Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604201A *I Aircraft Avionics*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	8.069	7.011	6.654	-	6.654	-	-	-	-	-	-
C97: *ACFT Avionics*	-	4.734	6.357	5.807	-	5.807	-	-	-	-	-	-
EW7: *Degraded Visual Environment*	-	2.552	-	-	-	-	-	-	-	-	-	-
VU3: *Networking And Mission Planning*	-	0.783	0.654	0.847	-	0.847	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2022 budget request funds the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Program Element support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems. Alternate capabilities (non-GPS) and/or complimentary PNT solutions will be investigated, studied, evaluated and developed as standalone or blended navigation functions.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. The DGNS upgrade includes Non-Recurring Engineering for the Computer Display Unit (CDU) which replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability, and optimizes pilot interface to promote safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (APNT) operations such as Resiliency and Software Assurance Modification (RSAM) in conjunction with additional system upgrades and upgrades to existing DGNS hardware in order to accommodate A-PNT in identified operational environments. This supports the requirement to maintain A-PNT throughout operations.

The Enhanced Aviation Global Air Traffic Management (GATM) Localizer Performance with Vertical Guidance (LPV) Embedded Global Positioning System (GPS) Inertial Navigation System (EGI) (EAGLE) development program upgrades existing EGI hardware to incorporate M-Code and assesses current capabilities in order to achieve A-PNT in identified operational environments. The EAGLE-M upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, and evaluate candidate solutions to cover any identified gaps. The EGI program will support enhanced A-PNT for currently fielded EGIs through software insertions, such as RSAM.

The Multi-platform Anti-jam GPS Navigation Antenna (MAGNA) is a GPS anti-jam adaptive antenna system that will be capable of receiving legacy and modernized GPS satellite signals. The MAGNA reduces the effect of GPS jamming by disrupting the GPS receiver enabling the Warfighter continued access to GPS-provided PNT in a GPS degraded environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201A *I Aircraft Avionics*

The Degraded Visual Environment (DVE) Environment Exploitation System (EES) focuses on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the Army aviation fleet.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM provides the Army rotary wing fleet with critical communication capabilities, enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracking transceiver, and provides the means for rapid data transfer.

The Aviation Mission Common Server (AMCS) effort is a replacement and capability upgrade for the current Army IDM-401. The AMCS program will implement IDM and Common Operating Environment capabilities utilizing a flexible open systems architecture and distributed processing resources with the capacity and architecture to perform an array of additional non-flight critical computing, data processing, radio and communications management, and graphics generation functions for the enduring and future Army Aviation fleet and de-couple non-flight critical mission system technology integration from flight critical components. The AMCS provides the ability to rapidly integrate technology upgrades required to keep pace with evolving threats on Multi-Domain Battlefield. The AMCS enables the hosting of enhanced capabilities to communicate, navigate, sense and deploy weapon systems across the Joint Force and will be the center of the future Common Digital Backbone for the enduring and future Army Aviation fleets, and is a key enabler Multi-Domain Operations.

The Aviation Mission Planning System (AMPS) is a system used to conduct pre-mission and aircraft performance planning. It recieves data from multiple sources and provides that data digitally to the aircraft to support aviation missions. AMPS is used for automated mission planning, risk assessment, and transfer of mission data to aviation platforms within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. These efforts include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow aircrews to continually plan and update route, threat, and performance data throughout all phases of an Aviation mission. Development of a mobile aircraft performance planning/weight and balance calculator is currently underway and will be the first migration of AMPS capabilities to a mobile hardware agnostic environment.

The AN/ARC-220 High Frequency (HF) Radio is a US Army rotary wing high frequency solution which is operational on over 2,400 Army helicopters (primarily CH-47, UH-60, and AH-64). Key capabilities are voice and data, Automatic Link Establishment, text messaging, position reporting, and Selective Calling. It is also Voice Interoperable with standard ground HF systems in use today. Efforts include development of an Airborne Radio Control Manager (ARCM) driver to enhance the modernization of the AN/ARC-220 HF Radio.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army					Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*		R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*			
B. Program Change Summary ($ in Millions)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Previous President's Budget	8.414	2.764	7.285	-	7.285
Current President's Budget	8.069	7.011	6.654	-	6.654
Total Adjustments	-0.345	4.247	-0.631	-	-0.631
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-0.151			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.345	-0.102			
• Adjustments to Budget Years	-	-	-0.631	-	-0.631

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) C97 / *ACFT Avionics*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
C97: *ACFT Avionics*	-	4.734	6.357	5.807	-	5.807	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Fiscal Year FY2022 budget request funds for the development of Aircraft Avionics systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems. Alternate capabilities (non-GPS) and/or complimentary PNT solutions will be investigated, studied, evaluated and developed as standalone or blended navigation functions.

