Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army											Date: February 2016	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*							
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	-	169.196	101.570	96.977	10.900	107.877	106.699	59.774	67.409	40.436	Continuing	Continuing
EB4: *CIRCM*	-	101.313	101.570	96.977	10.900	107.877	106.699	59.774	67.409	40.436	Continuing	Continuing
EE3: *A/C Surv Equip Dev*	-	14.274	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
EE4: *Common Missile Warning System (CMWS)*	-	53.609	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

Fiscal Year (FY) 2015 funds are a restructuring of funds from FY 2014 Projects 665 (A/C Surv Equip Dev), VU7 (Common Missile Warning System), and VU8 (Common Infrared Counter Measure), Program Element (PE) 0604270A (EW Development) to projects EE3 (A/C Surv Equip Dev), EE4 (Common Missile Warning System (CMWS)), and EB4 (CIRCM) respectively, PE 0605035A (Common Infrared Countermeasures (CIRCM)). Funds for project EB4 (CIRCM) remain in PE 0605035A (Common Infrared Countermeasures (CIRCM)) in FY 2016 and beyond. Funds from projects EE3 (A/C Surv Equip Dev), EE4 (Common Missile Warning System (CMWS)), PE 0605035A (Common Infrared Countermeasures (CIRCM)) are restructured to projects ER7 (Aircraft Survivability Equipment Development) and ER8 (Common Missile Warning System (CMWS)) respectively, PE 0605051A (Aircraft Survivability Development) for FY 2016 and beyond for more efficient and effective program management.

A. Mission Description and Budget Item Justification

The Common Infrared Countermeasure (CIRCM) budget line includes CIRCM (EB4), A/C Surv Equip Dev (EE3), and Common Missile Warning System (CMWS) (EE4). This budget line also includes funding for Joint Urgent Operational Needs Statement (JUONS) SO-0010 Phase 2a and the Headquarters Department of the Army (HQDA) Directed Requirement for the Advanced Threat Warner and Common Infrared Countermeasures Quick Reaction Capability (ATW & CIRCM QRC).

EB4: CIRCM

CIRCM is an infrared (IR) countermeasure system that interfaces with a Missile Warning System (MWS) to provide near spherical protection of the host platform in order to defeat IR threat missiles. The CIRCM will provide the sole acquisition of future laser-based IR countermeasure systems for all rotary-wing, tilt-rotor, and small fixed-wing aircraft across the Department of Defense. The Army's concept of CIRCM is part of the Suite of Integrated Infrared Countermeasures (SIIRCM). The core components of the SIIRCM concept are: a MWS, IR expendables countermeasures (flares) and a laser-based Infrared Countermeasure (IRCM). The SIIRCM detects, declares and initiates IRCM against IR-guided Surface-to-Air Missiles (SAM) or Air-to-Air Missiles (AAM). The CIRCM is the next generation of the laser-based IRCM component and will interface with both the Army's CMWS and future missile warning systems.

The A-Kit for CIRCM includes mounting hardware, wiring harnesses, and other components necessary to install and interface the mission kit on host aircraft. The A-Kit ensures the mission kit is functionally and physically operational with a specific host aircraft type. The CIRCM B-Kit is the mission kit (laser, pointer tracker, and controller) required to achieve near spherical coverage for an aircraft.

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 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605035A *I Common Infrared Countermeasures (CIRCM)*

This program also includes funding to counter emerging technology as identified in JUONS S0-0010. Initially, a select number of aircraft in the threat area of responsibility will be outfitted with a Department of the Department of the Navy Large Aircraft Infrared Countermeasure (DoNLAIRCM) system. However, this approach came with a Space, Weight and Power (SWaP) penalty which is being addressed as a follow-on HQDA Directed Requirement with a Quick Reaction Capability (QRC) using Advanced Threat Warner (ATW) and CIRCM.

EE3: Aircraft Surv Equip Dev

Beginning in FY 2016, funds were moved to Project ER7 (Aircraft Survivability Equipment Development), PE 0605051A (Aircraft Survivability Development).

The objective of the Aircraft Survivability Equipment (ASE) Development Project is to improve Radio Frequency (RF) ASE for Army aviation. The APR-39 Radar Warning Receiver (RWR) detects, categorizes, and prioritizes RF emitters and provides a visual / aural alert to aircrew members warning them of targeting by RF-guided weapons. The Milestone Decision Authority (MDA) approved Phases 1 and 2 of a 3-phased path forward.

EE4: CMWS

Beginning in FY 2016, funds have been moved to Project ER8 (Common Missile Warning System (CMWS)), PE 0605051A (Aircraft Survivability Development).

The US Army operational requirements concept for Aviation IR countermeasure systems is known as the Suite of Integrated Infrared Countermeasures (SIIRCM). SIIRCM is an integrated warning and countermeasure system to enhance aircraft survivability against IR-guided threat missile systems. The CMWS is a core element of the SIIRCM concept. CMWS is an integrated ultraviolet (UV) missile warning system, with an Improved Countermeasure Dispenser (ICMD) serving as a subsystem to a host aircraft.

The CMWS program is a UV missile warning system that cues both flare and laser-based countermeasures to defeat incoming IR-seeking missiles and will alert aircrews to the presence of certain incoming unguided munitions. The CMWS Generation 3 (Gen 3) ECU in conjunction with ongoing software development efforts will address outstanding material release conditions to achieve a Full Material Release (FMR) for CMWS and ensure protection against emerging IR-guided missile threats.

This program also includes funding to counter emerging technology as identified in JUONS S0-0010. Initially in Phase 2A, a select number of aircraft in the threat area of responsibility will be outfitted with a Department of the Department of the Navy Large Aircraft Infrared Countermeasure (DoNLAIRCM) system.

