Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army												Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	169.752	56.871	64.557	77.420	141.977	92.449	14.440	18.707	16.186	0.000	510.382
ER7: *Aircraft Survivability Equipment Development*	-	25.120	16.143	58.772	-	58.772	9.933	7.692	11.821	8.240	0.000	137.721
ER8: *Common Missile Warning System (CMWS)*	-	144.632	40.728	5.785	77.420	83.205	82.516	6.748	6.886	7.946	0.000	372.661

A. Mission Description and Budget Item Justification

The Aircraft Survivability Development budget line includes Aircraft Survivability Equipment Development (ER7) and Common Missile Warning System (ER8). This budget line also includes funding for Joint Urgent Operational Needs Statement (JUONS) SO-0010 Phase 2a, Headquarters Department of the Army (HQDA) Directed Requirement for the Advanced Threat Warner (ATW) portion of the Phase 3 ATW/Common Infrared Countermeasures Quick Reaction Capability (ATW/CIRCM QRC), and the next generation missile warning system.

ER7: 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.

Phase 1, the APR-39C(V)1/4, serves as an obsolescence / sustainment upgrade to the Processor Line Replaceable Unit (LRU) of the AN/APR-39A(V) Radar Warning Receiver (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 2A is RWR Modernization begins by adopting the United States Navy 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. Phase 2B, the APR-39E(V)2 (MRWR), is an Army Engineering Change Proposal (ECP) to the APR-39D(V)2 that will implement enhanced hardware and software upgrades to keep the APR-39 technically relevant against new and emerging agile threats.

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

Justification: FY 2020 Base RDT&E funding of $58.772 million supports APR-39E(V)2 system development and prototyping.

ER8: Common Missile Warning System (CMWS).
The CMWS program is a missile warning system that cues both flare and laser-based countermeasures to defeat incoming Inrared (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,

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605051A *I Aircraft Survivability Development*

unguided munitions detection and aircrew notification, false alarm rejection, and countermeasure employment/cueing functions of the system. The CMWS Electronic Control Unit (ECU) receives ultraviolet (UV) missile detection data from Electro-Optic Missile Sensors (EOMS), which detect UV signals, 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 materiel release conditions to achieve a Full Materiel 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.

As a part of Phase 2a of the JUONS (SO-0010) program, the Army has now integrated the Department of the Navy Large Aircraft Infrared Countermeasure (DoN LAIRCM) system onto the Apache, Blackhawk, and Chinook platforms. Due to a number of challenges, circumstances, and variables, the Army updated the ATW/ CIRCM QRC and LIMWS Directed Requirements (dated 16 November 2018). The updated requirements extend the utilization of ATW DoN LAIRCM on conventional Army aircraft and cancel the need for the ATW/CIRCM QRC system for the conventional Army. (It should be noted that the updated requirement maintains the need for ATW/CIRCM on the Special Operations aircraft.) As a result, the Army will no longer acquire the ATW sensors for use in Phase 3 of the JUONS effort. Instead, the Army will accelerate the procurement of the CIRCM QRC systems for use with the currently fielded Common Missile Warning System (CMWS) in preparation for transition to the Limited Interim Missile Warning System (LIMWS) system when available.

Phase 4 Limited Interim Missile Warning System (LIMWS) QRC: Phase 4 LIMWS QRC addressess the HQDA Directed Requirement to provide a greater capability than the current Program of Record (POR), CMWS, to bridge the gap between CMWS and the future POR.

Justification:
CMWS: FY 2020 Base Research, Development, Test, and Evaluation (RDTE) dollars in the amount of $5.785 million funds threat and vulnerability analysis, and Systems Engineering Program Management (SEPM).

Phase 3 Common Infrared Countermeasure Quick Reaction Capability (Phase 3, CIRCM QRC): FY 2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount of $2.220 million fund System Test & Evaluation (ST&E) and tech manual development.

Phase 4 Limited Interim Missile Warning System (LIMWS) QRC: FY2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount of $75.200 million are estimated to fund test of system and design for lead platform and development of follow-on platform designs.

Joint Staff, J-8 Deputy Director for Requirements (DOR) memorandum, April 24, 2015

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605051A *I Aircraft Survivability Development*

Phase 2a SOCOM JUONs S0-0010, Joint Rapid Acquisition Cell (JRAC) memorandum, May 29, 2015 Directed Requirement for the Phase 3 Advanced Threat Warner and Common Infrared Countermeasure Quick Reaction Capability (ATW/CIRCM QRC) to Support Joint Urgent Operational Need (JUON) S0-0010, CIRCM Critical Intelligence Parameters Breach, December 18, 2015 Directed Requirement for the Phase 4 Limited Interim Missile Warning System (LIMWS) QRC, March 26, 2017

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	60.979	56.898	22.712	-	22.712
Current President's Budget	169.752	56.871	64.557	77.420	141.977
Total Adjustments	108.773	-0.027	41.845	77.420	119.265
• Congressional General Reductions	-0.025	-0.027			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	110.000	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.202	-			
• Adjustments to Budget Years	-	-	41.845	77.420	119.265

