the current Carrier Strike Group (CSG) organic ISR shortfall and fills the future CVW-tanker gap, mitigating Strike Fighter shortfall and preserving F/A-18E/F Fatigue Life Expenditure for its primary missions. As the first carrier-based, group 5 Unmanned Aircraft System (UAS), MQ-25 will pioneer the integration of manned and unmanned operations, utilize mature, complex sea-based Command, Control, Communications, Computers, and Intelligence (C4I) UAS technologies, and pave the way for future multifaceted multi-mission UAS to pace emerging threats.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605414N *I Unmanned Carrier Aviation (UCA)*

The MQ-25 system will enhance (CVN) capability and versatility for the Joint Forces Commander through the integration of a persistent, sea-based, multi-mission aerial refueling and reconnaissance UAS into the CVW. MQ-25 is comprised of an AS which will integrate with the UCA Mission Control System (UMCS) program. These architectural segments will be managed by the PMA-268 Government Lead Systems Integrator (LSI) that provides system-of-systems integration and is also responsible for managing enterprise-level UCA architecture and associated interfaces. MQ-25 Development includes development and test of the air vehicle to include software, peculiar support equipment, training systems and other logistics elements.

In FY21, MQ-25 PU 3278 will continue to fund the Air System integration and interface development activities. The Engineering Development Models (EDMs) will complete production in FY21 and enter developmental flight-testing. The MQ-25 Government team will increase to meet testing and logistics readiness execution in FY21. Software contractor testing and test readiness reviews will continue in preparation for first flight. Final assembly of the third System Demonstration Test Article will complete.

The Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) program, PU 3279, develops and integrates the MQ-25 control station, designated the MD-5, and auxiliary communications systems using ARC-210 and Mobile User Objective System (MUOS) capable radios as well as a situational awareness display called the Video Management System (VidMS). UMCS also develops software for the MD-5 control station and integrates that software with MQ-25 unique software. UMCS performs CVN infrastructure modifications by reconfiguring several spaces within the carrier in order to install the MD-5 control station, auxiliary communications systems, and VidMS in support of MQ-25 test events and operations aboard select NIMITZ Class carriers. UMCS is also responsible for unique modifications to and integration with C4I systems that provide communications and network paths for Air Vehicle (AV) and mission payload (ISR data) connectivity. UMCS accomplishes this by integrating the MD-5 control station, with the MQ-25 AS along with multiple networks and systems both afloat and on shore.

In FY21 UMCS will continue to fund the modification and installation of UMCS hardware and software on two CVNs needed for MQ-25 underway test periods. UMCS will continue product development and NRE activities for Aircraft Launch and Recovery Equipment (ALRE), the Integrated Communication System (ICS), the MD-5 control station subsystems, the MUOS capable radios, and start testing. UMCS will continue the development and integration of UMCS software components and deliver two baselined configurations to the MQ-25 contractor in support of MQ-25 first flight activities. UMCS will continue the development and integration activities with multiple NAVWAR C4I programs of record (e.g. CVN networks, Navy Tactical Wide Area Networks, CVN and shore exploitation systems (i.e. The Distributed Common Ground System Navy (DCGS-N) and Classic Reach)and Common Data Link systems).

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy					Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0605414N *I Unmanned Carrier Aviation (UCA)*		
B. Program Change Summary ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Previous President's Budget	518.942	671.258	277.674	-	277.674
Current President's Budget	503.989	649.055	266.970	-	266.970
Total Adjustments	-14.953	-22.203	-10.704	-	-10.704
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-22.203			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-14.953	0.000			
• Program Adjustments	0.000	0.000	-6.284	-	-6.284
• Rate/Misc Adjustments	0.000	0.000	-4.420	-	-4.420

Change Summary Explanation

The FY 2021 funding request was reduced by (-$10.704M):

PU 3278 ($-3.367) - The MQ-25 program completed a tech transfer (-$5.962M) to the ANTS POR, which supports the MQ-25 airborne networking requirements managed via PMW-160, and will incorporate the MQ-25 requirements into the ANTS/ADNS PORs. Additionally, other MISC rate adjustments (+$2.595M) has no impact to the MQ-25 efforts.

PU 3279 (-$7.337) - (-$6.300M) reduced to account for the availability of prior year execution balances. Additionally, MISC rate adjustments of (-$1.037) has no impact to the UMCS efforts.

Technical: PU 3279 - Due to the FY20 Congressional Directed Reductions, the UMCS program will cease installation plans on two CVNs reducing CVNs available and ready for MQ-25 test from four to two which adds additional risk to the program schedule and IOC.

Schedule: Based on the reduction of CVNs available for test going from four to two, there will be a likelihood of a 10 month slide to the MQ-25 IOC.

Schedules have been updated to provided greater insight into established milestones by reflecting critical schedule elements that affect or are directly correlated to future schedule milestones, updated delivery of Air Vehicle (AV) 1-4, and added delivery of System Demonstration Test Articles (SDTA) based on Prime Contractor delivery schedule.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605414N / *Unmanned Carrier Aviation (UCA)*	Project (Number/Name) 3278 / *MQ-25 Air System (AS)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3278: *MQ-25 Air System (AS)*	270.039	446.638	590.925	215.614	-	215.614	186.989	185.596	120.882	123.324	Continuing	Continuing
Quantity of RDT&E Articles		4	3	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: P462

