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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 / BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV							
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	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing
RQ7: RQ-7 Shadow UAV	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Tactical Unmanned Aerial System (TUAS) RQ-7 provides the Army Brigade Commander with dedicated Reconnaissance, Surveillance and Target Acquisition (RSTA), Intelligence, Battle Damage Assessment (BDA), and Force Protection. In line with the Army's Aviation Restructure Initiative (ARI) three Shadow Platoons are being integrated into the Combat Aviation Brigade's (CAB) Apache Reconnaissance Battalion. This will provide Aviation Brigades with Manned-Unmanned-Teaming (MUM-T) and enhanced Aerial Scout capabilities. The RQ-7B Shadow has logged over 1,050,000 flight hours, most of which were flown in support of Overseas Contingency Operations (OCO).

The full Shadow system consists of four air vehicles with payload, two Universal Ground Control stations, two Universal Ground Data Terminals, one Portable Ground Control Station with Portable Ground Data Terminal, Ground Support Equipment, two launchers, ten High Mobility Multipurpose Wheeled Vehicles (HMMWVs) with trailer(s), and a Light Medium Tactical Vehicle. Each system is equipped with one Maintenance Section Multifunctional (MSM) and is supported at the division level by a Mobile Maintenance Facility (MMF). The baseline fielded payload was the electro-optic infrared (EO/IR), but half of those have been replaced with a Laser Designator (LD) payload. All 104 systems required by the Army Procurement Objective (APO) have been procured. In 2010 the Army G8 established an RQ-7B Unmanned Aerial Vehicle (UAV) MODs program.

Justification: Fiscal Year (FY) 2018 RQ-7B UAS Base funding of \$12.773 million will be utilized in the following: 1) \$10.654M will be used to continue modifications for the RQ-7B UAS, 2) \$2.119M provides interoperability and enhancements for the One System Remote Video Terminal (OSRVT). The \$10.645M for modifications of the RQ-7B UAS will continue development of the air vehicle modifications to allow operations in a Global Positioning System (GPS) denied environment. This is a phased, multi-year effort. Phase I (FY16) provided a trade study to determine the best hardware and software alternatives. Phase II (FY16) initiated the design and development through preliminary design review. Phase III (FY17) will complete design and development through critical design review and conduct engineering flight testing. Phase IV (FY18) will complete development, qualification, and developmental testing. RDTE also provides interoperability modifications that support Manned Unmanned Teaming with the AH-64 Apache Helicopter, and Test and Evaluation to support the capability improvements.

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Appropriation/Budget Activity		R-1 Program Element (Number/Name)			
2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development		PE 0305233A / RQ-7 UAV			
B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	11.797	4.597	10.389	-	10.389
Current President's Budget	11.797	7.597	12.773	-	12.773
Total Adjustments	0.000	3.000	2.384	-	2.384
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	0.000	3.000	2.325	-	2.325
• Other Adjustments 1	0.000	0.000	0.061	-	0.061
• Other Adjustments 2	0.000	0.000	-0.002	-	-0.002
Change Summary Explanation					
The additional funding in FY 2018 is for the GPS denied project, specifically to begin integration of the M-Code GPS receiver.					

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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 0305233A / RQ-7 UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV			
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
RQ7: RQ-7 Shadow UAV	-	11.797	7.597	12.773	-	12.773	10.163	13.817	0.269	5.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2016	FY 2017	FY 2018
Title: Air Vehicle Improvements	2.426	4.967	5.543
Description: Air Vehicle Improvements			
FY 2016 Accomplishments: Continued development of MUM-T and software blocking. Initiated development of the ability to operate in GPS denied environment.			
FY 2017 Plans:			

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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 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
Continued development of the ability to operate in GPS denied environment. FY 2018 Plans: Complete development of the ability to operate in GPS denied environment. Continued development of MUM-T and software blocking.				
Title: Payload Improvements Description: Payload Improvements FY 2016 Accomplishments: Integration and demonstration of moving target indicator capability with TUAS SAR payload.		1.600	-	-
Title: Ground Equipment Improvements Description: Ground Equipment Improvements FY 2016 Accomplishments: Continues to fund Ground Equipment Improvements. Continues development of interoperability capabilities through use of Universal Ground Data Terminals and Universal Ground Control Stations, Network Security and System Vulnerability. FY 2018 Plans: Continues to fund Ground Equipment Improvements. Continues development of interoperability capabilities through use of Universal Ground Data Terminals and Universal Ground Control Stations. Network Security and System Vulnerability.		3.649	-	2.933
Title: Test and Evaluation Description: Test and Evaluation FY 2016 Accomplishments: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2017 Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2018 Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements.		0.787	0.492	0.900
Title: System Engineering/Program Management Description: System Engineering/Program Management FY 2016 Accomplishments:		1.377	0.819	1.278