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Army					Date: February 2016
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*		R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*			
B. Program Change Summary ($ in Millions)	**FY 2015**	**FY 2016**	**FY 2017 Base**	**FY 2017 OCO**	**FY 2017 Total**
Previous President's Budget	145.337	77.570	72.909	-	72.909
Current President's Budget	169.196	101.570	96.977	10.900	107.877
Total Adjustments	23.859	24.000	24.068	10.900	34.968
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	24.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	30.000	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-6.141	-	24.068	10.900	34.968

Change Summary Explanation

FY 2017 funding increase was to align this Project with the approved Milestone B Army Cost Position.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EB4 / *CIRCM*	

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
EB4: *CIRCM*	-	101.313	101.570	96.977	10.900	107.877	106.699	59.774	67.409	40.436	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds in the program are a realignment of funds from program VU8, PE 0604270A (Electronic Warfare Development) for more efficient and effective program management.

A. Mission Description and Budget Item Justification

The Common Infrared Countermeasure (CIRCM) is an infrared (IR) countermeasure system that interfaces with a Missile Warning System (MWS) to provide near spherical protection of the host platform in order to defeat IR threat missiles. The CIRCM will provide the sole acquisition of future laser-based IR countermeasure systems for all rotary-wing, tilt-rotor, and small fixed-wing aircraft across the Department of Defense. The Army's concept of CIRCM is part of the Suite of Integrated Infrared Countermeasures (SIIRCM). The core components of the SIIRCM concept are: a MWS, IR expendables countermeasures (flares) and a laser-based Infrared Countermeasure (IRCM). The SIIRCM detects, declares and initiates IRCM against IR-guided Surface-to-Air Missiles (SAM) or Air-to-Air Missiles (AAM). The CIRCM is the next generation of the laser-based IRCM component and will interface with both the Army's Common Missile Warning System (CMWS) and future missile warning systems.

The A-Kit for CIRCM includes mounting hardware, wiring harnesses, and other components necessary to install and interface the mission kit on host aircraft. The A-Kit ensures the mission kit is functionally and physically operational with a specific host aircraft type. The CIRCM B-Kit is the mission kit (laser, pointer tracker, and controller) required to achieve near spherical coverage for an aircraft.

This program also includes funding to counter emerging technology as identified in JUONS S0-0010. Initially, a select number of aircraft in the threat area of responsibility will be outfitted with a Department of the Department of the Navy Large Aircraft Infrared Countermeasure (DoNLAIRCM) system. However, this approach came with a Space, Weight and Power (SWaP) penalty which is being addressed as a follow-on HQDA Directed Requirement with a Quick Reaction Capability (QRC) using Advanced Threat Warner (ATW) and CIRCM.

FY 2017 Base Research, Development, Test, and Evaluation (RDTE) funding in the amount of $96.977 million continues the Engineering and Manufacturing Development (EMD) phase to include A-Kit prototypes for the AH-64E, MH-60M, and HH-60M platforms, and supports integration with other missile warning systems.

FY 2017 Overseas Contingency Operations (OCO) funding in the amount of $10.900 million will support of efforts related to the HQDA Directed Requirement to include CIRCM QRC A-Kit development, integration with platforms and other ASE equipment, and initial Test and Evaluation efforts.

The intent of the ATW & CIRCM QRC program is to reduce the SWaP that require operational tradeoffs that are associated with the Phase 2a solution.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: CIRCM Product Development ***Description:*** CIRCM Product Development, Support Costs, & Management Services ***FY 2015 Accomplishments:*** RDTE dollars supported the CIRCM EMD phase to include non-recurring engineering (NRE), prototype manufacturing for B-Kit prototypes, platform integration, and support equipment. "Other R&D" supported the analysis of emerging threats. ***FY 2016 Plans:*** RDTE dollars support the CIRCM EMD phase to include Critical Design Review (CDR) Risk Reduction Activities, B-Kit ship set prototype deliveries, A-Kit integration, prototype A-Kit Modification Work Order (MWO) development, Training Support Plan (TSP), Technical Manual (TM) development, and NRE. ***FY 2017 Base Plans:*** RDTE dollars support the CIRCM EMD phase to include continued B-Kit and A-Kit development, CDR and A-Kit prototype procurement/deliveries. Other RDTE activities will support systems engineering/program management (SEPM) and Logistics Activities (Core Depot Assessment, Performance Based Logistics Business Case Analysis and Technical Manual updates).	68.154	66.113	56.755	-	56.755
Title: CIRCM Test & Evaluation (T&E) ***Description:*** CIRCM Test & Evaluation (T&E) Activities ***FY 2015 Accomplishments:*** RDTE dollars supported the CIRCM EMD phase efforts to include initiation of government conducted test events, modeling and simulation, and lab support. "Other Testing" included funds to develop IRCM solutions to defeat newly acquired threats. ***FY 2016 Plans:*** RDTE dollars support the CIRCM EMD phase to include software testing, flight testing, and Reliability Growth Testing (RGT). "Other Testing" includes funds to develop IRCM solutions to defeat newly acquired threats. ***FY 2017 Base Plans:***	33.159	11.457	40.222	-	40.222

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Supports CIRCM developmental testing to include A-kit testing for MH-60M, HH-60M, and AH-64E. This funding also includes test efforts to provide required lab capabilities such as in a system integration lab and procure test assets. Also continues efforts to develop IRCM solutions to defeat newly acquired threats.					
Title: Advanced Threat Warner (ATW) & CIRCM Quick Reaction Capability (QRC) Congressional Add ***Description:*** ATW & CIRCM QRC Development ***FY 2016 Plans:*** RDT&E dollars will support the ATW & CIRCM QRC A-Kit development, integration, and associated T&E efforts. This effort will integrate the ATW and CIRCM systems to reduce Space, Weight and Power (SWaP) in support of JUONS SO-0010.	-	24.000	-	-	-
Title: ATW & CIRCM QRC OCO ***Description:*** ATW & CIRCM QRC Integration ***FY 2017 Base Plans:*** This project only has OCO dollars for FY17 ***FY 2017 OCO Plans:*** Continue the ATW and CIRCM QRC A-Kit development and integration for the H-60, H-47, & H-64 platform variants and integration and integration with other ASE systems.	-	-	0.000	10.900	10.900
Accomplishments/Planned Programs Subtotals	101.313	101.570	96.977	10.900	107.877

