Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0203801A *I Missile/Air Defense Product Improvement Program*							
COST ($ in Millions)	**Prior Years**	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**	**FY 2018**	**FY 2019**	**FY 2020**	**FY 2021**	**Cost To Complete**	**Total Cost**
Total Program Element	-	4.917	3.154	5.122	-	5.122	2.209	1.351	0.828	0.826	Continuing	Continuing
038: *Avenger PIP*	-	4.917	3.154	5.122	-	5.122	2.209	1.351	0.828	0.826	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, highly mobile surface-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). The system employs a canopied turret consisting of a gunner position, two gyro-stabilized missile launcher pods containing four STINGER missiles each, a Forward Looking Infrared Receiver (FLIR), a Laser Range Finder (LRF), an Identification Friend or Foe (IFF) system, and a very high rate of fire .50 caliber machine gun. The gun system is used against ground targets and to cover the Stinger missile dead-zone. Avenger is capable of day, night and adverse weather operations; can be transported by UH-60L Blackhawk helicopter or C-130 aircraft; is air-droppable and can shoot on the move. The Avenger system is operated by a two-man crew to counter Unmanned Aerial Systems (UASs), cruise missiles, attack helicopters, and high performance fixed wing/rotary wing aircraft. The system can also be operated by remote control from a protected position up to 50 meters away from the fire unit. The system fills the line-of-sight rear component of the Forward Area Air Defense (FAAD) system.

These funds are provided to modify the Avenger to ensure viability and sustainability through the end of the useful life. Avenger is planned to remain in the force through the Fiscal Year (FY) 31. Avenger fills a capability gap which will be permanently filled by the Indirect Fire Protection Capability Increment 2 Intercept (IFPC Inc 2-I) which will be fully fielded in FY31. The Avenger Fire Control Computer (AFCC) will undergo software and hardware upgrades that will enable the system to handle increased targeting capability realized with the latest version of the Forward Area Air Defense (FAAD) early warning system and ensures the system meets the latest Information Assurance (IA) requirements, upgraded analog to digital vehicle internal communication (VIC) system and Mode 5 cooperative target identification functions.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	5.112	3.154	3.945	-	3.945
Current President's Budget	4.917	3.154	5.122	-	5.122
Total Adjustments	-0.195	0.000	1.177	-	1.177
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.195	-			
• Adjustments to Budget Years	-	-	1.177	-	1.177

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203801A / *Missile/Air Defense Product Improvement Program*	Project (Number/Name) 038 / *Avenger PIP*	

COST ($ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
038: *Avenger PIP*	-	4.917	3.154	5.122	-	5.122	2.209	1.351	0.828	0.826	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Avenger Air Defense System is a lightweight, highly mobile surface-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). The system employs a canopied turret consisting of a gunner position, two gyro-stabilized missile launcher pods containing four STINGER missiles each, a Forward Looking Infrared Receiver (FLIR), a Laser Range Finder (LRF), an Identification Friend or Foe (IFF) system, and a very high rate of fire .50 caliber machine gun. The gun system is used against ground targets and to cover the Stinger missile dead-zone. Avenger is capable of day, night and adverse weather operations; can be transported by UH-60L Blackhawk helicopter or C-130 aircraft; is air-droppable and can shoot on the move. The system can also be operated by remote control from a protected position up to 50 meters away from the fire unit.

The Avenger system is operated by a two-man crew to counter Unmanned Aerial Systems (UASs), cruise missiles, attack helicopters, and high performance fixed wing/ rotary wing aircraft. The system fills the line-of-sight rear component of the Forward Area Air Defense (FAAD) system.

These funds are provided for the Avenger PIP to modify and ensure that Avenger is viable and sustainable through the end of program life. Avenger will remain in the force through the Fiscal Year (FY) 31 timeframe according to the Long Range Investments Requirements Analysis. Avenger fills a capability gap which will be permanently filled by the Indirect Fire Protection Capability Increment 2-Intercept (IFPC Inc 2-I) which will be fully fielded in FY31. The Avenger Fire Control Computer (AFCC) will undergo software and hardware upgrades that will enable the system to handle increased targeting capability realized with the latest version of the Forward Area Air Defense (FAAD) early warning system and ensures the system meets the latest Information Assurance (IA) requirements, upgraded analog to digital vehicle internal communication (VIC) system and Mode 5 cooperative target identification functions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Avenger Modification	4.917	3.154	5.122
Description: This funds the effort to upgrade the Avenger Fire Control Computer (AFCC) software and adds new cooperative friendly identification function.			
FY 2015 Accomplishments: Established allocated and product baselines, and performed engineering design and development activities for platform integration, software upgrades, and capability enhancements. Planned test requirements and conducted limited contractor and government testing. Performed technical assessments, concept studies, cost reduction, risk reduction and development documentation.			
FY 2016 Plans: Continue to perform engineering design and development activities for platform integration, software upgrades, and capability enhancements. Develop and execute test requirements and conduct limited contractor and government testing on developing			

