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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army **Date:** May 2017

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0203744A I Aircraft Modifications/Product Improvement Programs							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	Continuing	Continuing
EB6: MQ-1C Gray Eagle MODS	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	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 Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.

The MQ-1C Gray Eagle Modification/Product Improvement Program (PIP) funding is required for the implementation of the Alternate Munition integration, Global Positioning System (GPS) Denied, an electronic warfare capability, Universal Ground Control Station (UGCS) improvements, and Ground Based Sense And Avoid (GBSAA) Block II.

The Fiscal Year (FY) 2018 Aircraft Modification/Product Improvement funding of \$39.358 million will support the development required to integrate Alternate Munition, GPS Denied, and UGCS Improvements into the MQ-1C Gray Eagle product. GBSAA Research, Development, Test, and Evaluation (RDTE) will provide development, integration and testing for Block II. This moves the GBSAA display into the UGCS to provide information to the aircraft operator to include maneuver recommendations necessary to avoid intruder aircraft. Adds capabilities to minimize operator workload and combines two operator screens onto one display to shrink footprint. Block II decreases operational and sustainment costs, operator workload, hardware/software costs, increases system safety, and provides full materiel release for soldier operation.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	0.000	35.793	39.579	-	39.579
Current President's Budget	0.000	35.793	39.358	-	39.358
Total Adjustments	0.000	0.000	-0.221	-	-0.221
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	0.000	0.000	-0.221	-	-0.221

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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
<u>Change Summary Explanation</u> N/A		

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Exhibit R-2A, RDT&E Project Justification: FY 2018 Army										Date: May 2017		
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
EB6: MQ-1C Gray Eagle MODS	-	0.000	35.793	39.358	-	39.358	18.488	6.962	4.575	5.475	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 Unmanned Aircraft System (UAS) fielded to all Army Divisions, Intelligence and Security Command and Army Special Operations Command in support of the commander's warfighting priorities.												
The MQ-1C Gray Eagle Modification/Product Improvement Program (PIP) funding is required for the implementation of the Alternate Munition capability, Global Positioning System (GPS) Denied which is an electronic warfare capability, Universal Ground Control Station (UGCS) improvements, and Ground Based Sense And Avoid (GBSAA) Block II.												
The Fiscal Year (FY) 2018 Aircraft Modification/Product Improvement funding of \$39.358 million will support the development required to integrate Alternate Munition, GPS Denied, and UGCS Improvements for the MQ-1C Gray Eagle product. GBSAA RDTE will provide development, integration and testing for Block II. Moving the GBSAA display into the UGCS provides the aircraft operator real-time information for evasive maneuvers. Funding supports additional features to minimize operator workload and combines two operator screens onto one display to decrease logistic footprint. Block II decreases operational and sustainment costs, operator workload, hardware/software costs, increases system safety, and provides full materiel release for soldier operation.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Global Positioning System (GPS) Denied								-	2.741	4.313	-	4.313
Description: GPS Denied												
FY 2017 Plans: Funding supports development of an electronic warfare capability and a capability to continue operations during periods of GPS outage as well as the ability to identify GPS jammer position will provide a significant combat multiplier to the Warfighter.												
FY 2018 Base Plans: Funding supports continued development of an electronic warfare capability that provides the system the ability to continue operations during periods of GPS outage as well as the ability to identify GPS jammer												

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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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
position location. The funding will enable the MQ-1C Gray Eagle to implement all levels of electro-optical countermeasures that will be compatible with other tactical UAS's.						
Title: Universal Ground Control Station (UGCS) Improvement Description: UGCS Improvement FY 2017 Plans: Development of UGCS Improvement - Funding supports development of Hardware, Software and documentation improvements based on Follow-On Test & Evaluation (FOTE) findings. FY 2018 Base Plans: Funding will be used to continue the implementation, training, and documentation updates to correct FOT&E findings and maintain the Net Ready KPP for the MQ-1C Gray Eagle UGCS.		-	7.825	9.235	-	9.235
Title: Alternate Munition Integration Description: Alternate Munition Integration FY 2017 Plans: Development of Alternate Munition Integration - Funding supports implementation of software changes and documentation/training that provides the ability of Soldiers to operate and maintain the MQ-1C system with Alternate Munition and Hellfire missiles. FY 2018 Base Plans: Development of software changes, training, and documentation, ground/flight tests, environmental testing, Electromagnetic Environmental Effects (E3) testing, production prove-out tests, and live-fire tests. This capability will provide reduced collateral damage during weapons engagement, increase munitions inventory without affecting flight endurance, reducing enemy engagement costs and potentially reduce advanced audible and visual signatures.		-	11.973	9.180	-	9.180
Title: Ground Base Sense and Avoid (GBSAA) Block II Description: GBSAA Block II FY 2017 Plans:		-	12.851	8.330	-	8.330

