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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army	Date: February 2018
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Appropriation/Budget Activity	R-1 Program Element (Number/Name)											
2040: <i>Research, Development, Test & Evaluation, Army I BA 7: Operational Systems Development</i>	PE 0305233A / RQ-7 Shadow UAV											
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	-	4.597	12.773	12.863	-	12.863	10.817	2.269	3.000	0.225	0.000	46.544
RQ7: <i>RQ-7 Shadow UAV</i>	-	4.597	12.773	12.863	-	12.863	10.817	2.269	3.000	0.225	0.000	46.544

A. Mission Description and Budget Item Justification

The Tactical Unmanned Aircraft 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 1,090,000 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) 2019 RQ-7B UAS Base funding of \$12.863 million will be utilized in the following: 1) \$10.696M will be used to continue modifications for the RQ-7B UAS, 2) \$2.167M provides interoperability and enhancements for the One System Remote Video Terminal (OSRVT). The \$10.696M for modifications of the RQ-7B UAS will conduct an operational test on the Shadow v2 Block III upgrade, complete testing of the air vehicle modifications to allow operations in a Global Positioning System (GPS) denied environment and Air Vehicle and Ground Equipment software development for interoperability and MUM-T. The operational test for the Block III upgrade is required to assess the safety, suitability and effectiveness of the Block III upgrade prior to fielding. The GPS denied development 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) completed design and development through critical design review and conducted engineering flight testing. Phase IV (FY18 & FY19) will complete development, qualification, and developmental testing. RDTE also provides interoperability modifications that support MUM-T with the AH-64 Apache Helicopter, and Systems Engineering and Test and Evaluation to support the capability improvements.

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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 0305233A / RQ-7 Shadow UAV
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.597	12.773	10.163	-	10.163
Current President's Budget	4.597	12.773	12.863	-	12.863
Total Adjustments	-3.000	0.000	2.700	-	2.700
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	2.700	-	2.700
• RAA not appropriated	-3.000	-	-	-	-

Change Summary Explanation

Addition of \$2.7 Million in FY2019 will be used towards the completion of developmental testing of the ability to operate in a GPS denied environment; Interoperability software modifications that support Manned Unmanned Teaming with the AH-64 Apache Helicopter.

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army										Date: February 2018		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV			
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
RQ7: RQ-7 Shadow UAV	-	4.597	12.773	12.863	-	12.863	10.817	2.269	3.000	0.225	0.000	46.544
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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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) 2019 RQ-7B UAS Base funding of \$12.863 million will be utilized in the following: 1) \$10.696M will be used to continue modifications for the RQ-7B UAS, 2) \$2.167M provides interoperability and enhancements for the One System Remote Video Terminal (OSRVT). The \$10.696M for modifications of the RQ-7B UAS will conduct an operational test on the Shadow v2 Block III upgrade, complete testing of the air vehicle modifications to allow operations in a Global Positioning System (GPS) denied environment and Air Vehicle and Ground Equipment software development for interoperability and MUM-T. The operational test for the Block III upgrade is required to assess the safety, suitability and effectiveness of the Block III upgrade prior to fielding. The GPS denied development 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) completed design and development through critical design review and conducted engineering flight testing. Phase IV (FY18 & FY19) will complete development, qualification, and developmental testing. RDTE also provides interoperability modifications that support MUM-T with the AH-64 Apache Helicopter, and Systems Engineering and Test and Evaluation to support the capability improvements.

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

	FY 2017	FY 2018	FY 2019
Title: Air Vehicle Improvements	2.087	5.543	2.620
Description: Air Vehicle Improvements			
FY 2018 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018		
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2017	FY 2018	FY 2019
Complete development of the ability to operate in GPS denied environment. FY 2019 Plans: Complete developmental testing of the ability to operate in a GPS denied environment; Interoperability software modifications that support Manned Unmanned Teaming with the AH-64 Apache Helicopter. FY 2018 to FY 2019 Increase/Decrease Statement: 'Complete developmental testing of the ability to operate in a GPS denied environment				
Title: Ground Equipment Improvements Description: Ground Equipment Improvements 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. FY 2019 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. FY 2018 to FY 2019 Increase/Decrease Statement: 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		-	2.933	5.018
Title: Test and Evaluation Description: Test and Evaluation FY 2018 Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2019 Plans: Funds Operational Test for the Shadow V2 Block III upgrade and continues to fund test and evaluation of Air Vehicle and Ground Equipment. FY 2018 to FY 2019 Increase/Decrease Statement: Funds Operational Test for the Shadow V2 Block III upgrade and continues to fund test and evaluation of Air Vehicle and Ground Equipment.		0.492	0.900	2.454
Title: System Engineering/Program Management		0.699	1.278	1.304

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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		
Description: System Engineering/Program Management											
FY 2018 Plans: Continues to fund System Engineering/Program management											
FY 2019 Plans: Continues to fund System Engineering/Program management											
FY 2018 to FY 2019 Increase/Decrease Statement: Continues to fund System Engineering/Program management											
Title: One System Remote Video Terminal (OSRVT)							1.319	2.119	1.467		
Description: OSRVT											
FY 2018 Plans: Continues to fund interoperability and performance improvements for OSRVT.											
FY 2019 Plans: Continues to fund interoperability and performance improvements for OSRVT.											
FY 2018 to FY 2019 Increase/Decrease Statement: Continues to fund interoperability and performance improvements for OSRVT.											
Accomplishments/Planned Programs Subtotals							4.597	12.773	12.863		
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
• A00018: A00018	135.408	83.160	46.786	-	46.786	21.753	15.000	24.000	20.137	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
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 Aircraft 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											