The Doppler Global Positioning System Navigation Set (DGNS) Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as an inertial sensor interface card and Instrument Flight Rules map display. The DGNS upgrade includes Non-Recurring Engineering for the Computer Display Unit (CDU) which replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability, and optimizes pilot interface to promote safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (APNT) operations such as Resiliency and Software Assurance Modification (RSAM) in conjunction with additional system upgrades and upgrades to existing DGNS hardware in order to accommodate A-PNT in identified operational environments. This supports the requirement to maintain A-PNT throughout operations.

The Enhanced Aviation Global Air Traffic Management (GATM) Localizer Performance with Vertical Guidance (LPV) Embedded Global Positioning System (GPS) Inertial Navigation System (EGI) (EAGLE) development program upgrades existing EGI hardware to incorporate M-Code and assesses current capabilities in order to achieve A-PNT in identified operational environments. The EAGLE-M upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, and evaluate candidate solutions to cover any identified gaps. The EGI program will support enhanced A-PNT for currently fielded EGIs through software insertions, such as RSAM.

The Multi-platform Anti-jam GPS Navigation Antenna (MAGNA) is a GPS anti-jam adaptive antenna system that will be capable of receiving legacy and modernized GPS satellite signals. The MAGNA reduces the effect of GPS jamming by disrupting the GPS receiver enabling the Warfighter continued access to GPS-provided PNT in a GPS degraded environment.

The AN/ARC-220 High Frequency (HF) Radio is a US Army rotary wing high frequency solution which is operational on over 2,400 Army helicopters (primarily CH-47, UH-60, and AH-64). Key capabilities are voice and data, Automatic Link Establishment, text messaging, position reporting, and Selective Calling. It is also Voice Interoperable with standard ground HF systems in use today. Efforts include development of an Airborne Radio Control Manager (ARCM) driver to enhance the modernization of the AN/ARC-220 HF Radio.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: EAGLE Navigation System A-PNT Integration	4.734	1.857	5.807

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: The GATM LPV GPS EGI EAGLE development program upgrades existing EGI hardware to incorporate M-Code and assesses current capabilities in order to achieve A-PNT in identified operational environments. The EAGLE-M upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, and evaluate candidate solutions to cover any identified gaps. The EGI program will support enhanced A-PNT for currently fielded EGIs through software insertions, such as RSAM. ***FY 2021 Plans:*** Continue EAGLE-M airworthiness qualification testing and Resiliency & Software Assurance Modification integration onto legacy GPS receivers. Continue EAGLE M-code development. ***FY 2022 Plans:*** Continue EAGLE-M development through safety of flight (SOF) qualification followed by full airworthiness testing/qualification. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding increases in FY 2022 to complete the full airworthiness testing/qualification of EAGLE-M.			
Title: AN/ARC-220 High Frequency Radio Modernization ***FY 2021 Plans:*** Develop AN/ARC-220 HF Radio Modernization hardware, software and firmware to upgrade performance and capability. Develop an Airborne Radio Control Manager driver to enhance the modernization of the AN/ARC-220 HF Radio. Conduct technology insertion efforts to provide advanced radio frequency application, digital signal processor, fast analog digital converters, and automatic gain control to include cyber hardening. Develop microelectronics such as integrated circuits to handle more power than today's RF circuitry. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The decrease in FY22 funding reflects that the only funding for HF Radio Modernization was a Congressional increase in FY21.	-	4.500	-
Accomplishments/Planned Programs Subtotals	4.734	6.357	5.807

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• AA0723: *Comms, Nav Surveillance*	164.315	101.355	58.117	-	58.117	-	-	-	-	-	-
• AA0704: *GATM - Rotary Wing Aircraft*	30.966	12.180	16.776	-	16.776	-	-	-	-	-	-
• A01006: *Aviation ASSURED PNT*	-	53.509	47.028	-	47.028	-	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• C97: *ACFT Avionics*	4.734	6.357	5.807	-	5.807	-	-	-	-	-	-

Remarks

APA funding associated with the Aircraft Avionics Project C97 RDT&E efforts is now in the Aviation Assured PNT line (SSN A01006) beginning in FY21. Aviation Assured PNT funding on the Comms, Nav Surveillance line (SSN AA0723) was realigned to A01006 beginning in FY21.

