Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army											Date: February 2020	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0203744A / *Aircraft Modifications/Product Improvement Programs*							
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	-	13.629	9.278	11.688	-	11.688	0.000	0.000	0.000	0.000	Continuing	Continuing
EB6: *MQ-1C Gray Eagle MODS*	-	13.629	9.278	11.688	-	11.688	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) Unmanned Aircraft System (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and HELLFIRE missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission UAS fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities within multi-domain battle operations.

The Fiscal Year (FY) 2021 Aircraft Modification/Product Improvement funding of $11.7 million will both greatly enhance propulsion reliability and mitigate obsolescence. The current MQ-1C Gray Eagle engines can no longer be procured. Additionally, this propulsion reliability effort will reduce MQ-1C Gray Eagle Return to Base events and decrease the likelihood of engine related aircraft mishaps. This modernization effort will increase operational readiness and posture Gray Eagle to support multi-domain.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	17.684	16.486	13.904	-	13.904
Current President's Budget	13.629	9.278	11.688	-	11.688
Total Adjustments	-4.055	-7.208	-2.216	-	-2.216
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-7.208			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.407	-			
• SBIR/STTR Transfer	-0.648	-			
• Adjustments to Budget Years	-	-	-2.216	-	-2.216

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	Project (Number/Name) EB6 / *MQ-1C Gray Eagle MODS*	

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
EB6: *MQ-1C Gray Eagle MODS*	-	13.629	9.278	11.688	-	11.688	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The MQ-1C Gray Eagle provides the Army with an extended range, multi-purpose (ERMP) Unmanned Aircraft System (UAS); capable of executing reconnaissance, security, attack, and intelligence collection missions in the range of military operations (ROMO). Sensors/payloads include an Electro-Optical/Infrared/Laser Designator (EO/IR/LD), Synthetic Aperture Radar/Moving Target Indicator (SAR/MTI), Signals Intelligence (SIGINT), and HELLFIRE missiles; providing a near all-weather mission capability. MQ-1C Gray Eagle is a dedicated, assured, multi-mission UAS fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities within multi-domain battle operations.

The Fiscal Year (FY) 2021 Aircraft Modification/Product Improvement funding of $11.7 million will improve propulsion reliability. The propulsion reliability effort will reduce MQ-1C Gray Eagle Return to Base events and decrease the likelihood of engine related aircraft mishaps. Additionally, this effort will increase operational readiness for the Operational Commander.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Global Positioning System (GPS) Denied ***Description:*** GPS Denied ***FY 2020 Plans:*** Funding continued support to system processor re-architecture, as well as development of an alternate navigation technology that enables operations during periods of GPS outage using terrestrial and/or celestial data to include engineering support activities. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Efforts completed.	3.803	0.992	-
Title: Alternate Munitions Integration ***Description:*** Alternate Munitions Integration ***FY 2020 Plans:*** Funding continues Universal Armament Interface/Universal Payload Interface development. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Efforts completed	0.482	0.656	-
Title: Ground Base Sense and Avoid (GBSAA) Block II	6.344	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	**Project (Number/Name)** EB6 / *MQ-1C Gray Eagle MODS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Description: GBSAA Block II			
Title: Survivability ***FY 2020 Plans:*** Funding continued development of system processor modules that support current and future Survivability enhancements, datalinks modernization, and modular open-system architecture requirements. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Efforts completed	-	0.730	-
Title: Propulsion Reliability ***Description:*** Propulsion Reliability ***FY 2020 Plans:*** Funding provided development , testing, and qualification of various propulsion reliability improvements aimed at reducing Return to Base events and decreasing propulsion related aircraft mishaps. ***FY 2021 Plans:*** This funding supports engine development efforts and qualification testing to mitigate engine obsolescence and to increase operational readiness. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Supports increased testing requirements.	-	6.900	11.688
Title: Reprogramming action	3.000	-	-
Accomplishments/Planned Programs Subtotals	13.629	9.278	11.688

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
• A00005: *MQ-1 UAV*	103.326	144.000	0.000	-	0.000	-	-	-	-	0.000	247.326
• AA6601: *Gray Eagle Mods2*	189.781	14.699	16.280	-	16.280	10.365	8.580	8.674	-	0.000	248.379

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	**Project (Number/Name)** EB6 / *MQ-1C Gray Eagle MODS*

D. Acquisition Strategy

An ERMP Operational Requirement Document (ORD) was approved by the Joint Requirement Oversight Council (JROC) 6 Apr 2005. Milestone B occurred on 20 Apr 2005, and the System Development and Demonstration contract was awarded 8 Aug 2005, as a result of a competitive solicitation which included a vendor system capabilities demonstration. A Capabilities Production Document (CPD) was approved 14 Mar 2009. MQ-1C Gray Eagle completed Follow-On Test and Evaluation (FOTE) on 12 Jun 2015.