A. Mission Description and Budget Item Justification

The scope of the program includes, but is not limited to, system level requirements identification, allocation of requirements to segments and components, design, development, integration, fabrication, test, training, and support activities to provide the MQ-25 capabilities. To provide these capabilities, MQ-25 will transition technologies from other programs and adapt them into the carrier environment. MQ-25 will deliver the necessary air vehicles, command, control, connectivity, shipboard and land-based launch and recovery control systems, associated support systems, interfaces, and upgrades to other Navy systems (as required) to meet the required capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Air Segment Product Development	370.078	484.728	73.720	0.000	73.720
Articles:	4	3	-	-	-
Description: Air Segment Product Development efforts include, but are not limited to, design, development, integration, fabrication, test and training to deliver a carrier-suitable, semi-autonomous, unmanned vehicle capable of aerial refueling (give) and persistent Intelligence, Surveillance, and Reconnaissance (ISR) operations.					
FY 2020 Plans: Continue to perform Air Segment system integration and interface development activities. Continue design and fabrication of Air Vehicle subsystem and begin assembly of Air Vehicles. Complete three (3) Hardware in the Loop labs and one (1) Ironbird to stand up government and contractor System Integration Labs. Complete software qualifications, begin contractor testing, conduct Test Readiness Review, and complete test preparations for first flight in FY21. Exercise option for System Demonstration Test Articles (SDTA). Continue EMD Studies and Analysis.					
FY 2021 Base Plans: Continue to perform Air Segment and UMCS development, design, and integration to include government led efforts that support science and technology investments and roadmap refinement. Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the STIL, the Lab Revitalization Program (LRP), and test facilities. Continue operation of the STIL in support of government led hardware and software development and test					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
activities. Procure LRP infrastructure communications and telemetry hardware to support test activities. Continue government and contractor STIL integration activities in support of software verification and validation. Conduct and support flight test activities at contractor facilities. Fund remainder of SDTA option. Conduct and support laboratory tests in support of EMD aircraft systems ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21 by -$411.0M due to scheduled funding allotments for the EMD contract being finalized in FY20. The program has fully funded the EMD contract to the ceiling of $805.3M. The EDM development, test, and correction of deficiencies work continues.					
Title: Lead Systems Integration (LSI) Product Development	38.264	54.648	68.218	0.000	68.218
Articles:	-	-	-	-	-
Description: Lead Systems Integration (LSI) is a Government-led effort including, but not limited to, advanced development, architecture development, interface definition, integration, system level test and evaluation, science and technology investments, roadmap refinement, and coordination of all MQ-25 capabilities across system segments and stakeholders. ***FY 2020 Plans:*** Continue to perform Air Segment and UMCS development, design, and integration to include government led efforts that support science and technology investments and roadmap refinement. Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the System Test Integration Lab (STIL), the Lab Revitalization Program (LRP), and test facilities. Continue operation of the STIL in support of government led hardware & software development and test activities. Procure LRP infrastructure communications and telemetry hardware to support test activities. Continue government and contractor STIL integration activities in support of software verification and validation. Conduct and support flight test activities at contractor facilities. Conduct and support laboratory tests in support of EMD aircraft systems. ***FY 2021 Base Plans:*** Continue to perform Air Segment and UMCS development, design, and integration to include government led efforts that support science and technology investments and roadmap refinement. Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the System Test Integration Lab (STIL), the Lab					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Revitalization Program (LRP), and test facilities. Continue operation of the STIL in support of government led hardware & software development and test activities. Procure LRP infrastructure communications and telemetry hardware to support test activities. Continue government and contractor STIL integration activities in support of software verification and validation. Connect STIL and LRP to air system contractor labs. Conduct and support flight test activities at contractor facilities. Conduct and support laboratory tests in support of EMD aircraft systems. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** LSI funding increased from FY20 to FY21 is due to the ramp up of integration and test activities that will support the delivery of EDM 1 and first flight preparations. Additionally, funding supports the connection to the air system contractor system integration labs and continuation of combined contractor and government integration activities.					
Title: Management	6.538	6.630	7.321	0.000	7.321
Articles:	-	-	-	-	-
Description: Efforts include program, engineering, test, and logistics management to include travel. ***FY 2020 Plans:*** Continue oversight, coordination, and management of MQ-25 acquisition, system interface and integration activities. Oversee contract activities, including execution of the Air System Engineering, Manufacturing and Development (EMD) contract. Conduct logistics management tasks. Maintain security and program office environments. ***FY 2021 Base Plans:*** Continue oversight, coordination, and management of MQ-25 acquisition, system interface and integration activities. Oversee contract activities, including execution of the EMD contract; including travel and training. Conduct logistics management tasks. Maintain security and program office environments. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Management increase from FY20 to FY21 is due to rate increases and additional government travel by government embedded team members to support prime contractor activities.					
Title: Test and Evaluation	28.639	41.360	59.055	0.000	59.055
Articles:	-	-	-	-	-
Description: Provide Government Integrated testing and evaluation, Performance Based Specifications (PBS) compliance verification, support equipment evaluations/assessments, instrumentation development/support, and Integrated Test support.					
FY 2020 Plans: Continue to support development and implementation of test facilities, range, and lab test requirements. Support updates to the Test and Evaluation Master Plan (TEMP), support engineering events, and program management activities. Support surrogate test activities for landing systems demonstrations. Support activities in Modeling and Simulation development to include validation and verification. Continue support of the Government Systems Test & Integration Lab (STIL) and continue stand up of the integrated test facilities in support of the Engineering & Manufacturing Development (EMD) contract, to include test facility installation, integration, procurement of support equipment and accreditation activities. Provide government engineering to support contractor testing in preparation of first flight in FY21.					
FY 2021 Base Plans: Continue to support development and implementation of test facilities, range, and lab test requirements. Support updates to the Test and Evaluation Master Plan (TEMP), support engineering events, and program management activities. Support surrogate test activities for landing systems demonstrations. Support activities in Modeling and Simulation development to include validation and verification. Continue support of the Government Systems Test & Integration Lab (STIL) and continue stand up of the integrated test facilities in support of the Engineering & Manufacturing Development (EMD) contract, to include test facility installation, integration, procurement of support equipment and accreditation activities. Provide government engineering to support contractor testing; support first test flight of the government's EDMs.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Test and Evaluation increase from FY20 to FY21 supports first flight test activities and associated test resources; such as ranges, labs, and chase aircraft.					
Title: Support	3.119	3.559	7.300	0.000	7.300
Articles:	-	-	-	-	-
Description: Efforts include studies, analyses, and training development support. ***FY 2020 Plans:*** Continue to perform logistics supportability studies and analyses, modeling and simulation efforts. Continue development efforts of training tools for the Fleet, and development of manpower and training assessments, to support EMD contract and timeline. ***FY 2021 Base Plans:*** Refine logistics supportability and begin development of spares models with NAVSUP in support of Initial Operational Capability (IOC). Begin training of Initial Operational Test and Evaluation (IOT&E) and initial Fleet operators and maintainers in support of IOTE activities. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Support increase from FY20 to FY21 is due to the hardware needed for the maintenance trainer development supporting IOT&E.					
Accomplishments/Planned Programs Subtotals	446.638	590.925	215.614	0.000	215.614