D. Acquisition Strategy

This project is comprised of multiple systems supporting aircraft avionics. While the detailed acquisition strategy varies from program to program, the general strategy is for each individual program to complete the development and testing efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the United States Army Combat Capabilities Development Command Aviation & Missile Center for software development. This requires the use of various contract methods and types to accomplish the aircraft avionics development efforts. All required acquisition program documentation is prepared.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) C97 / *ACFT Avionics*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Services (DGNS Upgrade/ DGNS A-PNT)	Various	Development Command Aviation & Missiles Center SED : Redstone Arsenal, AL	1.122	-		-		-		-		-	0.000	1.122	-
PM Services (EAGLE)	Various	Development Command Aviation & Missiles Center : Redstone Arsenal, AL	0.499	0.037	Oct 2019	-		-		-		-	0.000	0.536	-
		Subtotal	1.621	0.037		-		-		-		-	0.000	1.658	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DGNS A-PNT Assessment and Upgrade	SS/CPFF	BAE Systems : Wayne, NJ	7.721	-		-		-		-		-	0.000	7.721	-
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	SS/CPFF	Honeywell : Clearwater, FL	16.218	4.697	Jan 2020	-		-		-		-	0.804	21.719	-
EGI/EAGLE M-Code	SS/CPIF	Honeywell International : Clearwater, FL	-	-		1.787	Jun 2021	5.807	Feb 2022	-		5.807	Continuing	Continuing	-
AN/ARC-220 High Frequency Radio Modernization	SS/CPFF	Defense Microelectronics Activity (DMEA) : San Francisco, CA	-	-		3.500	Jun 2021	-		-		-	0.000	3.500	-
Airborne Radio Control Manager Driver (AN/ ARC-220 HF Radio)	SS/CPFF	Georgia Tech Research Institute : Tucson, AZ	-	-		1.000	Jun 2021	-		-		-	0.000	1.000	-
		Subtotal	23.939	4.697		6.287		5.807		-		5.807	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) C97 / *ACFT Avionics*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EAGLE M-Code / EGI RSAM Flight Test Support	Various	Development Command Aviation & Missiles Center Engineering Directorate : Redstone Arsenal, AL	0.173	-		0.035	Jun 2021	-		-		-	0.000	0.208	-
		Subtotal	0.173	-		0.035		-		-		-	0.000	0.208	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EAGLE M-Code / EGI RSAM Airworthiness Qualification Testing	RO	Redstone Test Center : Redstone Arsenal, AL	0.146	-		0.035	Jun 2021	-		-		-	0.000	0.181	-
		Subtotal	0.146	-		0.035		-		-		-	0.000	0.181	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	25.879	4.734		6.357		5.807		-		5.807	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