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
• APA Funding: *SSN AZ3537; BA4; CIRCM*	-	-	0.000	108.721	108.721	6.337	55.460	115.625	120.851	Continuing	Continuing

Remarks

None

D. Acquisition Strategy

The December 28, 2011 Defense Acquisition Executive (DAE) Acquisition Decision Memorandum (ADM) authorized entry into the Technology Maturation and Risk Reduction (TMRR) phase, designated the program a pre-Major Defense Acquisition Program (MDAP), and approved the updated exit criteria. CIRCM Engineering and

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

Manufacturing Development (EMD) ADM was approved on August 25, 2015. The EMD contract was awarded to Northrup Grumman Systems Corporation (NGSC) on August 28, 2015. The EMD contract will include priced options for Other Platform A-Kit Development, A-Kit Engineering Support, Low Rate Initial Production (LRIP) 1 and 2 Prototypes (Hardware and Installs), LRIP 1 and 2 Engineering and Test Support, Software Technical Data Package (TDP), Navy funded requirements, and Defense Exportability Features (DEF). Upon CIRCM MS C approval planned for the second quarter of FY18, the LRIP and Engineering Support options may be exercised and the program may immediately enter the Production & Deployment phase with First Unit Equipped (FUE) planned for first quarter of FY20, and a Full Rate Production Decision Review (FRPDR) planned for the first quarter of FY20.

Due to the urgency of addressing the SWaP penalty issues related to the JUONS SO-0010 initial DoNLAIRCM material solution, the Army Directed Requirement with an ATW and CIRCM QRC will be a sole source effort with Northrop Grumman being the Prime contractor. Northrop Grumman has the required technical capabilities, knowledge and special equipment needed to meet the urgent and compelling need for the ATW and CIRCM QRC efforts.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EB4 / *CIRCM*	

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
System Engineering Program Management	Various	Various : -	0.000	7.447		9.503		9.371		-		9.371	Continuing	Continuing	Continuing
ATW & CIRCM QRC System Engineering & Program Management	Various	Various : -	0.000	-		-		0.000		1.100	Oct 2016	1.100	0	1.100	0
		Subtotal	0.000	7.447		9.503		9.371		1.100		10.471	-	-	-

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
Non-Recurring Engineering (NRE)	C/CPFF	Various : -	0.000	20.101	Aug 2015	34.626	Mar 2016	35.303	Nov 2016	-		35.303	Continuing	Continuing	Continuing
Prototype Manufacturing	C/FPIF	Various : -	0.000	32.620	Aug 2015	13.890	Jan 2016	-		-		-	Continuing	Continuing	Continuing
Development Facilities	Various	Various : -	0.000	-		-		3.000	Apr 2017	-		3.000	Continuing	Continuing	Continuing
Other R&D	Various	Various : -	0.000	7.286		5.167	Mar 2016	5.081	Mar 2017	-		5.081	Continuing	Continuing	Continuing
Data	Various	Various : -	0.000	-		1.427	May 2016	1.000	May 2017	-		1.000	Continuing	Continuing	Continuing
ATW & CIRCM QRC NRE	C/CPFF	Various : -	0.000	-		-		0.000		3.280	Nov 2016	3.280	0	3.280	0
ATW & CIRCM QRC Prototype Manufacturing	C/CPFF	Various : -	0.000	-		-		0.000		2.120	Nov 2016	2.120	Continuing	Continuing	Continuing
ATW & CIRCM QRC A-Kit Development & Integration	Various	Various : -	0.000	-		22.390	Apr 2016	-		-		-	0	22.390	Continuing
		Subtotal	0.000	60.007		77.500		44.384		5.400		49.784	-	-	-

Support ($ 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
Support Equipment	Various	Various : -	0.000	0.700		1.500	Jul 2016	3.000	Jul 2017	-		3.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.700		1.500		3.000		-		3.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EB4 / *CIRCM*	

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
Government System Test and Evaluation	Various	Various : -	0.000	2.500		5.050	Apr 2016	17.251	Apr 2017	-		17.251	Continuing	Continuing	Continuing
Other Testing	Various	Various : -	0.000	30.659		6.407	May 2016	22.971	May 2017	-		22.971	Continuing	Continuing	Continuing
ATW & CIRCM Government System Test & Evaluation	Various	Various : -	0.000	-		1.610	Apr 2016	0.000		4.400	Mar 2017	4.400	Continuing	Continuing	Continuing
		Subtotal	0.000	33.159		13.067		40.222		4.400		44.622	-	-	-

	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	101.313		101.570		96.977		10.900		107.877	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