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APN/0449C: *MQ-25 Unmanned Carrier Aviation Advanced Procurement*	0.000	0.000	0.000	-	0.000	53.435	50.000	49.000	49.980	566.960	769.375
• APN/0449: *MQ-25 Unmanned Carrier Aviation APN-4*	0.000	0.000	0.000	-	0.000	0.000	729.339	681.718	693.352	7,744.000	9,848.409
• APN/0605/J0449: *MQ-25 APN-6 SPARES*	0.000	0.000	0.000	-	0.000	84.437	73.686	69.302	61.067	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

APN 0449 is APN-4 regular supporting the manufacturing/production of MQ-25 Air Systems (AS) Low Rate Initial Production (LRIP) aircraft.
APN 0449C is advanced procurement for the MQ-25 AS to procure LRIP long-lead items.

D. Acquisition Strategy

Based on the Government's acquisition strategy approved in April 2017, the MQ-25 program is an evolution from the previous Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) program and is an Acquisition Category (ACAT) IB program managed by Program Executive Office, Unmanned Aviation & Strike Weapons (PEO(U&W)), PMA-268 Unmanned Carrier Aviation (UCA) Program Office. Pursuant to 10 U.S.C. 2430(d)(1), the Milestone Decision Authority (MDA) is ASN(RDA).

MQ-25 requirements are aligned with the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) Initial Capabilities Document (ICD) and the Next Generation Air Dominance (NGAD) Family of Systems (FoS) ICD, which highlight the need for carrier-based refueling and persistent ISR capabilities. The Joint Requirements Oversight Council (JROC) endorsed the UCLASS ICD in April 2011 and formally approved it on 9 June 2011 via Joint Requirements Oversight Council Memorandum (JROCM) 087-11. The NGAD FoS ICD was validated by the JROC on 18 August 2015 and formally approved by JROCM 087-15. The JROC's guidance delineated in the validated ICDs and subsequent JROCMs was to establish a requirement for a versatile platform that supports a myriad of organic Naval missions such as aerial refueling and ISR to support the CVW. The JROC validated the Capability Development Document for MQ-25 Carrier Based Unmanned Air System on 21 July 2017. After contract award in 2018, an opportunity to accelerate Initial Operational Capability (IOC) to 2024 was recognized, and the Navy decided to make the investments required to capture that opportunity by increasing the number of test carrier installs to four from two and funding System Demonstration Test Article (SDTA) production to start in FY20. Due to the UMCS FY20 budget reduction (PU 3279), modifications will cease on two of the four carriers which could increase risk to reaching the 2024 IOC. The success of the FY24 IOC is based upon a stable funding base for both UMCS and MQ-25 execution in alignment with the schedules as defined in PU 3278 and PU 3279.

MQ-25 is using an evolutionary acquisition strategy to develop, fly, deploy, and evolve an Initial Operational Capability system for fleet integration. This MQ-25 acquisition strategy continues with entry into flight test, correction of deficiencies work and stand up of logistic/training efforts in conjunction with continued CVN modifications required for IOTE and IOC in 2024.

MQ-25 awarded a fixed price incentive, firm target (FPIF) contract for the AS EMD contract to Boeing in August 2018.

MQ-25 is dependent on the UMCS program to provide carrier-based control stations and integration into CVN networks.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Segment - Primary Hardware Development	C/FPIF	Boeing : St. Louis, MO	82.893	347.000	Oct 2018	375.400	Oct 2019	0.000		-		0.000	0.000	805.293	805.293
Air Segment - Primary Hardware SDTA	C/FPIF	Boeing : St. Louis, MO	0.000	0.000		63.500	Mar 2020	21.200	Mar 2021	-		21.200	0.000	84.700	84.700
Air Segment - Primary Hardware ESA	C/CPIF	Boeing : St. Louis, MO	0.000	10.000	Oct 2018	20.000	Mar 2020	20.000	Mar 2021	-		20.000	20.000	70.000	70.000
Air Segment - Systems Engineering	WR	NAWCAD : Patuxent River, MD	4.422	10.500	Nov 2018	23.238	Nov 2019	29.880	Nov 2020	-		29.880	110.060	178.100	-
Air Segment - Systems Engineering	WR	NAWCWD : China Lake, CA	0.324	1.330	Nov 2018	1.337	Nov 2019	1.360	Nov 2020	-		1.360	Continuing	Continuing	Continuing
Air Segment - Systems Engineering	Various	Various : Various	0.243	1.248	Mar 2019	1.253	Nov 2019	1.280	Nov 2020	-		1.280	Continuing	Continuing	Continuing
CS&C Segment	Various	Various : Various	58.911	0.000		0.000		0.000		-		0.000	0.000	58.911	-
Carrier Segment (Ship Integration)	Various	Various : Various	42.882	0.000		0.000		0.000		-		0.000	0.000	42.882	-
LSI - Advanced Development (Primary Hardware Development)	Various	Various : Various	1.272	0.000		0.000		0.000		-		0.000	0.000	1.272	-
LSI - Systems Engineering	Various	Various : Various	4.934	5.918	Dec 2018	5.548	Nov 2019	5.410	Nov 2020	-		5.410	0.000	21.810	-
LSI - Systems Engineering	WR	NAWCAD : Patuxent River, MD	29.878	24.666	Dec 2018	41.391	Nov 2019	54.890	Nov 2020	-		54.890	Continuing	Continuing	Continuing
LSI - Systems Engineering	Various	NAVWAR : San Diego, CA	4.111	3.640	Nov 2018	3.510	Nov 2019	3.638	Nov 2020	-		3.638	Continuing	Continuing	Continuing
LSI - Integrated Digital Environment	SS/FFP	NAWCAD : Lakehurst, NJ	4.162	4.040	Mar 2019	4.199	Mar 2020	4.280	Mar 2021	-		4.280	Continuing	Continuing	Continuing
		Subtotal	234.032	408.342		539.376		141.938		-		141.938	Continuing	Continuing	N/A