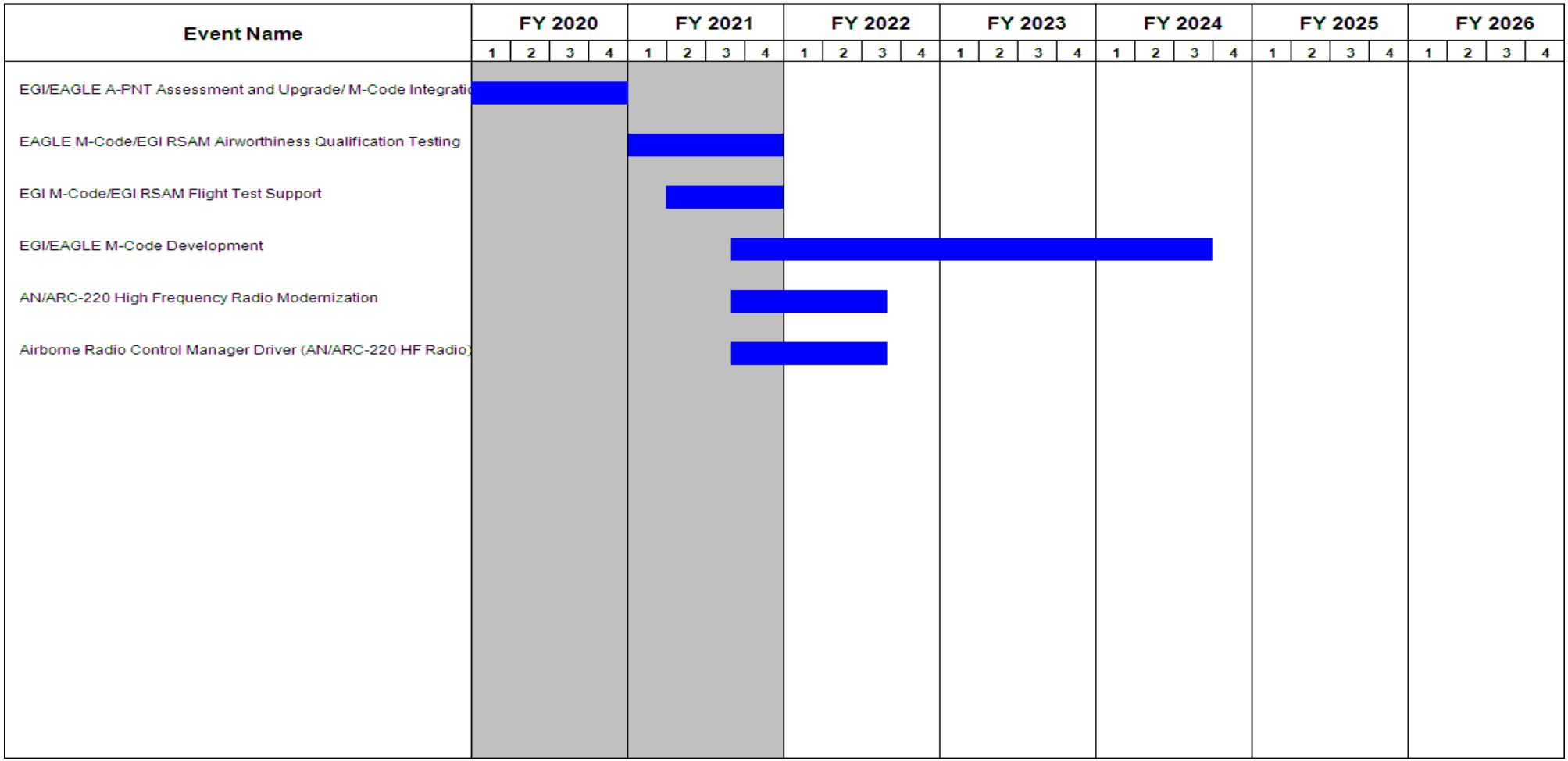


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
DGNS Anti-Jam Antenna Development	4	2016	4	2019
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	2	2018	4	2020
EAGLE M-Code/EGI RSAM Airworthiness Qualification Testing	1	2021	4	2021
EGI M-Code/EGI RSAM Flight Test Support	2	2021	4	2021
EGI/EAGLE M-Code Development	3	2021	3	2024
AN/ARC-220 High Frequency Radio Modernization	3	2021	3	2022
Airborne Radio Control Manager Driver (AN/ARC-220 HF Radio)	3	2021	3	2022

Note

DGNS: Doppler Global Positioning System (GPS) Navigation Set
A-PNT: Assured-Position Navigation and Timing
RSAM: Resiliency & Software Assurance Modification
M-Code: Military-Code
EGI: Embedded GPS Inertial

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) EW7 / *Degraded Visual Environment*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
EW7: *Degraded Visual Environment*	-	2.552	-	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project EW7 Degraded Visual Environment (DVE) completed development and test efforts in Fiscal Year (FY) 2020 and awarded an Other Transaction Authority (OTA) Prototype agreement for the Aviation Mission Common Server (AMCS) and Environment Exploitation System (EES) Modular Capabilities Demonstration.

