Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army											Date: February 2018	
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*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	-	54.915	30.153	32.293	-	32.293	25.582	25.103	27.610	29.558	0.000	225.214
C97: *ACFT Avionics*	-	0.798	20.915	16.748	-	16.748	7.187	5.824	5.470	3.228	0.000	60.170
EW7: *Degraded Visual Environment*	-	0.000	8.272	14.742	-	14.742	17.579	18.442	19.999	22.656	0.000	101.690
VU3: *Networking And Mission Planning*	-	54.117	0.966	0.803	-	0.803	0.816	0.837	2.141	3.674	0.000	63.354

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2019 budget estimate 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.

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 inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS ASN-128D Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The ASN-128D CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded GPS Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
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*

Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment. IDM new software architecture will incorporate the ability to host IDM functionality on hardware that meets the minimum requirements to run the IDM Operating Flight Program. These efforts will include development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	83.248	30.153	76.576	-	76.576
Current President's Budget	54.915	30.153	32.293	-	32.293
Total Adjustments	-28.333	0.000	-44.283	-	-44.283
• Congressional General Reductions	-0.029	-			
• Congressional Directed Reductions	-21.000	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.000	-			
• SBIR/STTR Transfer	-2.304	-			
• Adjustments to Budget Years	-	-	-44.283	-	-44.283

Change Summary Explanation

FY17 reflects a Congressional decrement of -$21.000 million for excess DVE product development funding, a reprogramming of -$5.000 million to settle a PM Advanced Scout Helicopter cancelled account contractor bill, and a decrement of -$0.029 million Congressional general reduction for FFRDC.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
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*

FY19 reflects multiple adjustments to funding as follows: HQDA realignments to other programs (-$42.028 million), realignment of reimbursable manpower funding to direct manpower funding (-$3.072 million), and realignment of funding to support Comms, Nav and Surveillance efforts (+$0.803 million) and Aviation Network and Mission Planning efforts (+$0.014 million).

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
C97: *ACFT Avionics*	-	0.798	20.915	16.748	-	16.748	7.187	5.824	5.470	3.228	0.000	60.170
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2018 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 Project support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

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 inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules map display. It also prepares Engineering Change Proposals (ECP) to the existing DGNS ASN-128D Line Replaceable Units (LRU) as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for Computer Display Unit (CDU) and Signal Data Converter LRU ECP packages. The ASN-128D CDU upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map capability and optimizes pilot interface to augment existing Instrument Flight Rules capability promoting safer flight operations. The CDU upgrade will support Assured-Position Navigation and Timing (A-PNT) operations in conjunction with additional system LRU upgrades, includes anti-jam antenna capabilities, and supports Department of Defense (DoD) and Army's requirement to maintain A-PNT throughout operations. This will require assessment and follow-on upgrade to the DGNS navigation system. The CDU upgrade will perform an assessment of A-PNT assurance levels to understand system performance and associated PNT capability gaps, and will evaluate candidate solutions to cover any identified gaps.