Remarks

Air Segment Systems Engineering - increase due to the additional activities supporting the Engineering Development Model (EDM) development efforts and Navy Working Capital Funds (NWCF) rate increases.
LSI Systems Engineering - Increase due to Test and Evaluation activities supporting delivery of EDM for first flight in FY21 and NWCF rate increases.
Common Display System (CDS)
Common Processing System (CPS)

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605414N / *Unmanned Carrier Aviation (UCA)*	Project (Number/Name) 3278 / *MQ-25 Air System (AS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Lead Systems Integration (LSI) Engineering and Manufacturing Development (EMD)															
LSI-Systems Engineering - Funding increase from FY20 to FY21 due to increased integration and test activities associated with incorporating Air Vehicle design into MQ-25 system of systems. Connect to air system contractor system integration laboratories and continue combined contractor and government integration activities. Support LRP and STIL efforts.															

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Manpower Studies & Analyses	Various	Various : Various	0.219	0.115	Nov 2018	0.156	Nov 2019	0.200	Nov 2020	-		0.200	Continuing	Continuing	Continuing
Training Development	Various	Various : Various	3.635	3.004	Dec 2018	3.403	Nov 2019	7.100	Nov 2020	-		7.100	Continuing	Continuing	Continuing
		Subtotal	3.854	3.119		3.559		7.300		-		7.300	Continuing	Continuing	N/A

Remarks

Training Development increase from FY20 to FY21 due to hardware needed for maintenance trainer development supporting IOT&E.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	WR	NAWCAD : Patuxent River, MD	20.937	25.626	Dec 2018	38.347	Nov 2019	55.985	Nov 2020	-		55.985	Continuing	Continuing	Continuing
Test and Evaluation	Various	Various : Various	0.025	3.013	Jan 2019	3.013	Jan 2020	3.070	Nov 2020	-		3.070	Continuing	Continuing	Continuing
		Subtotal	20.962	28.639		41.360		59.055		-		59.055	Continuing	Continuing	N/A

Remarks

Test and Evaluation funding increase from FY20 to FY21 supports first flight activities and associated test resources such as ranges, labs, and chase aircraft.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management	Various	Various : Various	2.869	1.804	Dec 2018	1.804	Nov 2019	1.840	Nov 2020	-		1.840	Continuing	Continuing	Continuing
Management	WR	NAWCAD : Patuxent River, MD	8.138	4.601	Nov 2018	4.693	Nov 2019	5.346	Nov 2020	-		5.346	Continuing	Continuing	Continuing
Management	Various	NAVAIR : Patuxent River, MD	0.184	0.133	Oct 2018	0.133	Oct 2019	0.135	Oct 2020	-		0.135	Continuing	Continuing	Continuing
		Subtotal	11.191	6.538		6.630		7.321		-		7.321	Continuing	Continuing	N/A

Remarks

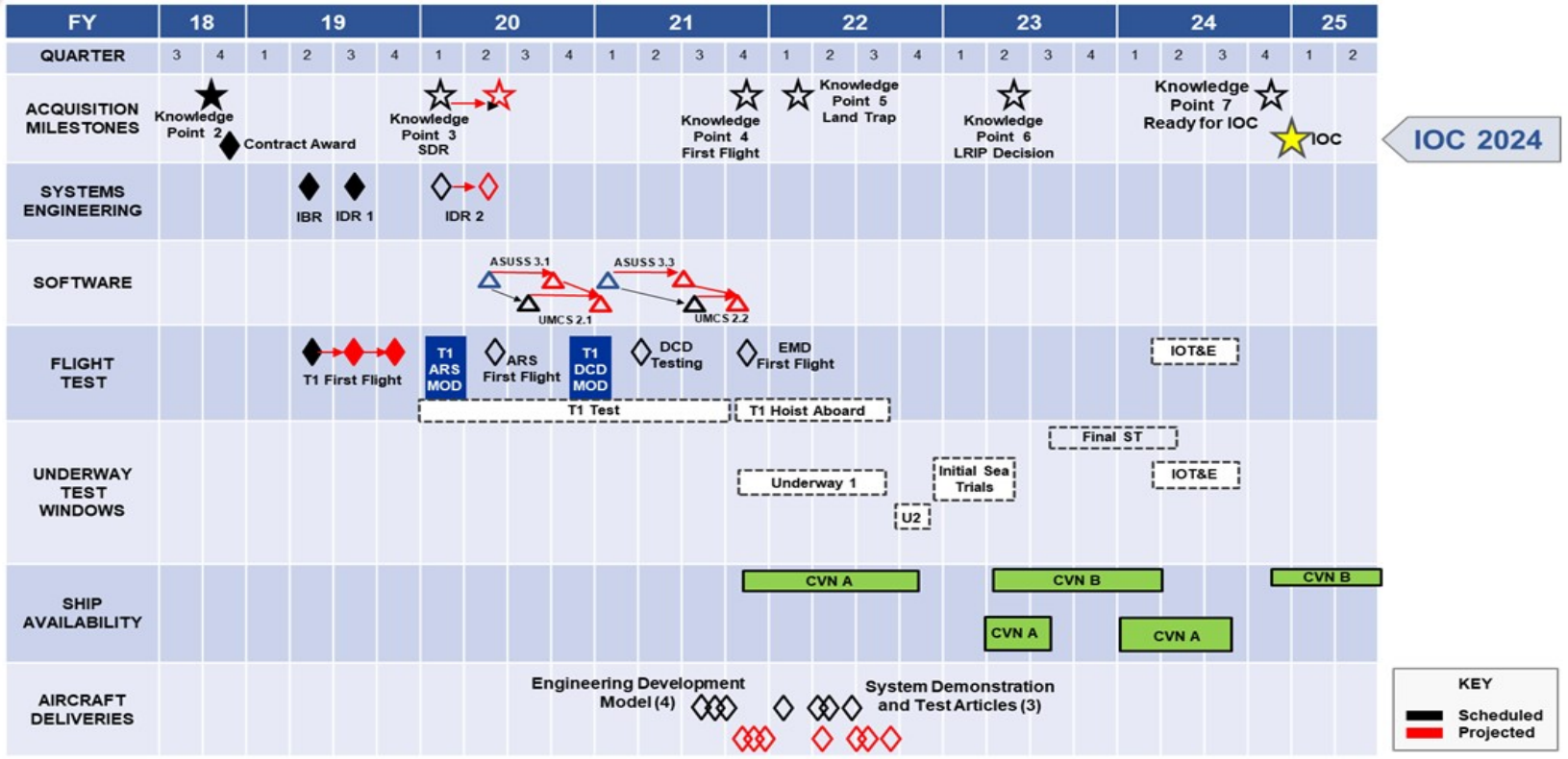
FY20 to FY21 funding increase in the Management G/WR NAWCAD line is due to NWCF rate increases.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	270.039	446.638		590.925		215.614		-		215.614	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