A. Mission Description and Budget Item Justification

The DVE EES focuses on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the Army aviation fleet.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Degraded Visual Environment (DVE)	2.552	-	-
Description: The DVE EES efforts focus on active and passive sensor technology, synthetic vision, sensor and software data fusion, imagery processing, user interface, and multicore processing technologies to enable current and future capabilities and innovative technical solutions for the current Army aviation fleet to safely operate in DVE.			
Accomplishments/Planned Programs Subtotals	2.552	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• A00713: *Degraded Visual Environment*	49.450	1.916	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The DVE EES acquisition strategy for development leveraged a competitively awarded Other Transaction Authority (OTA) Prototype agreement to provide a technical approach for the development of a distributive processing capability hosted with an open systems architecture that provides processing capacity and throughput required to support highly intensive graphic and data processing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) EW7 / *Degraded Visual Environment*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support for EES	Various	Various : Various	1.067	-		-		-		-		-	0.000	1.067	-
		Subtotal	1.067	-		-		-		-		-	0.000	1.067	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop and qualify the software and hardware for EES	Various	Elbit; Mercury; POC : ACC-NJ	0.063	2.552	Aug 2020	-		-		-		-	0.000	2.615	-
Develop hardware configuration DVE EES	Various	various : various	4.436	-		-		-		-		-	0.000	4.436	-
		Subtotal	4.499	2.552		-		-		-		-	0.000	7.051	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering, Logistics and Technical Support for EES	MIPR	Combat Capabilities Devlopment Command : Redstone Arsenal, AL	0.487	-		-		-		-		-	0.000	0.487	-
		Subtotal	0.487	-		-		-		-		-	0.000	0.487	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.053	2.552		0.000		-		-		-	0.000	8.605	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** EW7 / *Degraded Visual Environment*