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B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017	FY 2018	
Continues to fund System Engineering/Program Management.											
FY 2017 Plans: Continues to fund System Engineering/Program Management.											
FY 2018 Plans: Continues to fund System Engineering/Program management											
Title: One System Remote Video Terminal (OSRVT)								1.958	1.319	2.119	
Description: OSRVT											
FY 2016 Accomplishments: Funds the performance and interoperability improvements to the OSRVT.											
FY 2017 Plans: Continues to fund performance and interoperability improvements to the OSRVT.											
FY 2018 Plans: Continues to fund interoperability and performance improvements for OSRVT.											
Accomplishments/Planned Programs Subtotals								11.797	7.597	12.773	
C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RQ-7 UAV MODS: A00018	89.694	81.584	83.160	-	83.160	60.068	5.404	-	-	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
<p>A System Capability Demonstration (SCD) was conducted with four contractors. The results from the SCD in conjunction with proposal evaluations resulted in the competitive down select of a Best Value TUAS. A successful Milestone II Army Systems Acquisition Review Council (ASARC) was conducted 21 Dec 1999 and a Milestone III Decision was reached on 25 Sep 2002. The full rate production contract was awarded 27 Dec 2002 and in FY2009 the last of the authorized 104 systems was placed on contract. Continued development of the selected Tactical Unmanned Aerial Vehicle (TUAV) system will be accomplished through a series of modifications and retrofits such as Shadow v2, Communications Relay, Laser Designator, Block III engine, and reliability upgrades. Development/integration of these improved capabilities will be through individual efforts on an engineering services contract with Shadow contractors. Development of the Block III engine is being accomplished through a competitive process.</p>											

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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
E. Performance Metrics N/A		

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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 0305233A / RQ-7 UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV					
Management Services (\$ 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
Base: Program Management	RO	PM UAS : Redstone Arsenal, AL	3.288	0.264	Nov 2015	0.110	Nov 2016	0.426		-		0.426	Continuing	Continuing	Continuing
Subtotal			3.288	0.264		0.110		0.426		-		0.426	-	-	-
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
OIF Improvements / Block Upgrades / Capability Improvements	SS/CPFF	AAI Corporation : Hunt Valley, MD	3.105	1.500	Feb 2016	-		-		-		-	0.000	4.605	0.000
System Engineering / Reliability Solutions	SS/CPFF	AAI Corporation : Hunt Valley, MD	2.025	-		-		-		-		-	Continuing	Continuing	0.000
Ground Equipment Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	16.900	2.398	Oct 2015	-		2.933	Dec 2017	-		2.933	Continuing	Continuing	Continuing
Block III Engine Development	C/CPFF	LSF : Redstone Arsenal, AL	30.725	-		-		-		-		-	0.000	30.725	0.000
Other Air Vehicle Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	16.377	0.266	Oct 2015	-		0.375	Dec 2017	-		0.375	Continuing	Continuing	Continuing
GPS Denied Development	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	0.000	1.500	Oct 2015	5.087	Dec 2016	5.168	Dec 2017	-		5.168	Continuing	Continuing	0.000
Payload Improvements	SS/CPFF	Various : Various	2.750	2.000	Feb 2016	-		-		-		-	0.000	4.750	0.000
One System Remote Video Terminal (OSRVT)	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	11.129	1.958	May 2016	1.319	Apr 2017	2.119	Dec 2017	-		2.119	Continuing	Continuing	Continuing
Subtotal			83.011	9.622		6.406		10.595		-		10.595	-	-	-

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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 0305233A / RQ-7 UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV					
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
Contractor Engineering Support	Various	Various : Various	1.893	0.656	Oct 2015	0.379	Dec 2016	0.284	Dec 2017	-		0.284	Continuing	Continuing	Continuing
Base: Government Engineering and Logistic Support	MIPR	Various : Various	0.946	0.328	Feb 2016	0.189	Nov 2016	0.568	Dec 2017	-		0.568	Continuing	Continuing	Continuing
Subtotal			2.839	0.984		0.568		0.852		-		0.852	-	-	-
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
RQ-7 Developmental Testing of Product Development	Various	Various : Various	4.848	0.827	Oct 2015	0.413	Dec 2016	0.800		-		0.800	Continuing	Continuing	Continuing
RQ-7 Operational Testing of Product Developments	MIPR	Various : Various	0.300	0.100	Oct 2015	0.100	Dec 2016	0.100	Dec 2017	-		0.100	Continuing	Continuing	Continuing
OSRVT Developmental Testing	MIPR	Various : Various	0.100	-		-		-		-		-	0.000	0.100	0.000
OSRVT - Operational Testing	MIPR	Various : Various	2.033	-		-		-		-		-	0.000	2.033	0.000
Subtotal			7.281	0.927		0.513		0.900		-		0.900	-	-	-
			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			96.419	11.797		7.597		12.773		-		12.773	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Army	Date: May 2017
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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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
Block III Engine Development																												
GPS Denied Development																												
Interoperability Upgrades																												
Software Block Upgrades																												
Reliability Improvements																												
OSRVT Increment II Interoperability Improvements																												

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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 0305233A / RQ-7 UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Block III Engine Development	1	2015	3	2016
GPS Denied Development	3	2016	4	2018
Interoperability Upgrades	1	2015	4	2020
Software Block Upgrades	1	2015	4	2020
Reliability Improvements	1	2019	4	2020
OSRVT Increment II Interoperability Improvements	1	2013	4	2021