UCA PROGRAM SCHEDULE



Note: The program will make a final assessment regarding the FY20 budget impacts to IOC following the release of the upcoming carrier availability schedule.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MQ-25				
Acquisition Milestones: Milestones & Reviews: Initial Design Review 1	3	2019	3	2019
Acquisition Milestones: Milestones & Reviews: T1 First Flight	4	2019	4	2019
Acquisition Milestones: Milestones & Reviews: Initial Design Review 2	2	2020	2	2020
Acquisition Milestones: Milestones & Reviews: T1 Mod-1 First Flight	3	2020	3	2020
Acquisition Milestones: Milestones & Reviews: KP3 System Design Review	2	2020	2	2020
Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 1	3	2021	3	2021
Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 2	3	2021	3	2021
Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 3	1	2022	1	2022
Acquisition Milestones: Milestones & Reviews: Air Vehicle Delivery 4	4	2021	4	2021
Acquisition Milestones: Milestones & Reviews: KP4 First Flight	4	2021	4	2021
Acquisition Milestones: Milestones & Reviews: KP5 Land Trap	1	2022	1	2022
Acquisition Milestones: Milestones & Reviews: Initial Sea Trials	1	2023	1	2023
Acquisition Milestones: Milestones & Reviews: KP6 LRIP CA	2	2023	2	2023
Acquisition Milestones: Milestones & Reviews: KP7 Ready for IOC	4	2024	4	2024
Acquisition Milestones: Milestones & Reviews: Milestone Squadron Established	4	2023	4	2023
Acquisition Milestones: Milestones & Reviews: Initial Operational Test and Evaluation	1	2024	3	2024
Acquisition Milestones: Milestones & Reviews: KP7 Initial Operational Capability	4	2024	4	2024
Acquisition Milestones: Milestones & Reviews: System Demonstration Test Article 1 Delivery	2	2022	2	2022
Acquisition Milestones: Milestones & Reviews: System Demonstration Test Article 2 Delivery	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3278 / *MQ-25 Air System (AS)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acquisition Milestones: Milestones & Reviews: System Demonstration Test Article 3 Delivery	3	2022	3	2022
Systems Development: MQ-25 System Design & Integration: MQ-25 Architecture Development and Integration	1	2019	4	2024
Systems Development: Air Segment: Air System Design Review	4	2019	4	2019
Systems Development: Air Segment: Air System & Software Integration	2	2019	2	2021
Systems Development: Air Segment: ITT & Integration Support	3	2021	4	2024
Systems Development: UCA Mission Control System: CVN A MD-5 Control Station Installation 1	3	2021	3	2021
Systems Development: UCA Mission Control System: CVN B MD-5 Control Station Installation 2	1	2023	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605414N / *Unmanned Carrier Aviation (UCA)*	Project (Number/Name) 3279 / *Unmanned Carrier Aviation Mission Control System*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
3279: *Unmanned Carrier Aviation Mission Control System*	0.000	57.351	58.130	51.356	-	51.356	45.730	34.123	17.016	17.364	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) program builds, integrates, and installs control systems required to operate the MQ-25. The UMCS program includes what was previously identified as the Control System & Connectivity (CS&C) and Carrier Vessel, Nuclear (CVN) Segments previously captured under the MQ-25 Development PU 3278.

UMCS builds the following hardware: MD-5 Control Station, the Video Management System (VidMS), the ARC-210 Radio Communication System (RCS), and the Mobile User Objective System (MUOS) capable radios. The control station has a ship and shore variant designated the MD-5A and MD-5B, respectively. The MD-5 consists of the following subsystems: Common Display System (CDS), Common Processing System (CPS), Network Processing Group (NPG), Integrated Communication System (ICS), and the Stingray Operating Software Suite (SOSS). MD-5A and B use the same common components with slight differences in the ICS, SOSS, and networking equipment. The VidMS provides MQ-25 air vehicle operators with the required video situational awareness of the unmanned carrier environment. The ARC-210 RCS provides narrow band Line of Sight (LOS) command and control (C2) transmissions with the MQ-25 while the MUOS capable radio provides narrow band Beyond Line of Sight (BLOS) C2 transmissions with the MQ-25 using the MUOS satellite system.