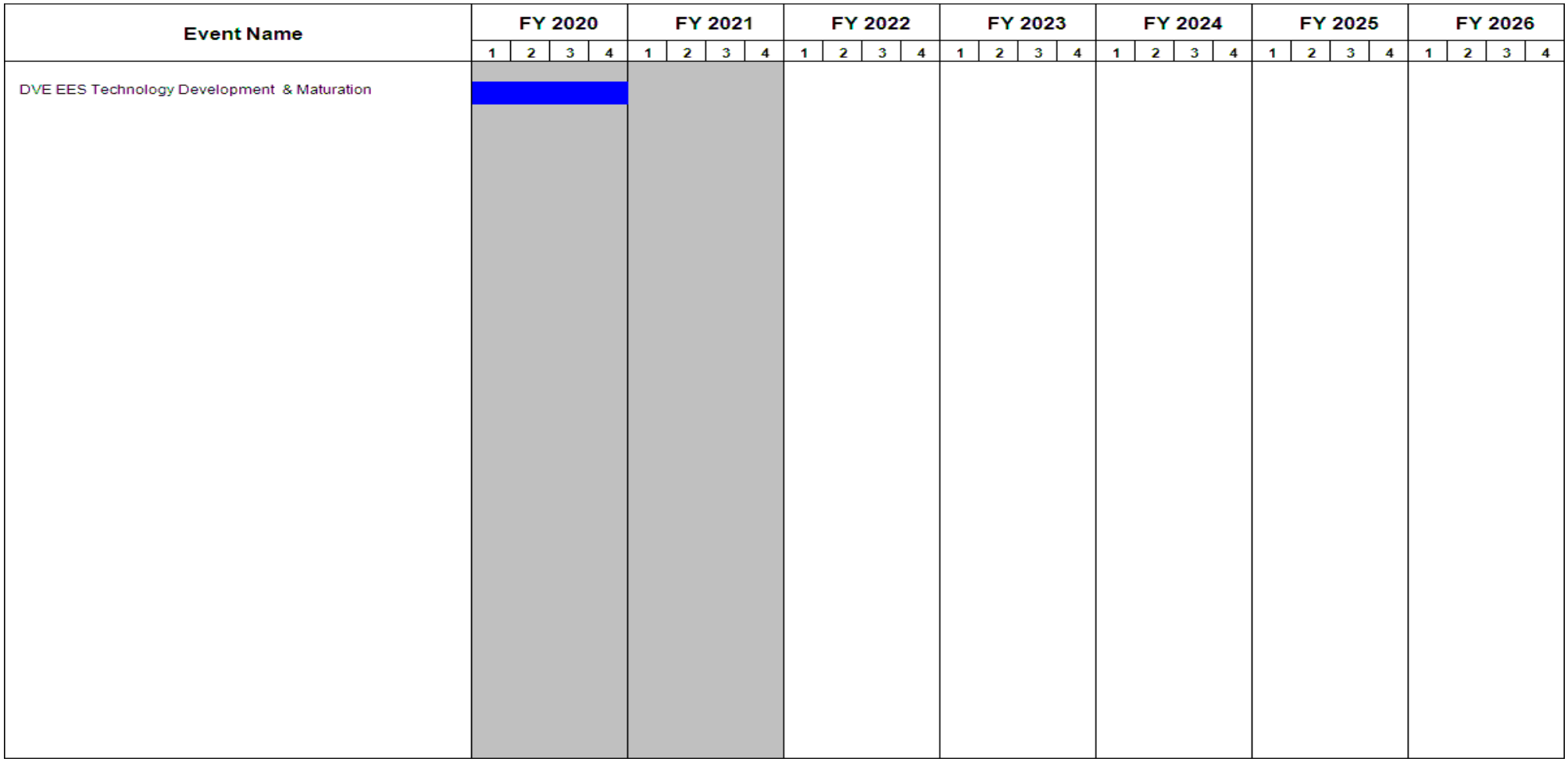


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** EW7 / *Degraded Visual Environment*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Degraded Visual Environment Directed Requirement (DVE DR)	3	2017	4	2019
Critical Design Review	3	2018	3	2018
Operational Test	4	2019	4	2019
Production Decision	4	2019	4	2019
DVE EES Technology Development & Maturation	1	2018	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) VU3 / *Networking And Mission Planning*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
VU3: *Networking And Mission Planning*	-	0.783	0.654	0.847	-	0.847	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Project VU3 Network and Mission Planning FY 2022 funding will be utilized to support the AMCS Modular Capabilities Demonstration OTA and other developmental activities in support of AMCS as a replacement and capability upgrade for the current Army IDM-401.

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2022 budget request funds the development of Networking and Mission Planning systems required to horizontally and vertically integrate the battlefield and the integration of those systems into Army aircraft. Tasks in this Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The Improved Data Modem (IDM) is the common solution for digitizing Army Aviation and is fielded on every modernized, rotary-wing Army aircraft, including the CH-47 Chinook, AH-64 Apache and UH-60 Black Hawk. The IDM provides the Army rotary wing fleet with critical communication capabilities, enables connectivity to multiple radios used by rotary-wing aircraft and the Blue Force Tracking transceiver, and provides the means for rapid data transfer.

The Aviation Mission Common Server (AMCS) effort is a replacement and capability upgrade for the current Army IDM-401. The AMCS program will implement IDM and Common Operating Environment capabilities utilizing a flexible open systems architecture and distributed processing resources with the capacity and architecture to perform an array of additional non-flight critical computing, data processing, radio and communications management, and graphics generation functions for the enduring and future Army Aviation fleet and de-couple non-flight critical mission system technology integration from flight critical components. The AMCS provides the ability to rapidly integrate technology upgrades required to keep pace with evolving threats on Multi-Domain Battlefield. The AMCS enables the hosting of enhanced capabilities to communicate, navigate, sense and deploy weapon systems across the Joint Force and will be the center of the future Common Digital Backbone for the enduring and future Army Aviation fleets, and is a key enabler for Multi-Domain Operations.

The Aviation Mission Planning System (AMPS) is a system used to conduct pre-mission and aircraft performance planning. It receives data from multiple sources and provides that data digitally to the aircraft to support aviation missions. AMPS is used for automated mission planning, risk assessment, and transfer of mission data to aviation platforms within an Aviation unit. This includes route generation, performance planning, communications planning, terrain analysis, data transfer, and mission rehearsal. These efforts include development and testing of a new underlying architecture to support the move of Army Aviation Mission Planning from the current structure to one that supports synchronization both vertically and horizontally between Aviation and Ground forces. It will allow aircrews to continually plan and update route, threat, and performance data throughout all phases of an Aviation mission. Development of a mobile aircraft performance planning/weight and balance calculator is currently underway and will be the first migration of AMPS capabilities to a mobile hardware agnostic environment.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Aviation Mission Common Server (AMCS)	0.783	0.654	0.847
Description: AMCS is a capability upgrade and replacement for the IDM-401. ***FY 2021 Plans:*** Perform airworthiness assessments and develop airworthiness documentation, multicore testing documentation, assess airworthiness requirements compliance, provide closing memos, produce airworthiness releases, and provide airworthiness support to the demonstration and test of the AMCS capability. ***FY 2022 Plans:*** Perform and support production representative prototype assessments, testing, demonstration and qualification activities in support of the Aviation Mission Common Server (AMCS) Modular Capabilities Demonstration Qualification and Prototype Delivery Phase and developmental activities. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increased funding is required to support testing and qualification requirements of the Aviation Mission Common Server Prototype effort required to inform the AMCS as a capability upgrade and replacement for the current Army IDM-401.			
Accomplishments/Planned Programs Subtotals	0.783	0.654	0.847