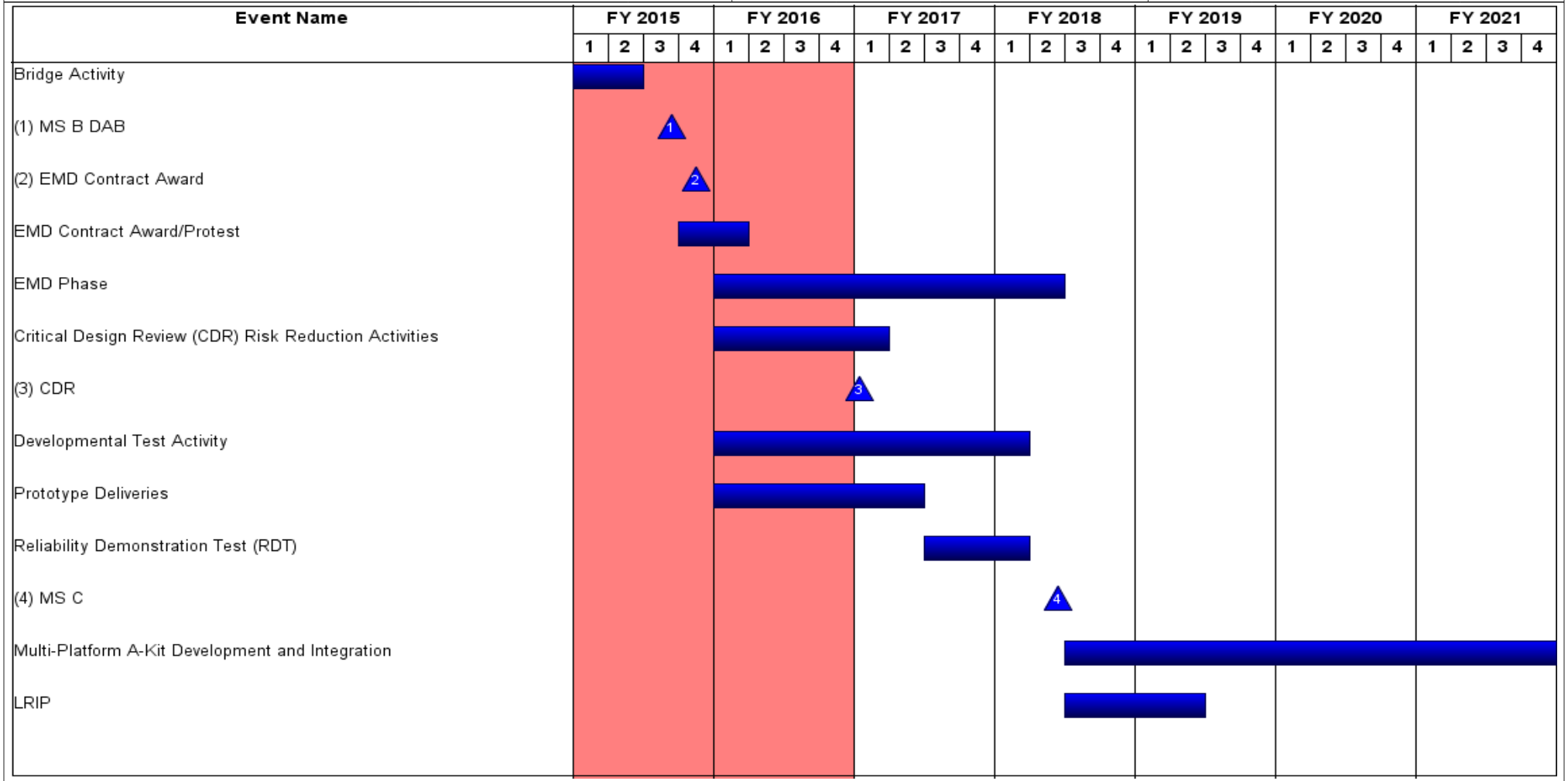

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

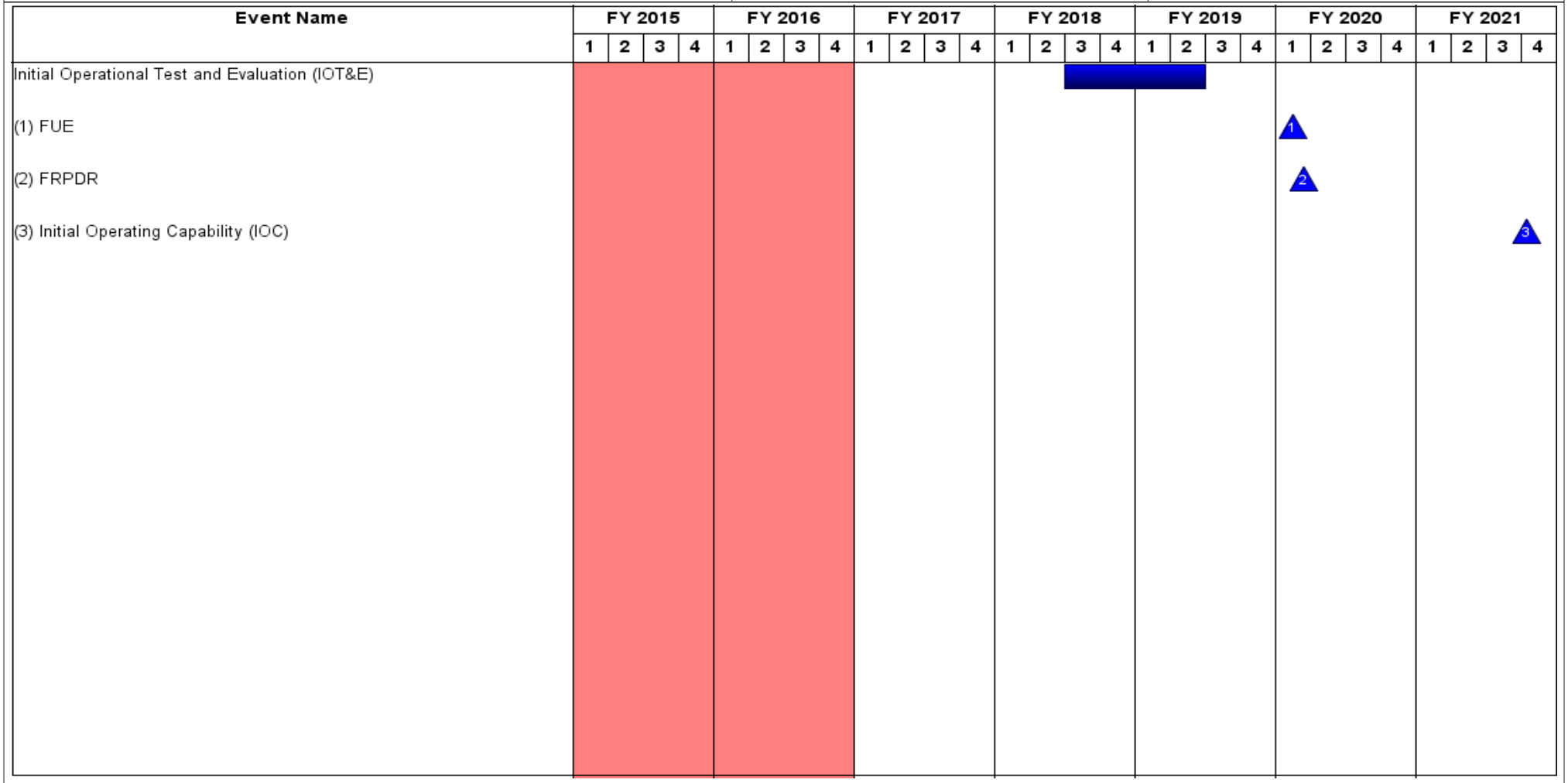

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EB4 / *CIRCM*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Bridge Activity	4	2014	2	2015
MS B DAB	3	2015	3	2015
EMD Contract Award	4	2015	4	2015
EMD Contract Award/Protest	4	2015	1	2016
EMD Phase	1	2016	2	2018
Critical Design Review (CDR) Risk Reduction Activities	1	2016	1	2017
CDR	1	2017	1	2017
Developmental Test Activity	1	2016	1	2018
Prototype Deliveries	1	2016	2	2017
Reliability Demonstration Test (RDT)	3	2017	1	2018
MS C	2	2018	2	2018
Multi-Platform A-Kit Development and Integration	3	2018	4	2021
LRIP	3	2018	2	2019
Initial Operational Test and Evaluation (IOT&E)	3	2018	2	2019
FUE	1	2020	1	2020
FRPDR	1	2020	1	2020
Initial Operating Capability (IOC)	4	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE3 / *A/C Surv Equip Dev*	

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
EE3: *A/C Surv Equip Dev*	-	14.274	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Fiscal Year (FY) 2015 funds are a restructuring of funds from FY 2014 Project 665 (A/C Surv Equip Dev), Program Element (PE) 0604270A (EW Development) to project EE3 (A/C Surv Equip Dev), PE 0605035A (Common Infrared Countermeasures (CIRCM)). Funds from Project EE3 (A/C Surv Equip Dev), PE 0605035A (Common Infrared Countermeasures (CIRCM)) are restructured to Project ER7 (Aircraft Survivability Equipment Development), PE 0605051A (Aircraft Survivability Development) for FY 2016 and beyond for more efficient and effective program management.

A. Mission Description and Budget Item Justification

The objective of the Aircraft Survivability Equipment (ASE) Development project is to improve Radio Frequency (RF) ASE for Army aviation. The APR-39 Radar Warning Receiver (RWR) detects, categorizes, and prioritizes RF emitters and provides a visual / aural alert to aircrew members warning them of targeting by RF-guided weapons. The Milestone Decision Authority (MDA) approved Phases 1 and 2 of a 3-phased path forward.

Phase 1 serves as an obsolescence / sustainment upgrade to the Processor Line Replaceable Unit (LRU) of the AN/APR-39A(V) RWR implemented to ensure that the currently fielded system remains viable until affordable improved RF ASE capability can be pursued in Phases 2 and 3.