UMCS leads development, modification, engineering, and integration activities, facilitating seamless voice, data, and command and control exchanges with the MQ-25 air system, local networks, voice networks, C2 networks, tactical networks, intelligence systems, and launch and recovery systems.

UMCS performs CVN infrastructure modifications and installs the hardware mentioned above in support of MQ-25 operations aboard select NIMITZ class carriers. All CVN installation and integration activities are planned and executed using the Ship Change Document (SCD) process.

CVN installations are regulated by Naval Sea Systems Command (NAVSEA) processes/guidelines that delineate strict schedules and deadlines for documentation, drawings, and hardware availability to support carrier modifications and by the CVN availability schedule (revised at least twice per year) which identifies pre-planned maintenance periods for all NIMITZ and FORD Class CVNs. Changes to the NAVSEA owned CVN availability schedule could, in turn, drive changes to the UMCS installation schedule.

The CVN modification and hardware installation process can be divided into four phases. Phase 1 is characterized by the development of technical data packages (TDPs), general and specific CVN hull number guidance documents, and the SCDs to be installed; this phase begins approximately three years, or more, before the start of the CVN maintenance period. Phase 2 is characterized by the performance of a hull specific Ship Check, development of the Ship Installation Drawings (SIDs) for a specific CVN installation, and the purchase of the MD-5 subsystems, the VidMS, and the LOS/BLOS subsystems; this phase begins two years before the start of the CVN maintenance period. Phase 3 is characterized by the approval of the SIDs, development of installation schedules, completion of cybersecurity/

logistics documentation, and the integration and testing of the MD-5 and associated subsystems; this phase begins approximately one year prior to the start of the CVN maintenance period. Phase 4 is characterized by the modification of the CVN infrastructure, installation of the MD-5 and associated subsystems, and completion of the system operational verification testing (SOVT);); tasking is scheduled based on the number of ship change documents (SCDs) being installed and the length of the planned CVN Maintenance Availability period. When availability periods are only six months long, activities will begin at the start of the CVN maintenance period. Due to the size and complexity of the UMCS modifications, a minimum of two 6-month maintenance periods is required for a full installation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Unmanned Carrier Aviation (UCA) Mission Control System	57.351	58.130	51.356	0.000	51.356
Articles:	-	-	-	-	-
Description: The UMCS program is a Government-led effort which includes, but is not limited to, development, integration, installation, and testing of the UMCS hardware and software, upgrades to existing CVN infrastructure to support accelerated delivery of MQ-25 capabilities, unique modifications to the Joint Precision Approach Landing System (JPALS) and the Aircraft Launch and Recovery Equipment (ALRE) to support specific MQ-25 capabilities, and integration with C4I systems.					
FY 2020 Plans: Continue MQ-25 unique ARC-210 GEN 6 software modifications and complete GEN 5 radio certification. Continue developing installation guidance documentation, Ship Change Documents (SCDs), and Ship Installation Drawings (SIDs) for the two (2) test ships. Continue the installation of multiple SCDs on CVN A while continuing installation of multiple SCDs on CVN B. Continue designing the Mobile User Objective System (MUOS) capable radio system and begin developing the technical data package, guidance documents, and SCDs for future CVN installations. Update all SCDs and technical data based on installation redlines, technology refresh, obsolescence, and engineering changes. Procure and integrate components of the MD-5 Control Station for the labs and at least two CVNs. Continue the development and integration of UMCS software components and deliver one formal configuration to the MQ-25 contractor. Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the MD-5A control station, the VidMS, the ARC-210 RCS, and the MUOS system. Develop and test MQ-25 unique engineering changes to the Naval Information Warfare Systems Command (NAVWARSYSCOM) C4I systems. Prepare for and conduct integration testing with operationally representative communication and network systems, including C4I, to assess UMCS performance and enable CVN installation. Continue development of two engineering change proposals (ECPs) with Joint Precision Approach Landing System (JPALS). Continue developing Aircraft Launch and Recovery Equipment (ALRE) modifications to provide Situational Awareness data for MQ-25 operators aboard the CVN and to integrate with JPALS and display MQ-25 status messages to safely recover the MQ-25. Installation of the ALRE modifications will be required on the two test ships from FY20 through FY23. Continue CVN and Carrier Air					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Wing (CVW) integration activities and development/refinement of Concepts of Employment (CONEMPs) in accordance with NAVSEA, NAVWARSYSCOM, PEO (CARRIERS), CNAF, and OPNAV processes. Continue development of Navy Modernization Program (NMP) supporting shipboard Configuration Management and Logistics.					
FY 2021 Base Plans: MD-5 control station - Complete system level integration, and testing of the MD-5 for CVN A - Begin assembling and integrating MD-5 components for CVN B - Continue the development and integration of software from multiple contractors (including the MQ-25 air system) and Government organizations. - Deliver two baselined configurations to the MQ-25 contractor in support of first flight activities. - Continue Cyber Security efforts to achieve Authority to Operate (ATO) certifications for the MD-5A control station, the VidMS and the ARC-210 RCS - Complete development of a MUOS capable radio system, finalize technical and logistics data packages, and complete Ship Installation Drawings (SIDs) - Complete certification of the ARC-210 GEN 5 radio; complete development of the ARC-210 GEN 6 radio software modifications and begin the certification process CVN Modifications - Complete modifications to CVN A which includes installing the MD-5A control station, performing system verification testing, and if the CVN schedule permits, perform end-to-end testing using the operational networks. - Complete installation guidance documentation and begin developing detailed ship installation drawings for CVN B. - Begin removing equipment from a prior CVN installation that was eliminated from the program due to FY20 budget reductions - Complete the development of Joint Precision Approach Landing System (JPALS) engineering change proposals - Continue developing Aircraft Launch and Recovery Equipment (ALRE) modifications to provide Situational Awareness data to MQ-25 operators and to integrate with JPALS in order to recover the MQ-25 safely. - Install ALRE system modifications on the first CVN - Continue CVN and Carrier Air Wing (CVW) integration activities and refinement of Concepts of Employment (CONEMPs) in accordance with established processes					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Naval Information Warfare Systems Command (NAVWARSYSCOM) C4I system integration - Perform hardware/software regression testing via the application integration process in support of updated Consolidated Afloat Network Enterprise Services (CANES) hardware/software baselines (required for each CVN installation) - Install engineering change request on the first CVN and at a Naval communication shore location enabling the end-to-end communication testing with the operational networks to assess UMCS performance and to support MQ-25 testing - Non Recurring Engineering for Common Airborne System Architecture for sustained end-to-end C4I communications from CVN to MQ-25A and shore stations which will be adopted by the ADNS PoR - Modify and integrate with two ISR exploitation systems (DCGS-N, NTCS) - Continue to develop and integrate with common data link systems (CDLS TR & NTCDL) and Military/ Commercial Satellite Communication systems ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21: The FY 2021 funding request was reduced by -$6.300M to account for the availability of prior year execution balances; the maintenance availability period for CVN A shifted to the right, delaying the start of planned installation tasks, and the ICS contract award was delayed from November to July due to original proposal expiring and contractor proposal having unexplained cost growth. Development and testing on the ARC-210 radio modifications are nearing completion. Development of JPALS and several ALRE systems completes in early FY21.					
Accomplishments/Planned Programs Subtotals	57.351	58.130	51.356	0.000	51.356

