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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Army **Date:** February 2015

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
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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	-	12.025	16.389	7.297	-	7.297	7.928	10.381	10.027	10.340	Continuing	Continuing
RQ7: RQ-7 Shadow UAV	-	12.025	16.389	7.297	-	7.297	7.928	10.381	10.027	10.340	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 924,000 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 were replaced with a Laser Designator (LD) payload. All 104 systems required by the Army Acquisition Objective (AAO) have been procured. In 2010 the Army G8 established an RQ-7B UAV MODs program. This budget line procures modifications including the Shadow v2, System Modifications, Mission Simulators, and One System Remote Video Terminal Upgrades (OSRVVT).

Implements Shadow v2: Tactical Common Data Link with Type 1 Encryption and NATO interoperability; solves obsolescence associated with legacy computer hardware and the SOLARIS operating system. Government Furnished Equipment (GFE) and spares are also included.

Justification: FY2016 RQ-7 UAV Base funding of \$7.297 million will be used for capability and reliability improvements, specifically: Air Vehicle modifications (development of the ability to operate in GPS denied environment) and Ground Equipment (interoperability) improvements. Additionally, funds will be for system engineering and system test and evaluation support. Funds will also be used to incorporate developmental improvements into Increment II OSRVVT to maintain its interoperability with future supported systems & developments.

UNCLASSIFIED

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B. Program Change Summary (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget	12.025	16.389	7.454	-	7.454
Current President's Budget	12.025	16.389	7.297	-	7.297
Total Adjustments	-	-	-0.157	-	-0.157
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments 1	-	-	-0.157	-	-0.157

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army										Date: February 2015		
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 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
RQ7: RQ-7 Shadow UAV	-	12.025	16.389	7.297	-	7.297	7.928	10.381	10.027	10.340	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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Implements Shadow v2: Tactical Common Data Link with Type 1 Encryption and NATO interoperability; solves obsolescence associated with legacy computer hardware and the SOLARIS operating system. Government Furnished Equipment (GFE) and spares are also included.

Justification: FY2016 RQ-7 UAV Base funding of \$7.297 million will be used for capability and reliability improvements, specifically: Air Vehicle modifications (development of the ability to operate in GPS denied environment) and Ground Equipment (interoperability) improvements. Additionally, funds will be for system engineering and system test and evaluation support. Funds will also be used to incorporate developmental improvements into Increment II OSRVT to maintain its interoperability with future supported systems & developments.

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

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Air Vehicle Improvements	5.472	6.297	1.766	-	1.766
Description: Funding is provided for the following effort					
FY 2014 Accomplishments:					

UNCLASSIFIED

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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			
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Continued development of manned unmanned teaming (MUM-T), software blocking, and continuation of engine development to include reduced noise signature for engine. FY 2015 Plans: Continued development of manned unmanned teaming (MUM-T), software blocking, and planned completion of engine development. FY 2016 Base Plans: Continued development of manned unmanned teaming (MUM-T), software blocking, and development of the ability to operate in GPS denied environment.					
Title: Ground Equipment Improvements Description: Funding is provided for the following effort FY 2014 Accomplishments: Continues to fund Ground Equipment Improvements. Continues development of interoperability capabilities through use of Universal Ground Data Terminals and Universal Ground Control Stations, and System Vulnerability FY 2015 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 2016 Base 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	3.766	3.682	2.270	-	2.270
Title: Test and Evaluation Description: Funding is provided for the following effort FY 2014 Accomplishments: Continues to fund Test and Evaluation FY 2015 Plans:	0.655	1.711	0.508	-	0.508

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army **Date:** February 2015

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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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements. FY 2016 Base Plans: Continues to fund test and evaluation of Air Vehicle and Ground Equipment Improvements.					
Title: System Engineering/Program Management Description: System Engineering/Program Management FY 2015 Plans: Continues to fund System Engineering/Program Management FY 2016 Base Plans: Continues to fund System Engineering/Program Management	-	2.566	0.795	-	0.795
Title: One System Remote Video Terminal (OSRVT) Description: Funding is provided for the following effort FY 2014 Accomplishments: Continues to fund One System Remote Video Terminal (OSRVT). Integrate Incremental II bi-directional functionality into the OSRVT. Develop Software Blocking and Interoperability improvements FY 2016 Base Plans: Continues to fund One System Remote Video Terminal (OSRVT). Integrate Incremental II bi-directional functionality into the OSRVT. Develop Software Blocking and Interoperability improvements	2.132	-	1.958	-	1.958
Title: One System Remote Video Terminal Test and Evaluation Description: One System Remote Video Terminal Test and Evaluation FY 2015 Plans: Complete developmental testing of Increment II capabilities and conduct Initial Operational Test and Evaluation (IOT&E)	-	2.133	-	-	-
Accomplishments/Planned Programs Subtotals	12.025	16.389	7.297	-	7.297

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2016 Army	Date: February 2015
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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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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RQ-7 UAV MODS (A00018): RQ-7 UAV MODS (A00018)	121.902	125.380	81.444	8.250	89.694	89.559	81.351	97.150	22.381	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 ASARC was conducted 21 Dec 1999 and a Milestone III Decision 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 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 a (mostly) sole source cost-plus fixed fee engineering services contract with the Shadow prime contractor. Development of the Block III engine is being accomplished through a competitive process.