The Enhanced Aviation GATM Localizer Performance with Vertical Guidance (LPV) Embedded Global Positioning System (GPS) Inertial (EGI) Navigation System (EAGLE) A-PNT integration program assesses current capabilities in identified operational PNT environment levels, tests identified upgrades to existing EGI hardware in order to accommodate A-PNT in identified operational environments, and incorporates M-Code. It supports DoD and Army's requirement to maintain A-PNT throughout operations and requires assessment and follow-on upgrade to the EGI navigation system. The EAGLE upgrade will perform an assessment of A-PNT assurance levels to understand system performance, associated PNT capability gaps, integrate anti-jam antenna capabilities, and evaluate candidate solutions to cover any identified gaps.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: DGNS / A-PNT Assessment	0.399	6.310	8.081
Description: The DGNS Upgrade program completes system engineering trade studies to reduce space, weight, and power with the introduction of new navigation support capabilities such as inertial sensor, MIL-STD-1553 interface card, and Instrument Flight Rules (IFR) map display. It also prepares ECPs to the existing DGNS ASN-128D LRU as a result of those trade studies. The DGNS upgrade continues with execution of Non-Recurring Engineering for CDU and Signal Data Converter LRU ECP packages. The ASN-128D CDU Upgrade replaces the current CDU faceplate with a touch screen display, provides a moving navigation map			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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 2017	FY 2018	FY 2019
capability and optimized pilot interface to augment existing IFR capability and promote safer flight operations. It also enables CDU support for A-PNT operations in conjunction with additional system LRU upgrades, including anti-jam antenna capabilities. ***FY 2018 Plans:*** Complete assessments and feasibility studies performed on the DGNS CDU to determine upgrades needed to meet A-PNT requirements and begin executing hardware and software upgrades identified in the completed assessment. Begin software modifications to legacy GPS receiver cards to include Resiliency Software Assurance Modification (RSAM) and continues GPS anti-jam antenna development and integration. ***FY 2019 Plans:*** Complete software modifications to legacy GPS receiver cards to include RSAM and complete GPS anti-jam antenna development and integration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The majority of the non-recurring engineering work for RSAM and GPS anti-jam antenna development will occur in FY 2018; the funding in FY 2019 increases due to contractor labor associated with meeting DO-178C Level B Software Documentation requirements, which will increase significantly as development efforts culminate.			
Title: EAGLE Navigation System A-PNT Integration	0.399	14.605	8.667
Description: The EAGLE Navigation System A-PNT integration program assesses current capabilities in identified operational PNT environment levels and tests identified upgrades to existing EGI hardware to accommodate A-PNT in identified operational environments. ***FY 2018 Plans:*** Complete assessments and feasibility studies performed on the EGI and EAGLE equipment to determine upgrades needed to meet A-PNT requirements, begin executing hardware and software upgrades identified in the completed assessment, and begin to incorporate M-Code. Continue software modifications to legacy GPS receiver cards to include RSAM and continues GPS anti-jam antenna development and integration. ***FY 2019 Plans:*** Complete software modifications to legacy GPS receiver cards, continue M-Code integration into the EAGLE, and complete the development and integration of a GPS anti-jam antenna. ***FY 2018 to FY 2019 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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 2017	FY 2018	FY 2019
The majority of the non-recurring engineering work for M-Code integration, RSAM, and GPS anti-jam antenna development will occur in FY 2018; the funding in FY 2019 decreases due to the majority of the work being passed through the prime to the GPS card developer for M-Code Integration resulting in front loaded funding awarded primarily in FY18.			
Accomplishments/Planned Programs Subtotals	0.798	20.915	16.748

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• AA0723: *COMMS, NAV Surveillance*	76.960	170.339	161.969	-	161.969	136.972	151.556	189.090	185.259	Continuing	Continuing
• AA0704: *GATM Rotary Wing*	45.302	37.403	26.848	-	26.848	41.433	35.306	16.336	15.795	Continuing	Continuing