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN/4269: *UMCS- Unman Carrier Aviation (UCA) Mission Cntrl Stn*	18.019	17.568	60.937	-	60.937	67.108	73.040	83.390	85.482	Continuing	Continuing
• OPN/9020/J4269: *Spares for Unmanned Carrier Aviation (UCA) Mission Cntrl Stnl*	0.000	0.000	0.000	-	0.000	0.000	1.102	1.214	2.028	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

The Unmanned Carrier Aviation (UCA) Mission Control System (UMCS) program builds, integrates, installs, and sustain control stations required to operate the MQ-25 via CVN or shore site.
- RDTE will fund the modification of CVN infrastructure and installation of hardware on the CVNs need for MQ-25 test event; Software development to support MQ-25 AS development and certification of new software for UMCS on Navy IT systems/platforms; Product development modifying existing systems with new capabilities for integration with or utilization by UMCS.
- OPN will fund the modification of CVN infrastructure and installation of hardware on CVNs and operational shore sites not aligned to MQ-25 test events; Incorporation of UMCS into existing Post MS-C PoRs (i.e. NAVWAR - C4I, ADNS, SATCOM, Secure Shore Integration; NAVAIR - ALRE, JPALS); Tech Refresh which includes replacement of a portion of selected hardware components on a three year recurring schedule.

D. Acquisition Strategy

In January of 2018, PU 3279 was established for the Unmanned Carrier Aviation (UCA) Mission Control System (UMCS).
In February 2019, the UMCS program was designated ACATII and is a separate PoR from the MQ-25 Air System (AS) ACAT IB. However, separate PoRs, UMCS and the MQ-25 AS are both required to field a Carrier Based Unmanned Air system (CBUAS) capability. MQ-25 AS is dependent on UMCS to meet the programs 2024 IOC.
- Due to the close alignment of requirements with MQ-25 AS, interoperability, and parent documentation, the UMCS PoR will leverage MQ-25 PoR acquisition events and milestones as part of the acquisition strategy for oversight and approvals.
- The MQ-25 CBUAS Program was designated as a Maritime Accelerated Acquisition (MAA) Program by the CNO and the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN(RDA)). This designation expedites the acquisition and fielding of the MQ-25 system and directs all associated organizations to support the MQ-25 Program on a priority basis.
- The UMCS government team is performing the role of the Lead Systems Integrator (LSI) for the ground control system.
- In order to expedite fielding of UMCS per MAA policy and to align with the IOC requirements for the MQ-25 SoS, the program team has and will continue to leverage systems with high Technology Readiness Levels, largely consisting of Commercial and Government Off the Shelf systems (i.e. COTS and GOTS) to the greatest extent possible.

UMCS completed Milestone C 05 March 2019. The UMCS acquisition strategy was approved in 25 July 2019. The UMCS PoR will use an evolutionary acquisition approach to develop, integrate, test, deploy, and evolve the capabilities throughout the life of the system. The UMCS requires integration of multiple products with the primary developmental system being the software dominant MD-5. There will be no Full-Rate Production decision due to the limited number of CVNS and shore sites.

UMCS hardware procurements will accommodate CVN installation, testing, and deployment constraints as well as ship modification schedule constraints.
- Because UMCS is integrated and installed aboard CVNs, PMA-268 must follow the ship modernization process, which directs delivery dates for deliverables and installation milestones associated with a CVN maintenance availability period. The lead-time associated with this process drives the timeline to design, develop, and procure equipment ahead of the planned installation date.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

UMCS testing will occur in multiple stages tied primarily to software version beginning with 2.0. Testing will progress from standalone testing with an AV simulator, to operating in conjunction with a hardware-in-the-loop air vehicle (hot bench) to shipboard evaluation of UAWC installations. Each version of UMCS will be evaluated for system functionality and usability through a series of capabilities based test events focusing on execution of the mission tanking, recovery tanking, and Intelligence, Surveillance, and Reconnaissance missions. Additional testing to include mission planning, supportability, and reliability will be conducted during dedicated events when not captured concurrently with other test