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PE 0305233A: RQ-7 Shadow UAV
Army

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity 2040 / 7						R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV					
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	3.552	0.110	Nov 2016	0.426		0.491		-		0.491	Continuing	Continuing	Continuing
Subtotal			3.552	0.110		0.426		0.491		-		0.491	Continuing	Continuing	N/A
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	4.605	-		-		1.302		-		1.302	0.000	5.907	-
System Engineering / Reliability Solutions	SS/CPFF	AAI Corporation : Hunt Valley, MD	2.025	-		-		4.252		-		4.252	Continuing	Continuing	-
Ground Equipment Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	19.298	-		2.933	Dec 2017	-		-		-	Continuing	Continuing	Continuing
Block III Engine Development	C/CPFF	LSF : Redstone Arsenal, AL	30.725	-		-		-		-		-	0.000	30.725	-
Other Air Vehicle Improvements	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	16.643	-		0.375		0.168		-		0.168	Continuing	Continuing	Continuing
GPS Denied Development	C/CPFF	TBD: Competitive in FY18 : TBD: Competitive in FY18	1.500	2.087	Dec 2016	5.168	Dec 2017	1.916		-		1.916	Continuing	Continuing	-
Payload Improvements	SS/CPFF	Various : Various	4.750	-		-		-		-		-	0.000	4.750	-
One System Remote Video Terminal (OSRVT)	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	13.087	1.319	Apr 2017	2.119		1.467		-		1.467	Continuing	Continuing	Continuing
Subtotal			92.633	3.406		10.595		9.105		-		9.105	Continuing	Continuing	N/A

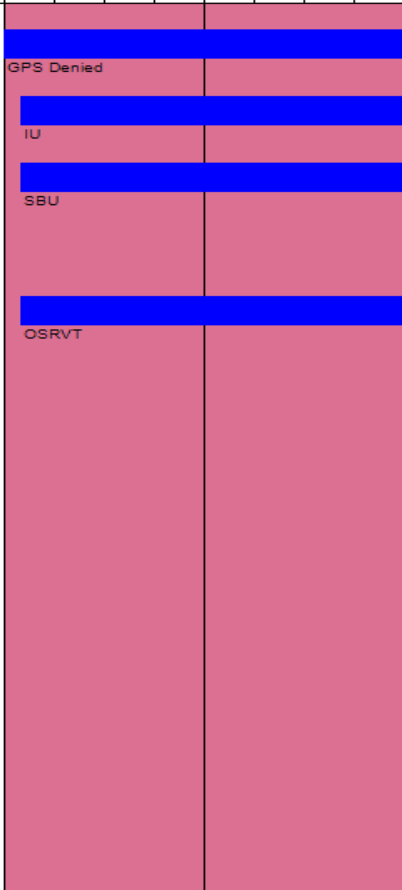




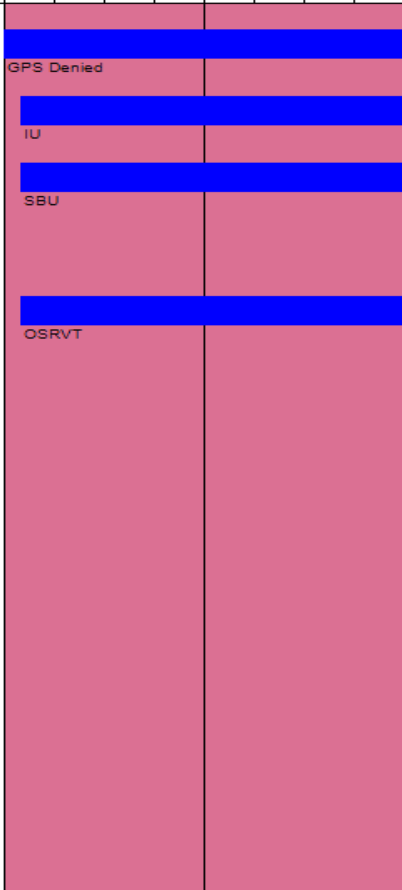



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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army												Date: February 2018			
Appropriation/Budget Activity 2040 / 7						R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow UAV				Project (Number/Name) RQ7 / RQ-7 Shadow UAV					
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	2.549	0.379	Dec 2016	0.284		0.183		-		0.183	Continuing	Continuing	Continuing
Base: Government Engineering and Logistic Support	MIPR	Various : Various	1.274	0.189	Nov 2016	0.568		0.630		-		0.630	Continuing	Continuing	Continuing
Subtotal			3.823	0.568		0.852		0.813		-		0.813	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	5.675	0.413	Dec 2016	0.800		1.000		-		1.000	Continuing	Continuing	Continuing
RQ-7 Operational Testing of Product Developments	MIPR	Various : Various	0.400	0.100	Dec 2016	0.100		1.454		-		1.454	Continuing	Continuing	Continuing
OSRVT Developmental Testing	MIPR	Various : Various	0.100	-		-		-		-		-	0.000	0.100	-
OSRVT - Operational Testing	MIPR	Various : Various	2.033	-		-		-		-		-	0.000	2.033	-
Subtotal			8.208	0.513		0.900		2.454		-		2.454	Continuing	Continuing	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			108.216	4.597		12.773		12.863		-		12.863	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army	Date: February 2018
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow UAV	Project (Number/Name) RQ7 / RQ-7 Shadow UAV
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Event Name	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
GPS Denied Development																												
GPS Denied																												
Interoperability Upgrades																												
IU																												
Software Block Upgrades																												
SBU																												
Reliability Improvements																												
RI																												
OSRVT Increment II Interoperability Improvements																												
OSRVT																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0305233A / RQ-7 Shadow 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	2019
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	2023