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• AA0712: *Network And Mission Plan*	98.236	77.432	29.206	-	29.206	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The AMCS will complete development, testing and qualification efforts in coordination with the aircraft platforms on integration issues, use the various contracts of the aircraft platforms original equipment manufacturers on integration efforts, and utilize the U.S. Army Combat Capabilities Development Command (CCDC) - Aviation & Missile Center (AvMC) for software development and integration at both the Line Replaceable Unit and platform level. The AMCS is leveraging a competitive Other Transaction Authority (OTA) prototype agreement to develop and demonstrate multiple AMCS Family of Systems (FoS) capabilities and hardware solutions with multiple industry vendors that will inform the Milestone Decision Authority's production decision.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) VU3 / *Networking And Mission Planning*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support (IDM)	MIPR	PdM A2E2 : Redstone Arsenal, AL	0.050	-		-		-		-		-	0.000	0.050	-
PM Support (AMCS)	Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	-	0.010		0.009		0.141		-		0.141	Continuing	Continuing	-
		Subtotal	0.050	0.010		0.009		0.141		-		0.141	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop software for IDM	C/Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	1.518	-		-		-		-		-	0.000	1.518	-
Hardware and Software Development/ Demonstration for the Aviation Mission Common Server (AMCS)	C/Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	-	-		-		0.706	Dec 2021	-		0.706	0.000	0.706	-
AMCS Hardware and Software Prototype Development OTA	C/FFP	Physical Optics Corporation and Elbit : Fort Worth, Tx and Torrance, California	-	0.199	Aug 2020	-		-		-		-	0.000	0.199	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) VU3 / *Networking And Mission Planning*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AMCS Medical HUB Demonstration	MIPR	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	-	0.086	Aug 2020	-		-		-		-	0.000	0.086	-
		Subtotal	1.518	0.285		-		0.706		-		0.706	0.000	2.509	N/A