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0605414N / *Unmanned Carrier Aviation (UCA)*	Project (Number/Name) 3279 / *Unmanned Carrier Aviation Mission Control System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UMCS (Ship Integration)	Various	Various : Various	0.000	15.746	Dec 2018	11.510	Jan 2020	8.883	Nov 2020	-		8.883	29.379	65.518	-
UMCS (Ship Integration)	WR	NAWCAD : Patuxent River, MD	0.000	32.986	Dec 2018	35.431	Jan 2020	33.664	Nov 2020	-		33.664	Continuing	Continuing	Continuing
UMCS (Ship Integration)	WR	NAWCAD : Lakehurst, NJ	0.000	2.630	Dec 2018	4.306	Jan 2020	2.959	Nov 2020	-		2.959	17.318	27.213	-
UMCS	SS/FFP	Rockwell Collins : Cedar Rapids, IA	0.000	1.403	Nov 2018	0.679	Nov 2019	0.160	Nov 2020	-		0.160	0.000	2.242	2.242
UMCS	Various	NAVWAR : San Diego, CA	0.000	4.586	Dec 2018	6.204	Jan 2020	5.690	Nov 2020	-		5.690	23.986	40.466	-
		Subtotal	0.000	57.351		58.130		51.356		-		51.356	Continuing	Continuing	N/A

	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	57.351		58.130		51.356		-		51.356	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

Unmanned Carrier Aviation
CVN Availability Targets

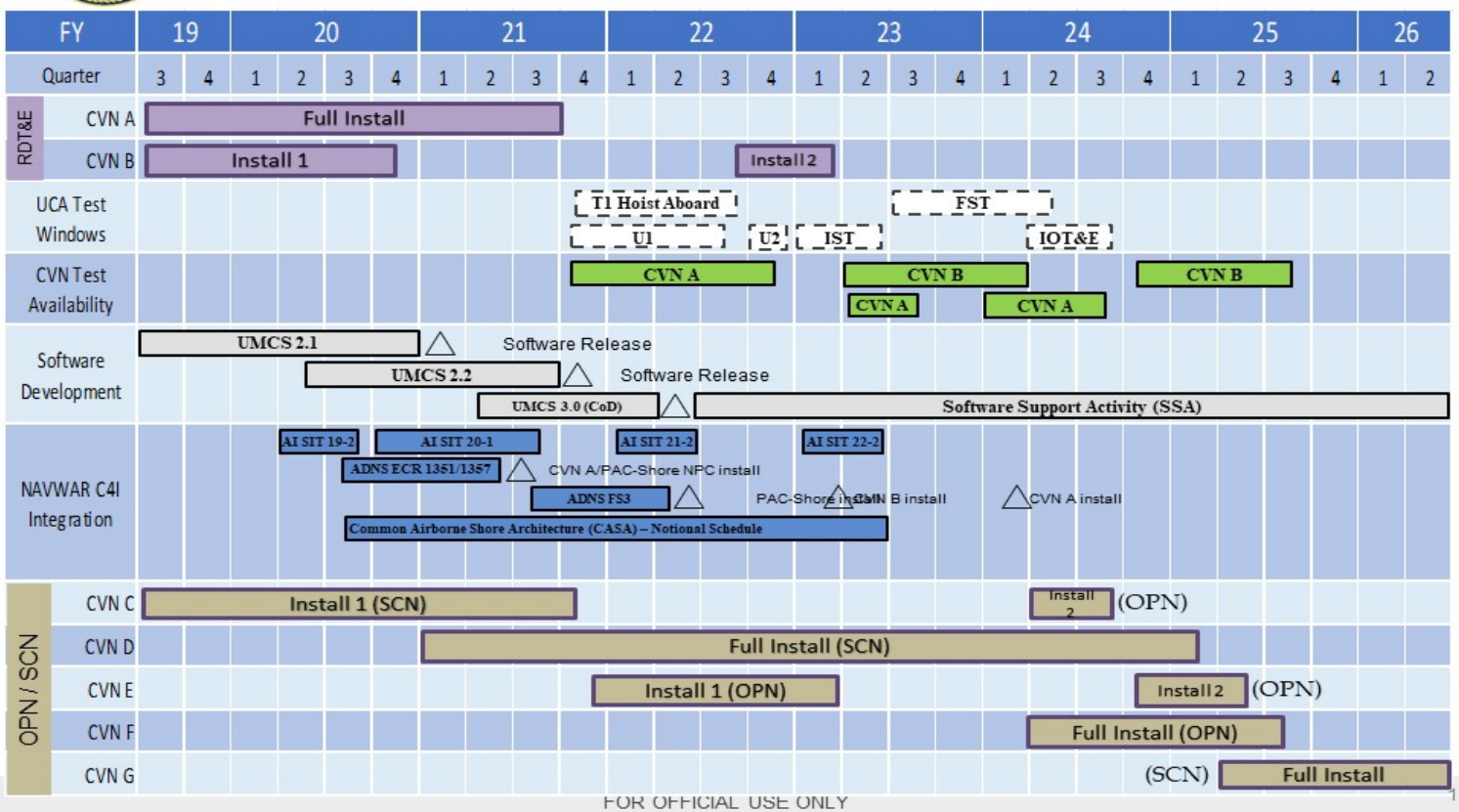

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605414N / *Unmanned Carrier Aviation (UCA)*	**Project (Number/Name)** 3279 / *Unmanned Carrier Aviation Mission Control System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
UMCS				
System Development (RDTE Carriers): UMCS Program (MD-5): CVN A Installation	3	2021	3	2021
System Development (RDTE Carriers): UMCS Program (MD-5): CVN B Installation 1	4	2020	4	2020
System Development (RDTE Carriers): UMCS Program (MD-5): CVN B Installation 2	1	2023	1	2023
System Development (RDTE Carriers): UMCS Program (MD-5): UMCS Program: Software (SW) Development/SW Testing/Technology Refresh/SW Integration	1	2019	4	2025
System Development (RDTE Carriers): NAVWAR C4I Integration: AI SIT, ADNS, Commom Airborne Shore Architecture	1	2019	2	2023
Carrier Modifications (OPN Carriers): CVN C Installation 1	3	2024	3	2024
Carrier Modifications (OPN Carriers): CVN E Installation 1	1	2023	1	2023
Carrier Modifications (OPN Carriers): CVN E Installation 2	2	2025	2	2025
Carrier Modifications (OPN Carriers): CVN F Installation 1	3	2025	3	2025