Phase 2, RWR Modernization, adopts the ongoing United States Navy Class I RWR Engineering Change Proposal (ECP), commonly referred to as the APR-39D(V)2 system. APR-39D(V)2 will significantly improve the RF threat coverage, automatic detection and identification of threat types, bearing, and lethality. Under Phase 2, the Army will develop enhancements to the APR-39D(V)2 as hardware upgrades needed to keep the APR-39D(V)2 technically relevant and address emerging Low Probability Intercept (LPI) and frequency agile threats.

Phase 3 adds active Electronic Countermeasures (ECM) jamming capability for selected aircraft; Materiel Development Decision (MDD) for this ECM jamming capability phase is not expected until later in the Future Years Defense Program (FYDP).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Phase 2 Radio Frequency Countermeasure	14.274	-	-	-	-
Description: Phase 2 Product Development					
FY 2015 Accomplishments:					

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE3 / *A/C Surv Equip Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
FY15 Base RDT&E funding supported AH-64E A-Kit development, Army Electro-Magnetic Interference (EMI) testing, Antenna Macrocell upgrades (MaRCm), funding for the Reliability Demonstration testing, and Mission Data Set (MDS) development.					
Accomplishments/Planned Programs Subtotals	14.274	-	-	-	-

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
• AZ3511: *Radio Frequency CM (AZ3511)*	56.163	28.730	50.425	-	50.425	50.067	40.833	74.147	57.498	Continuing	Continuing

Remarks

D. Acquisition Strategy

Army RF ASE is managed by Project Manager ASE (PM ASE) for development, testing, procurement, integration and installation on Army rotary wing and small fixed wing aviation platforms. PM ASE proposed a three-phased path forward commensurate with user priorities and affordability considerations. The Milestone Decision Authority (MDA) approved Phases 1 and 2 of a 3-phased path forward.

Phase 1 addresses obsolescence/Diminishing Manufacturing Sources (DMS) issues associated with the currently fielded AN/APR-39A(V) RWR via sole source ECP awarded to the APR-39A manufacturer.

Phase 2 adopts the on-going United States Navy (USN) RWR Class I Correction of Deficiencies ECP commonly referred to as the APR-39D(V)2 system, limiting service-unique design, test, and integration expenses. Full Army participation throughout the remaining development, testing, procurement, fielding, and sustainment of the APR-39D(V)2 Digital RWR will address the significant Army RF capability gap while avoiding additional costs associated with a single-Service solution. This multi-Service approach also fields an effective and suitable material solution sooner to support the re-balance of the National Defense Strategy to the RF threat-heavy Asia-Pacific Region.