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203801A / *Missile/Air Defense Product Improvement Program*	**Project (Number/Name)** 038 / *Avenger PIP*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
modernization parts. Perform technical assessments, concept studies, cost reduction, risk reduction and development documentation.			
FY 2017 Plans: Finish development activities for platform integration, software upgrades, and capability enhancements. Develop and execute test requirements and conduct limited contractor and government testing on developing modernization parts. Perform technical assessments, concept studies, cost reduction, risk reduction and development documentation. Increase testing activities on integration studies to ensure compatibility.			
Accomplishments/Planned Programs Subtotals	4.917	3.154	5.122

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• PE 0605456: *PE 0605456A, Proj PA3, PAC-3/MSE Missiles*	33.709	2.272	-	-	-	-	-	-	-	0	35.981
• PE 0604319A: *PE 0604319A, Proj DU3, IFPC2 (FY12 PE0603305A IFPC II - Intercept)*	92.475	155.361	-	-	-	-	-	-	-	0	247.836
• PE 0605457A: *PE 0605457A, Proj S40, Army Integrated Air and Missile Defense (AIAMD)*	147.250	222.075	252.811	-	252.811	169.070	152.942	32.914	34.447	Continuing	Continuing
• PE 0604820A: *PE 0604820A, Proj E10, Sentinel*	5.022	12.309	15.983	-	15.983	20.844	20.612	30.106	41.402	Continuing	Continuing
• PE 0604741A: *PE 0604741A, Proj 126, 146, 149; Air Defense C2I Eng Dev*	15.294	34.569	36.256	-	36.256	20.141	19.658	17.738	11.651	Continuing	Continuing
• PE 0605052: *PE 0605052A, Proj EY7, IFPC2 (Realigned from 0604319A, DU3*	-	-	83.995	-	83.995	63.370	43.204	109.323	133.326	Continuing	Continuing

Remarks

This program is an integral part of the Army Air and Missile Defense Modernization strategy.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
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D. Acquisition Strategy

The Avenger Product Improvement Program modifies Avenger and ensures that it is viable and sustainable through the end of its program life. Avenger will remain in the force through the fiscal year (FY) 2031 timeframe according to the Long Range Investments Requirements Analysis (LIRA), filling a capability gap to counter Unmanned Aerial Systems (UASs), cruise missiles, attack helicopters, and high performance fixed wing rotary wing aircraft. This capability will be permanently filled by the Indirect Fire Protection Capability Increment 2 Intercept (IFPC Inc 2-I) which will be fully fielded in FY31. The Avenger Fire Control Computer (AFCC) will undergo software and hardware upgrades that will enable the system to handle increased targeting capability realized with the latest version of the Forward Area Air Defense (FAAD) early warning system and ensures the system meets the latest Information Assurance (IA) requirements, upgraded analog to digital vehicle internal communication (VIC) system, and Mode 5 cooperative target identification functions.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Avenger Modification	Various	Cruise Missile Defense Systems Project Office : Redstone Arsenal, AL	0.000	0.509		0.254	Mar 2016	0.449	Mar 2017	-		0.449	Continuing	Continuing	0
		Subtotal	0.000	0.509		0.254		0.449		-		0.449	-	-	0.000

Remarks

This program supports the Army Integrated Air and Missile Defense (AIAMD) architecture.

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Avenger Modification	Various	The Boeing Company and Various Others : Huntsville, AL	0.000	3.038		2.167	Jan 2016	2.558	Jan 2017	-		2.558	Continuing	Continuing	0
		Subtotal	0.000	3.038		2.167		2.558		-		2.558	-	-	0.000

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Avenger Modification Test Support	Various	The Boeing Company, Aviation and Missile Research Development Engineering Center (AMRDEC) : Huntsville, AL; Redstone Arsenal, AL	0.000	1.370		0.733	Feb 2016	2.115	Jan 2017	-		2.115	Continuing	Continuing	0

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army		Date: February 2016
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	1.370		0.733		2.115		-		2.115	-	-	0.000

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	4.917		3.154		5.122		-		5.122	-	-	0.000

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203801A / *Missile/Air Defense Product Improvement Program*	**Project (Number/Name)** 038 / *Avenger PIP*