Remarks

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 Aviation & Missile Research, Development, and Engineering 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.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Services (EAGLE)	Various	PM AME/AMRDEC SED : Redstone Arsenal, AL	-	0.007	Oct 2016	0.583	Oct 2017	0.212	Mar 2019	-		0.212	0.000	0.802	-
PM Services (DGNS Upgrade/ DGNS A-PNT)	Various	PM AME/AMRDEC SED : Redstone Arsenal, AL	0.619	0.007	Oct 2016	0.577	Oct 2017	0.212	Mar 2019	-		0.212	0.000	1.415	-
		Subtotal	0.619	0.014		1.160		0.424		-		0.424	0.000	2.217	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DGNS A-PNT Assessment and Upgrade	SS/CPFF	BAE Systems : Wayne, NJ	-	-		5.527	Feb 2018	7.544	Feb 2019	-		7.544	Continuing	Continuing	Continuing
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	SS/CPFF	Honeywell : Clearwater, FL	-	-		14.028	Feb 2018	7.355	Feb 2019	-		7.355	Continuing	Continuing	Continuing
DGNS Anti-Jam Antenna Development	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	0.589	0.392	Aug 2017	0.200	Jan 2018	0.075	Jan 2019	-		0.075	0.000	1.256	-
EGI Anti-Jam Antenna Development	SS/CPFF	Mayflower Communications, Inc. : Bedford, MA	-	0.392	Aug 2017	-		0.100	Jan 2019	-		0.100	0.000	0.492	-
		Subtotal	0.589	0.784		19.755		15.074		-		15.074	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EAGLE M-Code / EGI RSAM Flight Test Support	MIPR	AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL	-	-		-		0.625	Nov 2018	-		0.625	0.000	0.625	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DGNS RSAM Flight Test Support	MIPR	AMRDEC Aviation Engineering Directorate : Redstone Arsenal, AL	-	-		-		0.125	Nov 2018	-		0.125	0.000	0.125	-
		Subtotal	-	-		-		0.750		-		0.750	0.000	0.750	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EAGLE M-Code / EGI RSAM Airworthiness Qualification Testing	Various	Redstone Test Center : Redstone Arsenal, AL	-	-		-		0.375	Nov 2018	-		0.375	0.000	0.375	-
DGNS RSAM Airworthiness Qualification Testing	Various	Redstone Test Center : Redstone Arsenal, AL	-	-		-		0.125	Nov 2018	-		0.125	0.000	0.125	-
		Subtotal	-	-		-		0.500		-		0.500	0.000	0.500	N/A

	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.208	0.798		20.915		16.748		-		16.748	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