This RDTE element funds a propulsion reliability improvement with the development of the Heavy Fuel Engine (HFE) 2.0 engine system. The current MQ-1C aircraft engine has experienced material failures that have resulted in aircraft mishaps (loss of aircraft) and a high number lost flight hours due to Return to Base (RTB) events. HFE 2.0 implements aviation grade components and focused reliability improvements that will address previous material failures and RTB drivers. Additionally, the Army was notified by the original equipment manufacturer (OEM) that the current engine core is obsolete and the current manufacture will no longer supply the engine core. HFE 2.0 also resolves this obsolescence/supply issue. In 2018, the Army issued an RFI to industry to assess the state of engine technology and availability of a COTS/ NDI engine solution that could meet MQ-1C capability needs and requirements. The primary goal of the RFI was to establish an alternative engine for MQ-1C that is reliable and could be integrated and qualified in a two year timeframe to resolve critical reliability and supply issues with the current engine. Upon completion of the RFI evaluations, an industry day event was held with all vendors to answer questions and gain additional information from each potential vendor in key areas such as reliability, cost and schedule. As a result of the Army's RFI and Industry day event, it was determined that the HFE 2.0 was the only engine to meet requirements for an alternative MQ-1C engine. Funded RDTE elements will support completion of integration, test, and qualification of the HFE 2.0 engine system on the MQ-1C aircraft. This effort will secure engine supply and result in greater propulsion system reliability and increased operational readiness to the commander in the field. Funds are planned for award on the Gray Eagle Technical Services contract as a Technical Services Memorandum (TSM) task order, and as a Military Interdepartmental Purchase Requisitions (MIPRs) to various other Government agencies. Upon completion of qualification, HFE 2.0 engine systems will be procured under the PBL contract and fielded through attrition.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	Project (Number/Name) EB6 / *MQ-1C Gray Eagle MODS*	

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
FY2019 Reprogramming Action	TBD	PEO M&S : Redstone Arsenal	-	3.000	Jul 2019	-		-		-		-	0.000	3.000	-
		Subtotal	-	3.000		-		-		-		-	0.000	3.000	N/A

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
Global Positioning System (GPS) Denied	SS/CPFF	General Atomics/ ASI : San Diego, CA	6.658	3.803	Mar 2019	0.992	Jan 2020	-		-		-	Continuing	Continuing	-
Universal Ground Control Station (UGCS) Improvements	SS/CPFF	General Atomics/ ASI : San Diego, CA	15.279	-		-		-		-		-	0.000	15.279	-
Alternate Munitions Integration	SS/CPFF	General Atomics- ASI : Poway, CA	18.606	0.482	Mar 2019	0.656	Jan 2020	-		-		-	0.000	19.744	-
Ground Base Sense and Avoid Block II	SS/CPFF	Various : Various	19.018	6.344	Oct 2018	-		-		-		-	0.000	25.362	-
Survivability	MIPR	Various : Various	0.148	-		0.730	Nov 2019	-		-		-	Continuing	Continuing	-
Propulsion Reliability	SS/CPFF	General Atomics/ ASI : San Diego, CA	-	-		6.900	Mar 2020	9.200	Mar 2021	-		9.200	Continuing	Continuing	-
		Subtotal	59.709	10.629		9.278		9.200		-		9.200	Continuing	Continuing	N/A

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
Engineering Support - GBSAA	MIPR	Various : Various	2.163	-		-		-		-		-	0.000	2.163	-
		Subtotal	2.163	-		-		-		-		-	0.000	2.163	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	Project (Number/Name) EB6 / *MQ-1C Gray Eagle MODS*	

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
Development Testing and Software Testing Block II - GBSAA	MIPR	Various : Various	0.403	-		-		-		-		-	0.000	0.403	-
Flight Test and Analysis	SS/ Various	Dugway Proving Grounds : Dugway Proving Grounds	4.350	-		-		2.488		-		2.488	0.000	6.838	-
		Subtotal	4.753	-		-		2.488		-		2.488	0.000	7.241	N/A

	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	66.625	13.629		9.278		11.688		-		11.688	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	**Project (Number/Name)** EB6 / *MQ-1C Gray Eagle MODS*