Phase 3 will develop and integrate active Electronic Countermeasure jamming capability for select aircraft.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE3 / *A/C Surv Equip Dev*	

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
Threat Management	Various	Various : -	7.985	0.848		-		-		-		-	Continuing	Continuing	Continuing
Project Management	Various	Various : -	0.182	0.247		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	8.167	1.095		-		-		-		-	-	-	-

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
Digital Radar Warning Receiver (RWR)	Various	Lab Demo / Study : Various	10.634	-		-		-		-		-	Continuing	Continuing	Continuing
S/W Development	Various	OGA, : Aberdeen Proving Ground, MD	0.000	1.498		-		-		-		-	Continuing	Continuing	Continuing
SIL Updates	MIPR	- : AMRDEC	0.000	1.726		-		-		-		-	Continuing	Continuing	Continuing
Depot Standup	MIPR	Tobyhanna : Tobyhanna, PA	1.052	-		-		-		-		-	0	1.052	0
Platform Integration	Various	Multiple : -	0.000	1.844		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	11.686	5.068		-		-		-		-	-	-	-

Support ($ 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
Contractor Support	Various	Various : -	2.359	0.444		-		-		-		-	Continuing	Continuing	Continuing
Matrix Support	Various	Various : -	6.236	0.194		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	8.595	0.638		-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE3 / *A/C Surv Equip Dev*	

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
Multi-Service DT/OT	Various	Various : -	0.025	1.557		-		-		-		-	Continuing	Continuing	Continuing
Government system Test and Evaluation	Various	Various : Various	0.000	5.916		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	0.025	7.473		-		-		-		-	-	-	-

	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	28.473	14.274		0.000		-		-		-	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE3 / *A/C Surv Equip Dev*

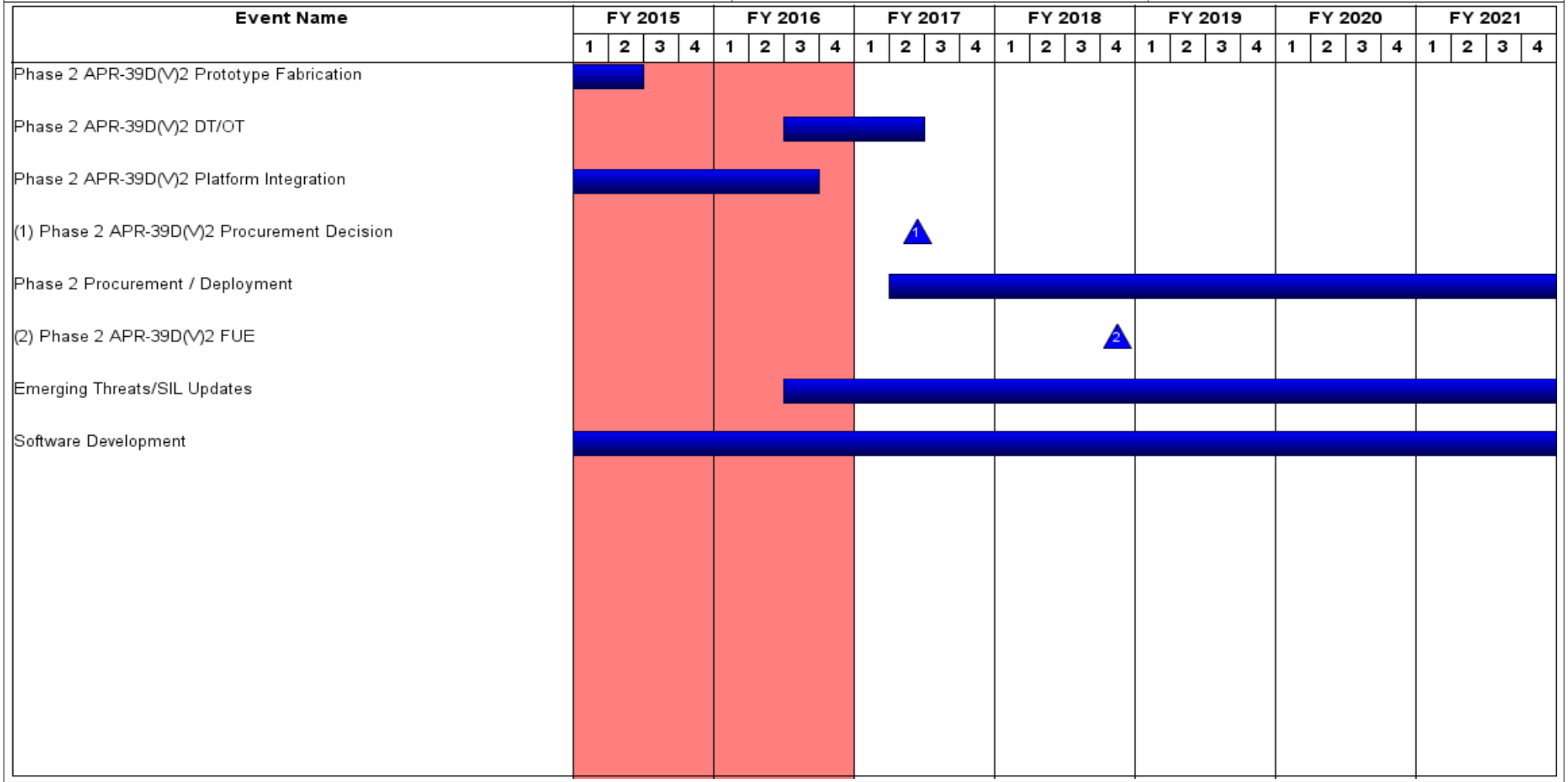

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE3 / *A/C Surv Equip Dev*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Phase 2 APR-39D(V)2 Prototype Fabrication	4	2013	2	2015
Phase 2 APR-39D(V)2 DT/OT	3	2016	2	2017
Phase 2 APR-39D(V)2 Platform Integration	1	2014	3	2016
Phase 2 APR-39D(V)2 Procurement Decision	2	2017	2	2017
Phase 2 Procurement / Deployment	2	2017	4	2021
Phase 2 APR-39D(V)2 FUE	4	2018	4	2018
Emerging Threats/SIL Updates	3	2016	4	2021
Software Development	1	2015	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE4 / *Common Missile Warning System (CMWS)*	

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
EE4: *Common Missile Warning System (CMWS)*	-	53.609	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Fiscal Year (FY) 2015 funds are a restructuring of funds from FY 2014 Project VU7 (Common Missile Warning System), Program Element (PE) 0604270A (EW Development) to Project EE4 (Common Missile Warning System (CMWS)), PE 0605035A (Common Infrared Countermeasures (CIRCM)). Funds from Project EE4 (Common Missile Warning System (CMWS)), PE 0605035A (Common Infrared Countermeasures (CIRCM)) are restructured to Project ER8 (Common Missile Warning System (CMWS)), PE 0605051A (Aircraft Survivability Development) for FY 2016 and beyond for more efficient and effective program management.