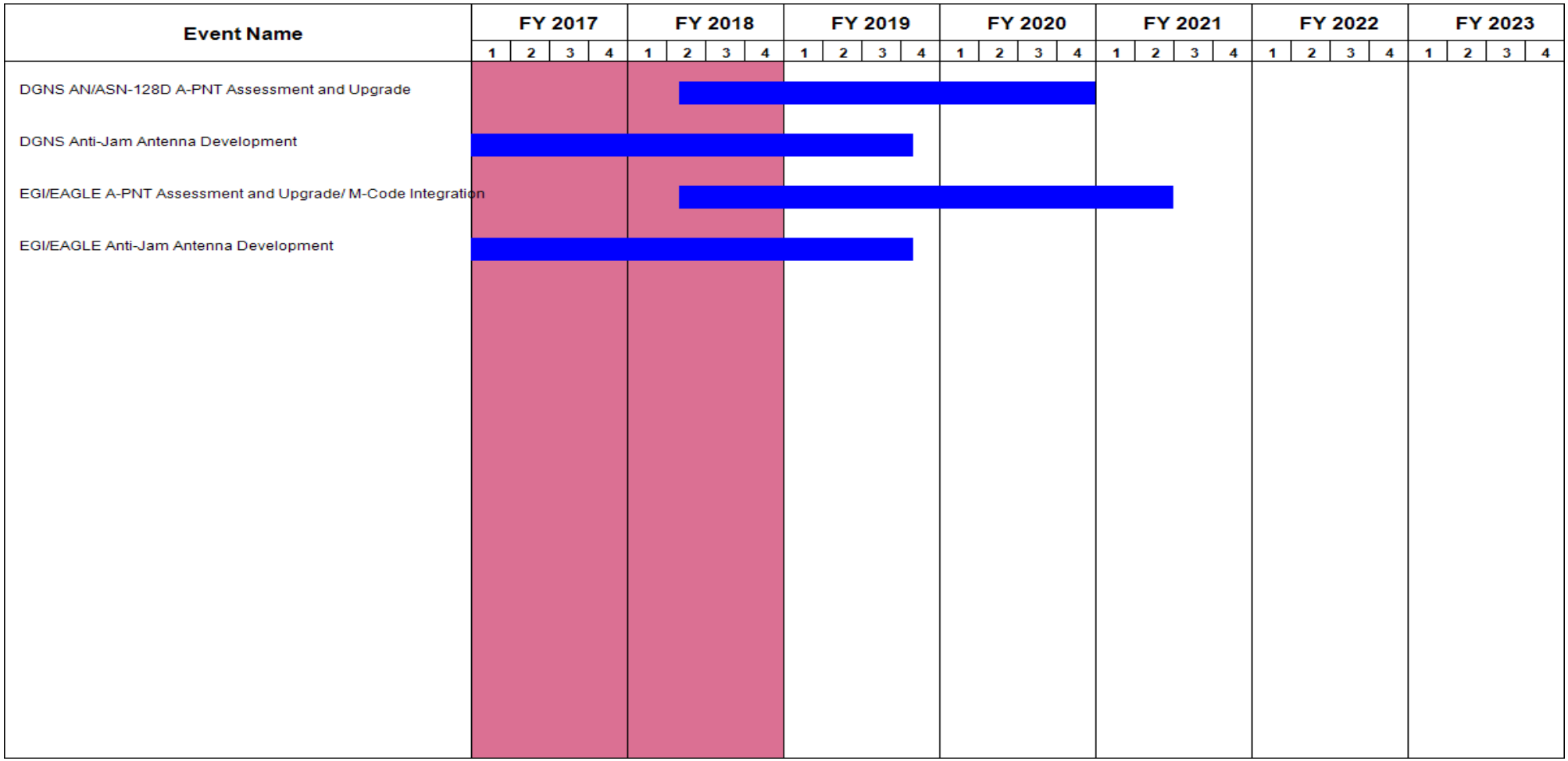

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** C97 / *ACFT Avionics*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
DGNS AN/ASN-128D A-PNT Assessment and Upgrade	2	2018	4	2020
DGNS Anti-Jam Antenna Development	4	2016	4	2019
EGI/EAGLE A-PNT Assessment and Upgrade/ M-Code Integration	2	2018	2	2021
EGI/EAGLE Anti-Jam Antenna Development	4	2016	4	2019
AMF-A Antenna Development and Co-Site Analysis	2	2011	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
EW7: *Degraded Visual Environment*	-	0.000	8.272	14.742	-	14.742	17.579	18.442	19.999	22.656	0.000	101.690
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding for the Degraded Visual Environment (DVE) program was previously included in PE 0604201A, Aircraft Avionics/Project VU3, Networking and Mission Planning.

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2019 budget request funds the Degraded Visual Environment (DVE) Quick Reaction Capability (QRC) Directed Requirement (DR) and the DVE Increment I program. DVE QRC DR activity includes the development, system testing, qualification, integration, and installation of a DVE system on Army aircraft to support an operational test event.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: DVE	-	8.272	14.742
Description: The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** EW7 / *Degraded Visual Environment*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. ***FY 2018 Plans:*** Develop program documentation, perform system modeling and simulation activities, and continue the development of integration Modification Work Order procedures for integration onto the UH/HH-60M and CH-47F. ***FY 2019 Plans:*** Develop program documentation, perform system modeling and simulation activities, conduct trade studies and develop software to interface system with UH-60/HH-60M and CH-47F. Continue the development of integration Modification Work Order procedures for integration onto the UH/HH-60M and CH-47F. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** DVE funding increase is due to 2019 Milestone B Decision with follow on development contract award.			
Accomplishments/Planned Programs Subtotals	-	8.272	14.742

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• A00713: *Degraded Visual Environmnet*	-	-	30.000	-	30.000	-	-	-	-	0.000	30.000