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B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Development and Integration for Block II to provide GBSAA display moved to Ground Control Station (GCS). Maneuver Recommendation to Aircraft Operator (AO). FY 2018 Base Plans: Funding supports the development and Integration for Block II to provide GBSAA display moved to Ground Control Station (GCS). Maneuver Recommendation to Aircraft Operator (AO).												
Title: Ground Base Sense and Avoid (GBSAA) Test Block II Description: Ground Base Sense and Avoid (GBSAA) Test Block II								-	0.403	-	-	-
FY 2017 Plans: Test Block II. Additional capabilities for functionality and software cyber security upgrades.												
Title: Survivability FY 2018 Base Plans: Funding for Electronic Attack (EA) survivability requirements for the MQ-1C Gray Eagle will be used to assess vulnerabilities of the current datalink. The Joint Software Integration Lab (JSIL) will be funded to research and provide a Datalink Vulnerabilities Improvement Assessment. The prime contractor, General Atomics, will be funded to provide survivability solutions for both software and hardware features.								-	-	8.300	-	8.300
Accomplishments/Planned Programs Subtotals								-	35.793	39.358	-	39.358
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• MQ-1 UAV (A00005) - Base APA: MQ-1 Unmanned Aircraft Vehicle (UAV)	-	185.388	30.205	87.300	117.505	-	-	-	-	0.000	302.893	
• MQ-1 UAV (A00002) - Base APA: MQ-1C Gray Eagle Modifications	-	-	74.291	-	74.291	104.240	58.724	24.662	-	Continuing	Continuing	
• MQ-1 UAV (375219) - RDTE: MQ-1C Gray Eagle - Army UAV (MIP)	22.285	-	9.574	-	9.574	-	-	-	-	0	31.859	
Remarks												

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<p>D. Acquisition Strategy</p> <p>An Extended Range Multi-Purpose (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 FOTE 12 Jun 2015.</p> <p>The RDTE funded elements for GPS Denied, UGCS Improvements and Alternate Munition Integration addressed in this submission are planned for award on the Gray Eagle Engineering Services contract as a Sub-Engineering Services Memorandum (SESM) task order, and as Military Interdepartmental Purchase Requisitions (MIPRs) to various other Government Agencies. The purpose of the SESMs is to mature the respective designs to a level that Engineering Change Requests (ECR) are submitted to the Government via the Configuration Control Board (CCB). Following successful completion of the SESM and CCB approval, a contract modification to retrofit and/or cut-in the respective engineering change will be awarded on the appropriate Performance Based Logistics (PBL) or Production contract. The RDTE funded element for GBSAA Block II addressed in this submission are planned for award on various contracts and MIPR actions to other government agencies.</p> <p>E. Performance Metrics</p> <p>N/A</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army												Date: May 2017			
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			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Global Positioning System (GPS) Denied	SS/CPFF	General Atomics/ ASI : San Diego, CA	0.000	-		2.577	Jan 2017	4.313	Jan 2018	-		4.313	Continuing	Continuing	0.000
Universal Ground Control Station (UGCS) Improvements	SS/CPFF	General Atomics/ ASI : San Diego, CA	0.000	-		7.356	Jan 2017	9.235	Jan 2018	-		9.235	Continuing	Continuing	0.000
Alternate Munition Integration	MIPR	Various : Various	0.000	-		11.214	Jan 2017	9.180	Jan 2018	-		9.180	Continuing	Continuing	0.000
Ground Base Sense and Avoid Block II	SS/CPFF	Various : Various	0.000	-		12.080	Oct 2016	8.330	Oct 2017	-		8.330	Continuing	Continuing	0.000
Survivability	SS/CPIF	GA-ASI : Poway, CA	0.000	-		-		8.300	Jan 2018	-		8.300	Continuing	Continuing	0.000
Subtotal			0.000	-		33.227		39.358		-		39.358	-	-	0.000
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering Support - MQ-1	MIPR	Various : Various	0.000	-		1.392	Mar 2017	-		-		-	0	1.392	0
Engineering Support - GBSAA	MIPR	Various : Various	0.000	-		0.795	Mar 2017	-		-		-	0	0.795	0
Subtotal			0.000	-		2.187		-		-		-	0.000	2.187	0.000
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Testing and Software Testing Block II - GBSAA	MIPR	Various : Various	0.000	-		0.379	Mar 2017	-		-		-	0.000	0.379	0.000
Subtotal			0.000	-		0.379		-		-		-	0.000	0.379	0.000

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Army											Date: May 2017			
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		Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		0.000	-		35.793		39.358		-		39.358	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army																				Date: May 2017																	
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																	
Event Name										FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
										1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Engineering and Manufacturing Development - GBSAA																																					
														EMD - GBSAA																							
Alternate Munition Integration																																					
														Alternate Munition Integration																							
Universal Ground Control Station Improvements																																					
														UGCS Improvements																							
Global Positioning System Denied																																					
																		GPS																			
Engineering and Software Development - MQ-1 Gray Eagle																																					
																		ESD-GE																			
Engineering and Software Development - GBSAA																																					
														EMD - GBSAA																							
Training Development and Software/System Testing - MQ-1 Gray Eagle																																					
																		DTST-GE																			
(1) Critical Design Review - GBSAA																																					
														CDR-GBSAA																							
Training Development and Software/System Testing- GBSAA																																					
														DTST-GBSAA																							
Materiel Release - GBSAA																																					
														MR-GBSAA																							
Survivability																																					
(2) First Unit Equipped - GBSAA																																					
																		FUE - GBSAA																			

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Army			Date: May 2017
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

Events	Start		End	
	Quarter	Year	Quarter	Year
Engineering and Manufacturing Development - GBSAA	1	2017	3	2017
Alternate Munition Integration	2	2017	4	2018
Universal Ground Control Station Improvements	2	2017	4	2019
Global Positioning System Denied	2	2017	4	2021
Engineering and Software Development - MQ-1 Gray Eagle	2	2017	4	2021
Engineering and Software Development - GBSAA	2	2017	2	2018
Training Development and Software/System Testing - MQ-1 Gray Eagle	3	2017	4	2019
Critical Design Review - GBSAA	4	2017	4	2017
Training Development and Software/System Testing- GBSAA	1	2018	4	2018
Materiel Release - GBSAA	3	2018	4	2018
Survivability	1	2019	4	2024
First Unit Equipped - GBSAA	4	2019	4	2019