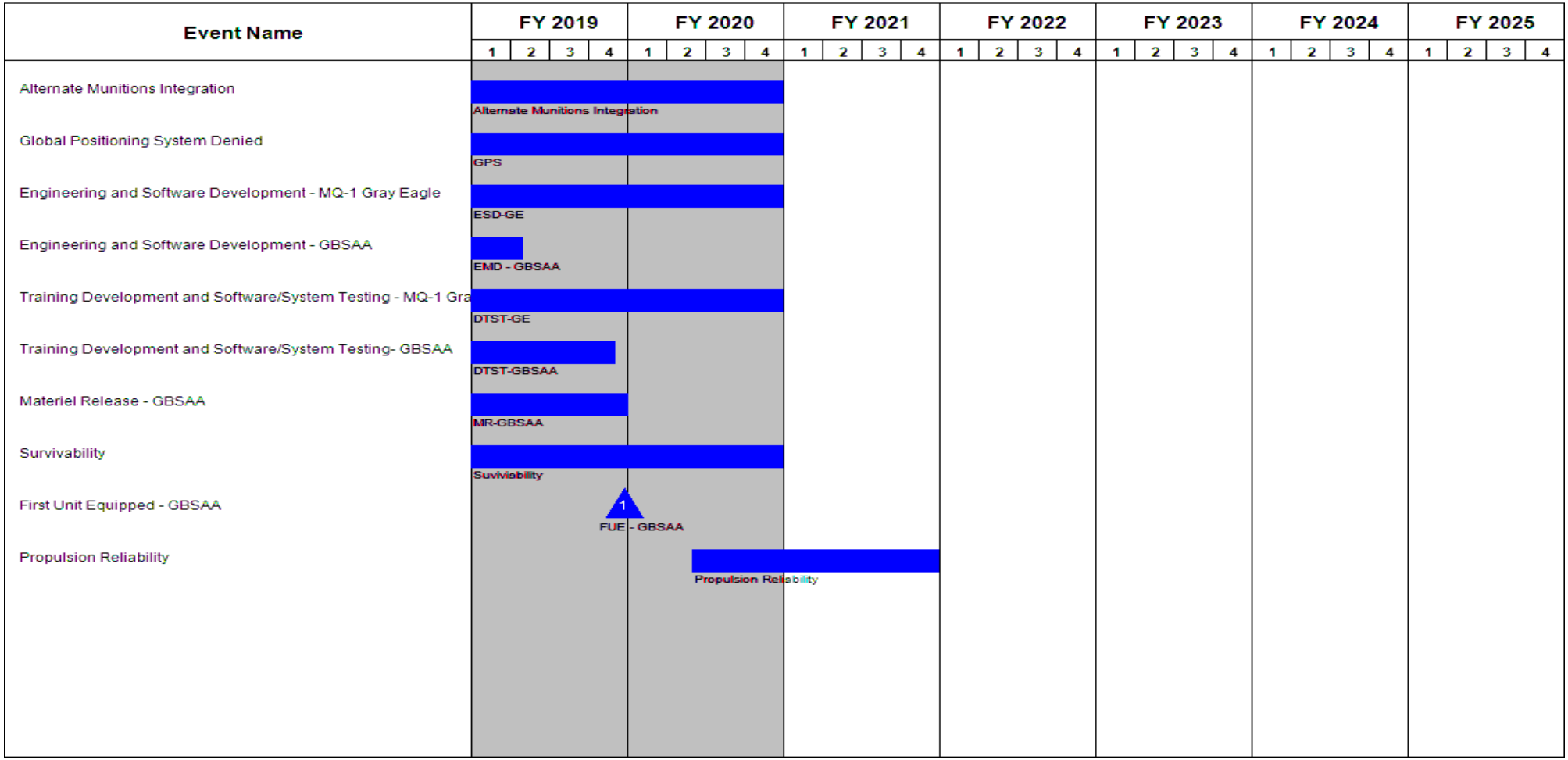

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203744A / *Aircraft Modifications/ Product Improvement Programs*	**Project (Number/Name)** EB6 / *MQ-1C Gray Eagle MODS*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Engineering and Manfacturing Development - GBSAA	4	2017	2	2018
Alternate Munitions Integration	2	2017	4	2020
Universal Ground Control Station Improvements	2	2017	4	2018
Global Positioning System Denied	2	2017	4	2020
Engineering and Software Development - MQ-1 Gray Eagle	2	2017	4	2020
Engineering and Software Development - GBSAA	1	2018	1	2019
Training Development and Software/System Testing - MQ-1 Gray Eagle	3	2017	4	2020
Critical Design Review - GBSAA	3	2018	3	2018
Training Development and Software/System Testing- GBSAA	4	2018	4	2019
Materiel Release - GBSAA	4	2018	4	2019
Survivability	2	2018	4	2020
First Unit Equipped - GBSAA	4	2019	4	2019
Propulsion Reliability	2	2020	4	2021