Remarks

D. Acquisition Strategy

The DVE QRC DR acquisition strategy is to leverage an existing contract competitively awarded by the Technology Applications Program Office. An Other Government Agency will perform the installation of the DVE QRC DR system into the designated aircraft. A disposition analysis of the DVE QRC DR will inform the DVE Increment I acquisition strategy. The DVE Increment I acquisition strategy is to leverage the DVE QRC DR materiel solution for installation onto additional aircraft.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support	Various	Various : Various	-	-		6.100		-		-		-	Continuing	Continuing	Continuing
		Subtotal	-	-		6.100		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop and qualify the software and hardware for DVE	Various	Various : Various	-	-		-		11.238	Jul 2019	-		11.238	Continuing	Continuing	Continuing
		Subtotal	-	-		-		11.238		-		11.238	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering, Logistics and Technical Support	Various	Various : Various	-	-		2.172	Jun 2018	3.145	Jul 2019	-		3.145	Continuing	Continuing	Continuing
		Subtotal	-	-		2.172		3.145		-		3.145	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DVE	Various	Various : Various	-	-		-		0.359	Jul 2019	-		0.359	0.000	0.359	-
		Subtotal	-	-		-		0.359		-		0.359	0.000	0.359	N/A

	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		8.272		14.742		-		14.742	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604201A / *Aircraft Avionics*	Project (Number/Name) EW7 / *Degraded Visual Environment*	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** EW7 / *Degraded Visual Environment*