A. Mission Description and Budget Item Justification

The US Army operational requirements concept for Aviation Infrared (IR) countermeasure systems is known as the Suite of Integrated Infrared Countermeasures (SIIRCM). SIIRCM is an integrated warning and countermeasure system to enhance aircraft survivability against IR-guided threat missile systems. The Common Missile Warning System (CMWS) is a core element of the SIIRCM concept. CMWS is an integrated ultraviolet (UV) missile warning system, with an Improved Countermeasure Dispenser (ICMD) serving as a subsystem to a host aircraft.

The CMWS program is a UV missile warning system that cues both flare and laser-based countermeasures to defeat incoming IR-seeking missiles and will alert aircrews to the presence of certain incoming unguided munitions. The B-Kit consists of the components which perform the missile detection and aircrew notification, unguided munitions detection and aircrew notification, false alarm rejection, and countermeasure employment/cueing functions of the system. The CMWS Electronic Control Unit (ECU) receives UV missile detection data from Electro-Optic Missile Sensors (EOMS) and sends a missile alert signal to warn aircrews via on-board avionics. Tier 1 threat missiles detected and tracked by the CMWS are subsequently defeated by a combination of missile seeker countermeasures, including decoy flares and IR Laser Jamming (currently Advanced Threat Infrared Countermeasures (ATIRCM)-equipped CH-47 platform only). In addition, the CMWS ECU receives from the EOMS unguided munitions detection data which it also passes to the aircrew through aural and visual alerts. The aircrew then applies the appropriate Tactics, Techniques and Procedures (TTPs) to break contact or engage the enemy with own-ship ordnance. The CMWS Generation 3 (Gen 3) ECU in conjunction with ongoing software development efforts will address outstanding material release conditions to achieve a Full Material Release (FMR) for CMWS and ensure protection against emerging IR-guided missile threats.

The A-Kit for CMWS includes mounting hardware, wiring harnesses, cables, and other components necessary to install and interface the mission kit on host aircraft. The A-Kit ensures the mission kit is functionally and physically operational with a specific host aircraft type.

Joint Urgent Operational Needs Statement (JUONS) SO-0010 will integrate the Department of the Navy Large Aircraft Infrared Countermeasure (DoN LAIRCM) system on a select number of Army and SOCOM aircraft in the threat area of responsibility. The purpose of this JUONS is to detect and defeat proliferate Surface-to-Air Missiles

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE4 / *Common Missile Warning System (CMWS)*

(SAM) threats. HQDA has provided a follow up Directed Requirement to this JUONS to reduce Space, Weight and Power (SWaP) and accelerate delivery of Common Infrared Countermeasures (CIRCMs).

The intent of the ATW & CIRCM QRC program is to reduce the SWaP that require operational tradeoffs that are associated with the Phase 2a solution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Development Effort ***Description:*** RDT&E funding supports continuing development engineering of the Threat Analysis Database (TAD), salaries, and integration with other ASE systems. ***FY 2015 Accomplishments:*** $23.609M FY15 Base RDT&E funding supported continuing development engineering of the Threat Analysis Database (TAD) by developing full spectrum compliance for Tier 1 threat list by improving Block 2.0 algorithm and creating software architecture for analysis of emerging threats, program management, performed data modeling of the CMWS ASE Buss Controller to platform Interface Requirements Specification/Interface Design Document in a FACE compliant methodology, prime contractor engineering services, air worthiness support, Apache and Black Hawk aircraft integration, testing and test instrumentation, and travel. $30.000M FY15 OCO RDT&E funding supported aircraft integration of the JUONS solution on US Army rotary wing aircraft, prime contractor engineering services, test and evaluation, and program management.	53.609	-	-	-	-
Accomplishments/Planned Programs Subtotals	53.609	-	-	-	-

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
• APA: *BA 4 AZ3517*	201.912	104.348	41.626	56.115	97.741	37.225	32.719	18.775	10.917	69.608	573.245

Remarks

D. Acquisition Strategy

The acquisition strategy includes buying CMWS B-Kits to support the Army Force Generation (ARFORGEN) model and installation of A-Kits on all modernized aircraft. The previous CMWS production contract was a firm fixed-priced (FFP), Indefinite Delivery, Indefinite Quantity (IDIQ) contract. A FFP bridge contract was awarded March 2013 for CMWS hardware. The follow-on CMWS production FFP/CPFF IDIQ contract is a 3 year firm fixed price contract to procure the remaining Generation 3 ECUs and A-Kits and was awarded SEP 2013. The Gen 3 ECU, which provides increased processing capacity and enables unguided munitions detection, became a part of the system in FY 2010; First Unit Equipped (FUE) for the Gen 3 ECU was achieved in Operation Enduring Freedom (OEF) on 18 September 2013. All aircraft deployed to OEF have received the new processor with hostile fire detection capability. Gen 3 ECU's will gradually replace all Gen 2 ECU's across the Aviation fleet.