E. Performance Metrics

N/A

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Army **Date:** February 2015

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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Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Base: Program Management	RO	PM UAS : Redstone Arsenal, AL	2.718	-		0.570		0.214	Dec 2015	-		0.214	Continuing	Continuing	Continuing
Subtotal			2.718	-		0.570		0.214		-		0.214	-	-	-

Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
OIF Improvements / Block Upgrades / Capability Improvements	SS/CPFF	AAI Corporation : Hunt Valley, MD	3.105	-		-		-		-		-	-	3.105	-
System Engineering / Reliability Solutions	SS/CPFF	AAI Corporation : Hunt Valley, MD	2.025	-		-		-		-		-	-	2.025	-
Ground Equipment Improvements	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	9.452	3.766	Apr 2014	3.682	Jan 2015	2.270	Jan 2016	-		2.270	Continuing	Continuing	Continuing
Block III Engine Development	C/CPFF	LSF : Redstone Arsenal, AL	20.377	4.447	May 2014	5.901	May 2015	-		-		-	-	30.725	-
Other Air Vehicle Improvements	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	14.956	1.025	Apr 2014	0.396	May 2015	0.266	May 2016	-		0.266	Continuing	Continuing	Continuing
GPS Denied Development	SS/CPFF	AAI Corporation : Hunt Valley, MD	0.000	-		-		1.500	May 2016	-		1.500	-	1.500	-
One System Remote Video Terminal (OSRVT)	SS/CPFF	AAI Corporation, MD : AAI Corporation, MD	8.997	2.132	Jan 2015	-		1.958	Apr 2016	-		1.958	Continuing	Continuing	Continuing
Payload Improvements	SS/CPFF	Various : Various	2.750	-		-		-		-		-	-	2.750	-
Subtotal			61.662	11.370		9.979		5.994		-		5.994	-	-	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Army **Date:** February 2015

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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Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Contractor Engineering Support	Various	Various : Various	0.562	-		1.331	Dec 2014	0.387	Dec 2015	-		0.387	Continuing	Continuing	Continuing
Base: Government Engineering and Logistic Support	SS/CPFF	Various : Various	0.281	-		0.665	Nov 2014	0.194	Nov 2015	-		0.194	Continuing	Continuing	Continuing
Subtotal			0.843	-		1.996		0.581		-		0.581	-	-	-

Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
RQ-7 Developmental Testing of Product Development	Various	Various : Various	2.582	0.655	Mar 2014	1.611		0.408	Dec 2015	-		0.408	Continuing	Continuing	Continuing
RQ-7 Operational Testing of Product Developments	MIPR	Various : Various	0.200	-		0.100		0.100		-		0.100	Continuing	Continuing	Continuing
OSRVT Developmental Testing	MIPR	Various : Various	0.000	-		0.100		-		-		-	-	0.100	-
OSRVT - Operational Testing	MIPR	Various : Various	0.000	-		2.033		-		-		-	-	2.033	-
Subtotal			2.782	0.655		3.844		0.508		-		0.508	-	-	-

	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	68.005	12.025	16.389	7.297	-	7.297	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Army **Date:** February 2015

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 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
(1) Block III Engine - Production Contract Award					Block III																							
Block III Fielding													Block III Fielding															
Block III Engine Development													Block III ED															
GPS Denied Development																	GPS Denied											
GPS Denied Fielding																					GPS Denied Fielding							
Interoperability Upgrades																					IU							
Software Block Upgrades																					SBU							
Reliability Improvements																									RI			
OSRVT Increment II Interoperability Improvements																									OSRVT			
(2) OSRVT IOT&E									OSRVT IOT&E																			

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Army **Date:** February 2015

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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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Block III Engine - Production Contract Award	4	2015	4	2015
Block III Fielding	1	2017	4	2018
Block III Engine Development	1	2016	3	2016
GPS Denied Development	1	2017	4	2018
GPS Denied Fielding	1	2019	4	2019
Interoperability Upgrades	1	2015	4	2020
Software Block Upgrades	1	2015	4	2020
Reliability Improvements	1	2020	4	2020
OSRVT Increment II Interoperability Improvements	1	2013	4	2020
OSRVT IOT&E	3	2015	3	2015