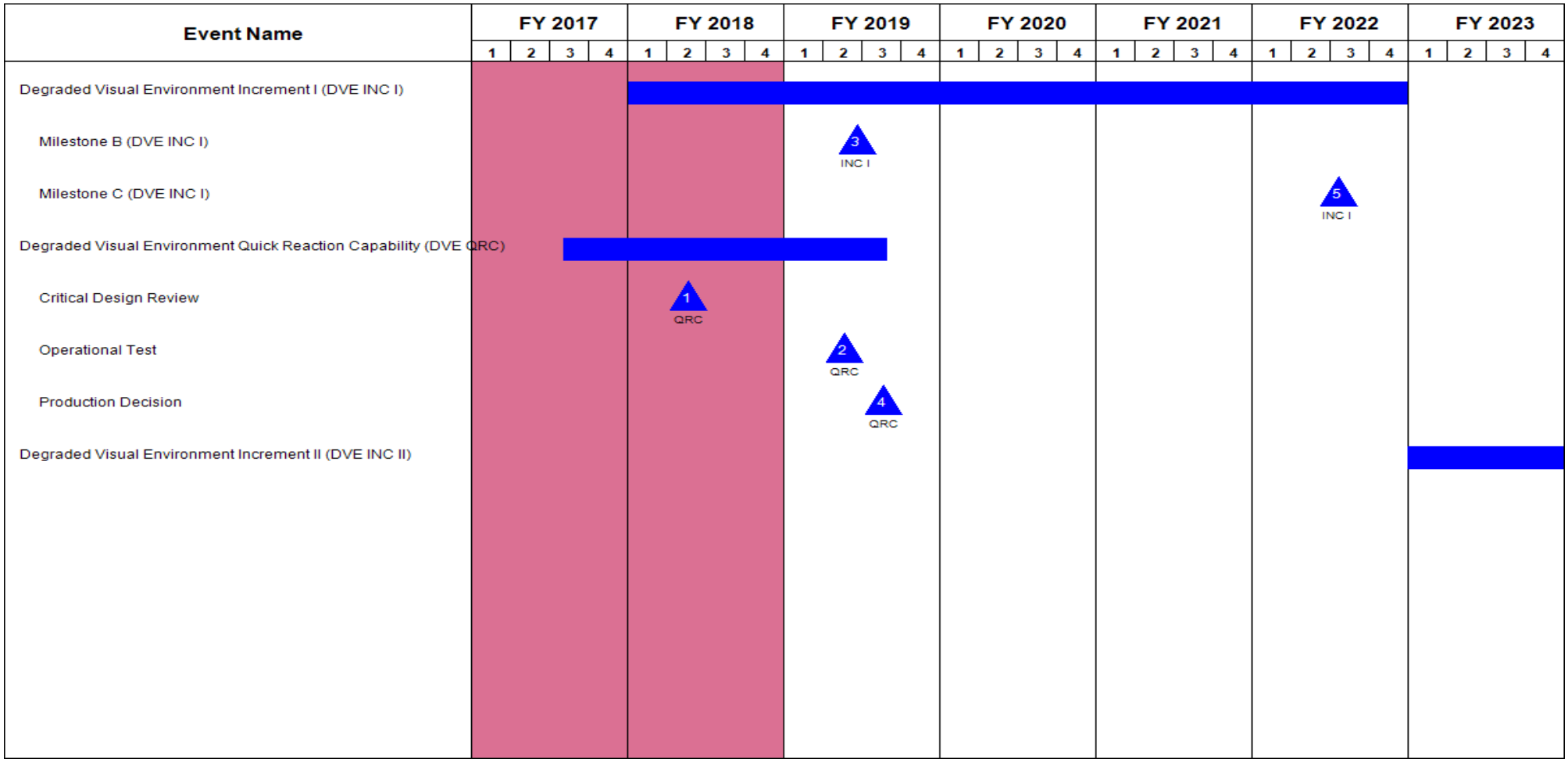

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** EW7 / *Degraded Visual Environment*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Degraded Visual Environment Increment I (DVE INC I)	1	2018	4	2022
Milestone B (DVE INC I)	2	2019	2	2019
Milestone C (DVE INC I)	3	2022	3	2022
Degraded Visual Environment Quick Reaction Capability (DVE QRC)	3	2017	3	2019
Critical Design Review	2	2018	2	2018
Operational Test	2	2019	2	2019
Production Decision	3	2019	3	2019
Degraded Visual Environment Increment II (DVE INC II)	1	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
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COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
VU3: *Networking And Mission Planning*	-	54.117	0.966	0.803	-	0.803	0.816	0.837	2.141	3.674	0.000	63.354
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funding for the Degraded Visual Environment (DVE) program has been moved to PE 0604201A, Aircraft Avionics/Project EW7, Degraded Visual Environment, beginning in FY18.

A. Mission Description and Budget Item Justification

The Fiscal Year (FY) 2019 budget estimate submission 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 Program Element Support research, development, and test efforts in the Engineering and Manufacturing Development phases of these systems.

The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions.

The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.

The Aviation Data Exploitation Capability (ADEC) is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to Centralized Aviation Flight Records System (CAFRS) to reduce data entry and the information technology footprint while enabling disconnected and split based operations.

The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment. IDM new software architecture will incorporate the ability to host IDM functionality on hardware that meets the

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*

minimum requirements to run the IDM Operating Flight Program. These efforts will include development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: DVE ***Description:*** The DVE Quick Reaction Capability (QRC) is an Army Directed Requirement (DR) to provide DVE systems to 15 HH-60M Blackhawk MEDEVAC helicopters and 25 Special Operations aircraft. The DVE QRC DR fulfills an immediate DVE requirement