Exhibit R-2A, RDT&E Project Justification: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE4 / *Common Missile Warning System (CMWS)*

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE4 / *Common Missile Warning System (CMWS)*	

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
CMWS Systems Engineering Program Management	Various	Various : PM ASE, HSV, AL	2.670	5.130		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	2.670	5.130		-		-		-		-	-	-	-

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
CMWS Tier 2/3 Upgrades	Various	Various : -	2.000	-		-		-		-		-	Continuing	Continuing	Continuing
CMWS Threat Analysis Database Design	Various	BAE : Various	0.455	-		-		-		-		-	Continuing	Continuing	Continuing
Threat Analysis Database (TAD)	Various	BAE : Various	0.000	0.874	Jun 2015	-		-		-		-	Continuing	Continuing	Continuing
CMWS Enhanced Sensor Study & Evaluation	Various	Various : -	11.466	-		-		-		-		-	Continuing	Continuing	Continuing
CMWS Data Modeling	TBD	Various : Various	0.000	0.688		-		-		-		-	Continuing	Continuing	Continuing
Prime Contractor - Integration Engineering	TBD	TBD : TBD	0.000	7.787		-		-		-		-	Continuing	Continuing	Continuing
Aircraft Integration	TBD	Various : Various	0.000	19.974		-		-		-		-	Continuing	Continuing	Continuing
Software	TBD	Various : Various	0.000	3.000		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	13.921	32.323		-		-		-		-	-	-	-

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
Test and Evaluation	TBD	TBD : Various	0.000	16.156		-		-		-		-	Continuing	Continuing	Continuing
		Subtotal	0.000	16.156		-		-		-		-	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Army			Date: February 2016
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	Project (Number/Name) EE4 / *Common Missile Warning System (CMWS)*	

	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	16.591	53.609		0.000		-		-		-	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Army		Date: February 2016
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605035A / *Common Infrared Countermeasures (CIRCM)*	**Project (Number/Name)** EE4 / *Common Missile Warning System (CMWS)*

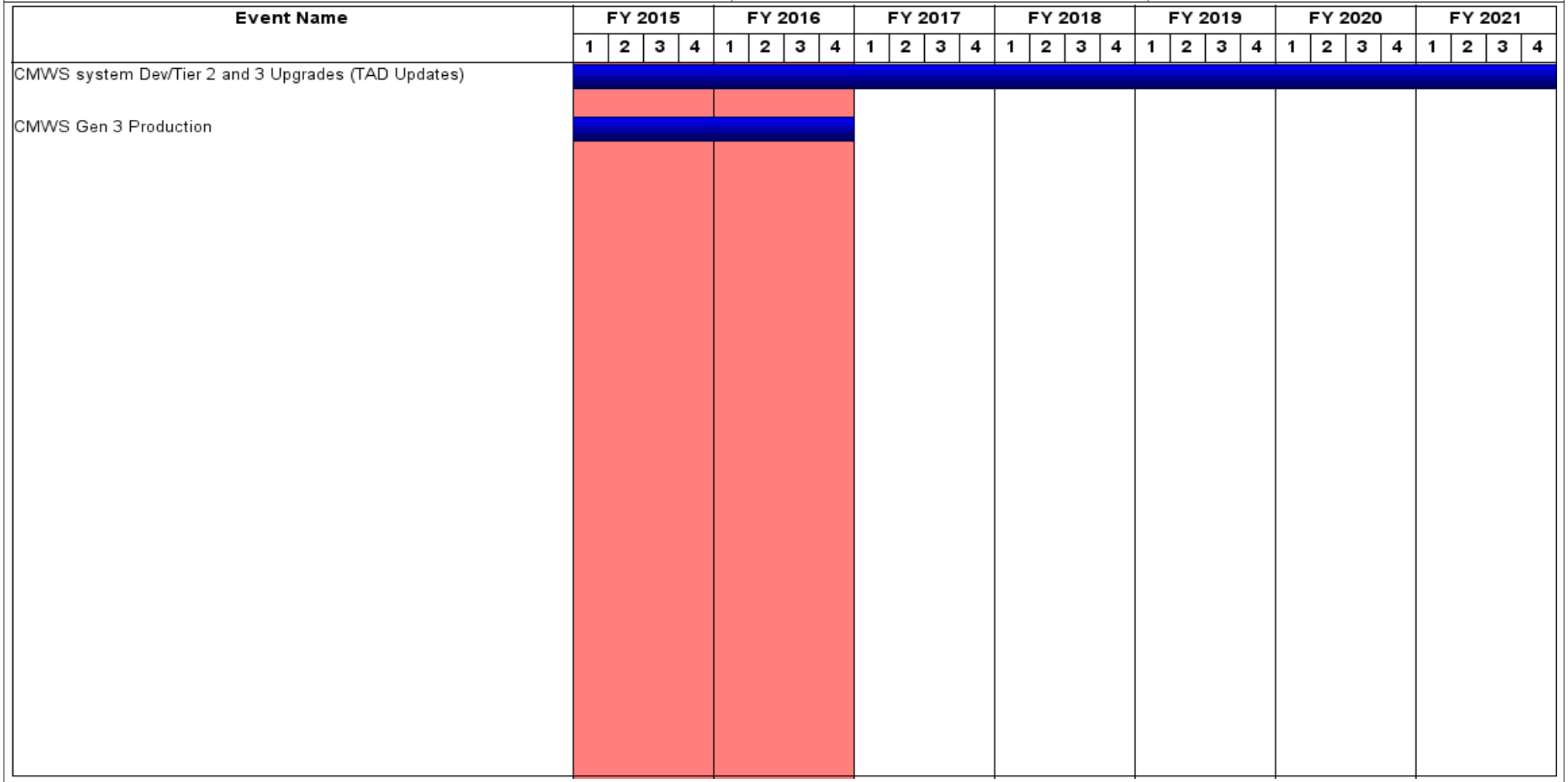

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Army		Date: February 2016
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CMWS system Dev/Tier 2 and 3 Upgrades (TAD Updates)	2	2011	4	2021
CMWS Gen 3 Production	3	2012	4	2016

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