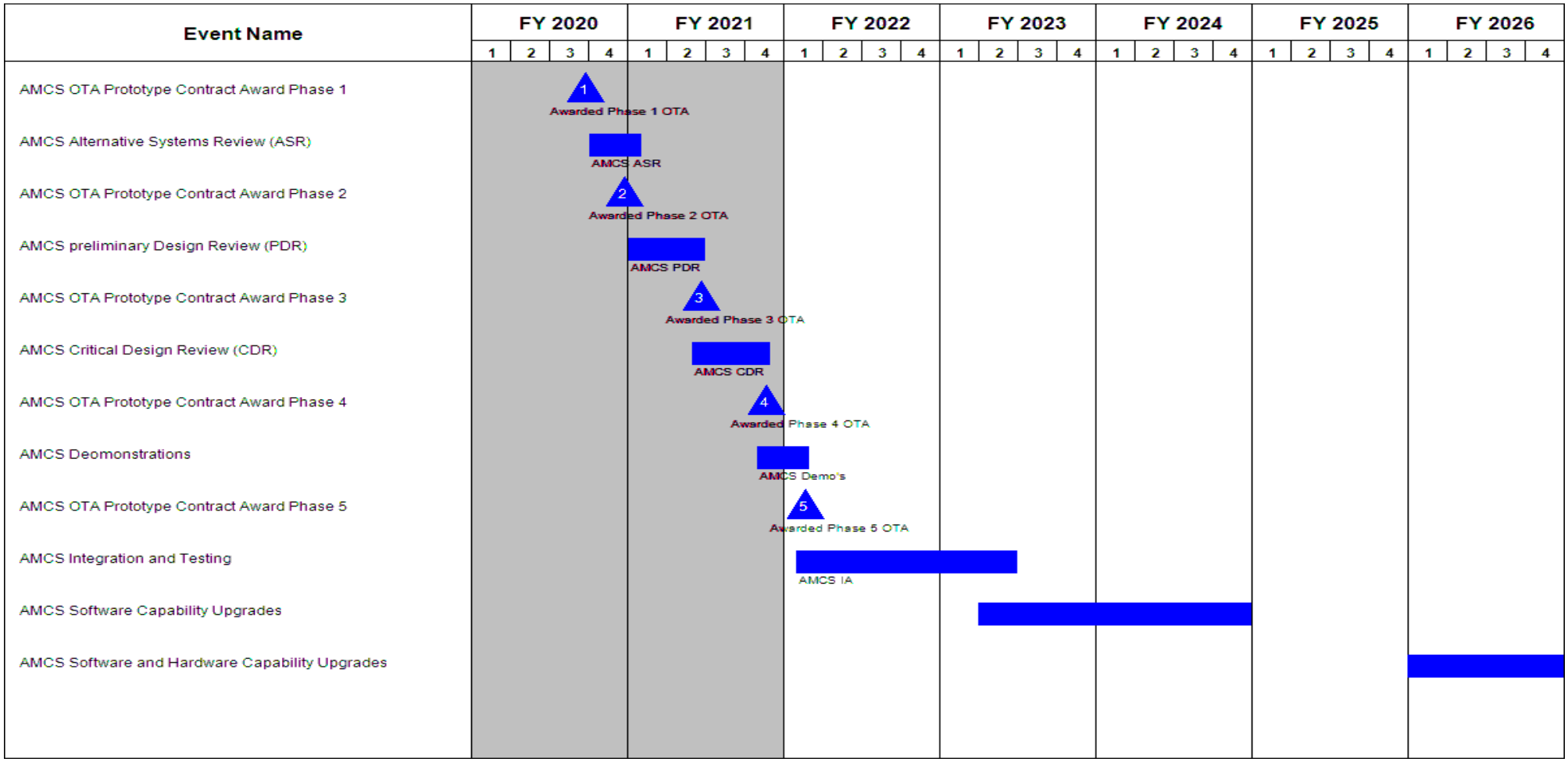
Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aviation Mission Common Server (AMCS) Prototype C5 Consortium OTA Support	MIPR	C5 Consortium : APG MD	-	0.041	Jun 2020	-		-		-		-	0.000	0.041	-
Hardware and Software Development Support for the Aviation Mission Common Server (AMCS)	C/Various	Combat Communications Development Command, Aviation & Missile Center : Redstone Arsenal, AL	-	0.447	Nov 2020	0.645	Oct 2020	-		-		-	0.000	1.092	-
		Subtotal	-	0.488		0.645		-		-		-	0.000	1.133	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.568	0.783		0.654		0.847		-		0.847	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*



Note

The Aviation Mission Common Server Modular Capabilities Demonstration Other Transaction Authority awarded 24 June 20. The schedule depicts the OTA's 5 Individual phases and their associated award and effort duration.

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Qualify ADEC Hardware and Software	2	2011	2	2018
Milestone B (ADEC)	4	2016	4	2016
Develop hardware and software (ACN)	1	2012	4	2016
Develop AMPS Software	1	2018	4	2018
Develop IDM Software	4	2018	4	2018
AMCS Airworthiness Studies and Assessments	2	2019	2	2019
AMCS OTA Prototype Contract Award Phase 1	3	2020	3	2020
AMCS Alternative Systems Review (ASR)	4	2020	1	2021
AMCS OTA Prototype Contract Award Phase 2	4	2020	4	2020
AMCS preliminary Design Review (PDR)	1	2021	2	2021
AMCS OTA Prototype Contract Award Phase 3	2	2021	2	2021
AMCS Critical Design Review (CDR)	2	2021	4	2021
AMCS OTA Prototype Contract Award Phase 4	4	2021	4	2021
AMCS Deomonstrations	4	2021	1	2022
AMCS OTA Prototype Contract Award Phase 5	1	2022	1	2022
AMCS Integration and Testing	1	2022	2	2023
AMCS Software Capability Upgrades	2	2023	4	2024
AMCS Software and Hardware Capability Upgrades	1	2026	4	2026

Note

ACN: Aircraft Notebook
ADEC: Aviation Data Exploitation Capability
AMCS: Aviation Mission Common Server
AMPS: Aviation Mission Planning System
EES: Environment Exploitation System

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*

IDM: Improved Data Modem