while bridging the gap between future DVE capabilities pursued within the DVE Increment I program of record. The DVE QRC DR provides a forward looking, situational awareness, fused-sensor image for single aircraft takeoff and landing in brownout conditions. The Degraded Visual Environment (DVE) Increment I program increases survivability due to DVE brownout conditions encountered during takeoff and landing. The DVE Increment I program is equally applicable to training scenarios as well as tactical operations. DVE Increment I will combine sensor(s) technology with critical aircraft flight information (aircraft state data) to provide an initial capability that increases aircrew awareness through detection and warning of hazardous terrain and obstacles. DVE Increment I improves safety, reduces risk, and maximizes flexibility for Aviation units. DVE Increment I activities include development, system testing, qualification, and aircraft integration.	49.183	-	-
Title: Aviation Data Exploitation Capability (ADEC) ***Description:*** The ADEC is an Army aviation automated information system program providing specific capabilities needed at the aviation unit level to implement and support improvements within aviation operations, safety, and training to increase operational effectiveness and situational awareness at all command echelons. ADEC provides a common and interoperable capability required to implement the DoD mandated Military Flight Operations Quality Assurance processes. ADEC will standardize flight scheduling/management, risk management, mission approval, and flight data analysis and visualization. ADEC provides interfaces to CAFRS to reduce data entry and the information technology footprint while enabling disconnected and split based operations.	4.934	-	-
Title: Improved Data Modem ***Description:*** The Improved Data Modem (IDM) provides digital connectivity among airborne and ground platforms and transmission of air-to-air target data between IDM equipped aircraft using existing radio and crypto equipment. ***FY 2018 Plans:*** Develop new software architecture that will incorporate the ability to host IDM functionality on any hardware that meets the minimum requirements to run the IDM Operating Flight Program. Efforts include the development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software. ***FY 2019 Plans:***	-	0.966	0.803