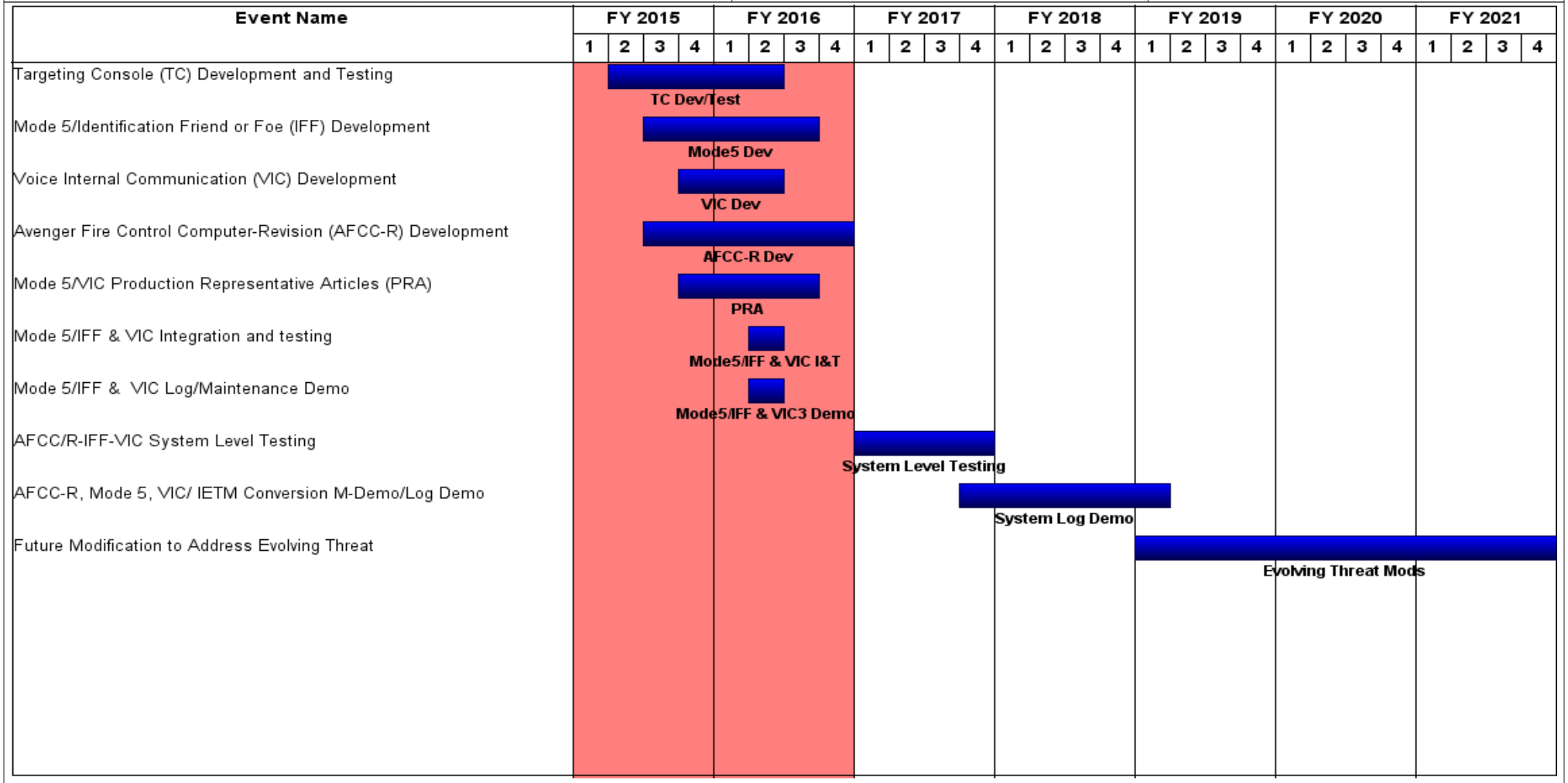

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0203801A / *Missile/Air Defense Product Improvement Program*	**Project (Number/Name)** 038 / *Avenger PIP*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Targeting Console (TC) Development and Testing	2	2015	2	2016
Mode 5/Identification Friend or Foe (IFF) Development	3	2015	3	2016
Voice Internal Communication (VIC) Development	4	2015	2	2016
Avenger Fire Control Computer-Revision (AFCC-R) Development	3	2015	4	2016
Mode 5/VIC Production Representative Articles (PRA)	4	2015	3	2016
Mode 5/IFF & VIC Integration and testing	2	2016	2	2016
Mode 5/IFF & VIC Log/Maintenance Demo	2	2016	2	2016
AFCC/R-IFF-VIC System Level Testing	1	2017	4	2017
AFCC-R, Mode 5, VIC/ IETM Conversion M-Demo/Log Demo	4	2017	1	2019
Future Modification to Address Evolving Threat	1	2019	4	2021