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue development of new software architecture that will incorporate the ability to host IDM functionality on any hardware that meets the minimum requirements to run the IDM Operating Flight Program. Efforts include the development and testing of that capability, as well as any documentation required to ensure Government Purpose rights to the new software. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** IDM's decrease in RDTE from FY18 to FY19 can be attributed to the collaborative efforts between ANMP and other stakeholders. This collaboration has led to the software architectural refinement, resulting in a forecasted decrease in cost due for IDM.			
Accomplishments/Planned Programs Subtotals	54.117	0.966	0.803

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• AA0712: *Network And Mission Plan*	74.752	142.102	123.614	-	123.614	98.605	96.165	93.961	94.031	Continuing	Continuing

Remarks

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 Aviation & Missile Research, Development, and Engineering Center for software development. The DVE QRC DR acquisition strategy is to leverage an existing contract competitively awarded by the Technology Applications Program Office. An Other Government Agency will perform the installation of the DVE QRC DR system into the designated aircraft. A disposition analysis of the DVE QRC DR will inform the DVE Increment I acquisition strategy. The DVE Increment I acquisition strategy is to leverage the DVE QRC DR materiel solution for installation onto additional aircraft.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PM Support (DVE)	Various	Program Manager DVE/BORES : Redstone Arsenal, AL	6.958	12.173	Oct 2016	-		-		-		-	0.000	19.131	-
System Engineering, Logistic, and Technical Support (IDM)	Various	PM ANMP : Redstone Arsenal, AL	-	-		0.053	Oct 2017	0.036	Oct 2018	-		0.036	0.000	0.089	-
		Subtotal	6.958	12.173		0.053		0.036		-		0.036	0.000	19.220	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop and qualify the software and hardware for DVE	C/Various	Various : Various	8.938	31.266	Mar 2017	-		-		-		-	0.000	40.204	-
Qualify ADEC software and hardware	Various	Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL	13.086	4.302	May 2017	-		-		-		-	0.000	17.388	-
Develop software for IDM	C/Various	Aviation Missile Research Development Engineering Center (AMRDEC) : Redstone Arsenal, AL	-	-		0.913	Feb 2018	0.767	Mar 2019	-		0.767	Continuing	Continuing	Continuing
		Subtotal	22.024	35.568		0.913		0.767		-		0.767	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering, Logistics, and Technical Support (DVE)	Various	Various : Various	6.343	4.988	Sep 2017	-		-		-		-	0.000	11.331	-
System Engineering, Logistics, and Technical Support (ADEC)	Various	Army Test & Evaluation (ATEC), Aberdeen, MD; AMRDEC : Redstone Arsenal, AL	1.193	-		-		-		-		-	0.000	1.193	-
		Subtotal	7.536	4.988		-		-		-		-	0.000	12.524	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DVE	Various	Various : Various	36.909	0.756	Sep 2017	-		-		-		-	0.000	37.665	-
ADEC	Various	Army Test & Evaluation Command (ATEC), Aberdeen MD; AMRDEC : Redstone Arsenal, AL	3.957	0.632	Jul 2017	-		-		-		-	0.000	4.589	-
		Subtotal	40.866	1.388		-		-		-		-	0.000	42.254	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	77.384	54.117		0.966		0.803		-		0.803	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
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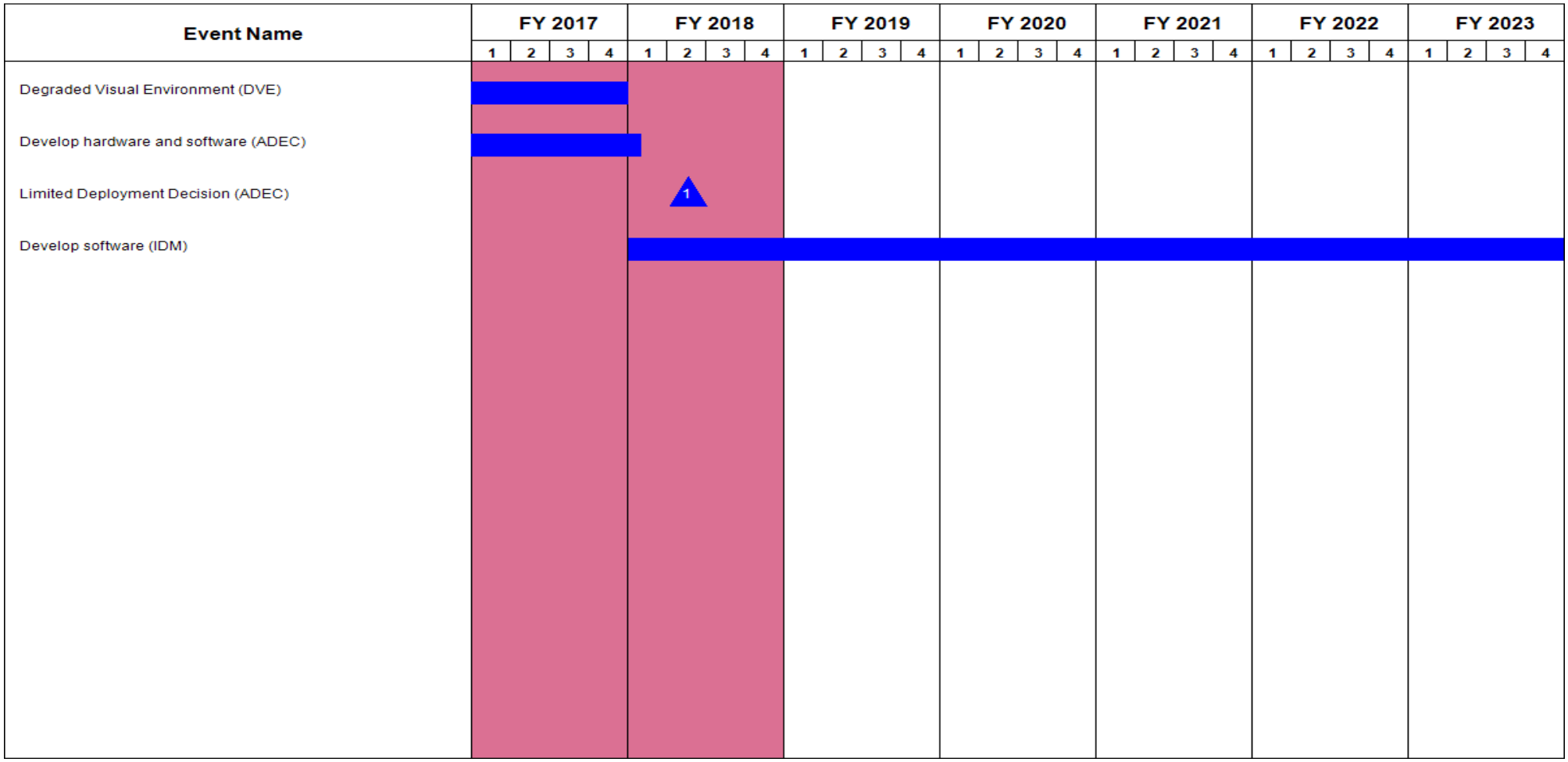

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604201A / *Aircraft Avionics*	**Project (Number/Name)** VU3 / *Networking And Mission Planning*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Degraded Visual Environment (DVE)	4	2011	4	2017
Develop hardware and software (ADEC)	2	2011	1	2018
Limited Deployment Decision (ADEC)	2	2018	2	2018
Develop software (IDM)	1	2018	4	2023