Change Summary Explanation

FY 2018 adjustment of $108.773 adds funding for ER8 Product Development

FY 2020 Adjustment of $119.265 adds funding for ER7 and ER8 Product Development.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER7 / *Aircraft Survivability Equipment Development*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
ER7: *Aircraft Survivability Equipment Development*	-	25.120	16.143	58.772	-	58.772	9.933	7.692	11.821	8.240	0.000	137.721
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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, the APR-39C(V)1/4, serves as an obsolescence / sustainment upgrade to the Processor Line Replaceable Unit (LRU) of the APR-39A(V) Radar Warning Receiver (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 2A is RWR Modernization begins by adopting the United States Navy 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. Phase 2B, the APR-39E(V)2 (MRWR), is an Army Engineering Change Proposal (ECP) to the APR-39D(V)2 that will implement enhanced hardware and software upgrades to keep the APR-39 technically relevant against new and emerging agile threats.

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

Justification: FY 2020 Base RDT&E funding of $58.772 million supports APR-39E(V)2 system development and prototyping.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Phase 2 Radio Frequency Countermeasure (CM)	25.120	16.143	58.772	-	58.772
Description: Phase 2 RWR Modernization					
FY 2019 Plans: Will fund APR-39E(V)2 hardware and software development.					
FY 2020 Base Plans: Will fund APR-39E(V)2 hardware and software development, prototyping, and integration.					
FY 2019 to FY 2020 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER7 / *Aircraft Survivability Equipment Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2020 includes increased Base RDT&E funding for additional hardware and software development, prototyping, and integration for APR-39E(V)2.					
Accomplishments/Planned Programs Subtotals	25.120	16.143	58.772	-	58.772

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• AZ3511: *Radio Frequency CM*	54.843	51.135	46.353	-	46.353	65.043	92.599	160.306	140.848	0.000	611.127

Remarks

D. Acquisition Strategy

Army Radio Frequency (RF) ASE is managed by Project Manager ASE (PM ASE) for development, testing, procurement, integration and installation on Army rotary wing and fixed wing Special Electronic Mission Aircraft (SEMA) 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, the APR-39C(V)1/4, addresses obsolescence/Diminishing Manufacturing Sources (DMS) issues associated with the currently fielded AN/APR-39A(V) Radar Warning Receiver (RWR) via sole source Engineering Change Proposal (ECP) awarded to the APR-39A(V) manufacturer.

Phase 2A adopts the United States Navy (USN) APR-39D(V)2 system, limiting service-unique design, test, and integration expenses. Adoption of the APR-39D(V)2 in limited quantity, followed by Phase 2B development, testing, procurement, and fielding of the APR-39E(V)2 will address the significant RF capability gap while avoiding additional up-front costs associated with a single-Service solution.

Phase 3 will develop and integrate active Electronic Countermeasures (ECM) jamming capability for selected aircraft.

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E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER7 / *Aircraft Survivability Equipment Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Threat Management	Various	Various : -	8.839	0.284		0.324		2.631	Nov 2019	-		2.631	Continuing	Continuing	-
Project Management	Various	Various : -	1.595	0.258		0.358	Nov 2018	3.243	Nov 2019	-		3.243	Continuing	Continuing	-
FY 2019 SBIR / STTR Transfer	TBD	various : -	-	-		0.592		-		-		-	0.000	0.592	-
		Subtotal	10.434	0.542		1.274		5.874		-		5.874	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Radar Warning Receiver (RWR) (D(V)2)	Various	Lab Demo / Study : Various	10.634	-		-		-		-		-	Continuing	Continuing	-
APR-39E(V)2 SW & HW Development	Various	OGA : Aberdeen Proving Grounds, MD	10.136	22.910		14.869	Dec 2018	42.898	Jan 2020	-		42.898	Continuing	Continuing	-
Threat and Vulnerablity Analysis/Sil Updates	MIPR	I2WD : Aberdeen Proving Grounds, MD	2.547	-		-		-		-		-	Continuing	Continuing	-
Depot Standup	MIPR	Tobyhanna : Tobyhanna, PA	1.063	-		-		-		-		-	0.000	1.063	-
APR-39E(V)2 Platform Integration	Various	Multiple : -	4.516	0.036		-		10.000	Jan 2020	-		10.000	Continuing	Continuing	-
		Subtotal	28.896	22.946		14.869		52.898		-		52.898	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Support	Various	Various : -	4.182	0.503		-		-		-		-	Continuing	Continuing	-
Matrix Support	Various	Various : -	6.800	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	10.982	0.503		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER7 / *Aircraft Survivability Equipment Development*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DT/OT	Various	Various : -	3.060	0.379		-		-		-		-	Continuing	Continuing	-
Government System Test and Evaluation	Various	Various : -	20.059	0.750		-		-		-		-	Continuing	Continuing	-
		Subtotal	23.119	1.129		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	73.431	25.120		16.143		58.772		-		58.772	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER7 / *Aircraft Survivability Equipment Development*

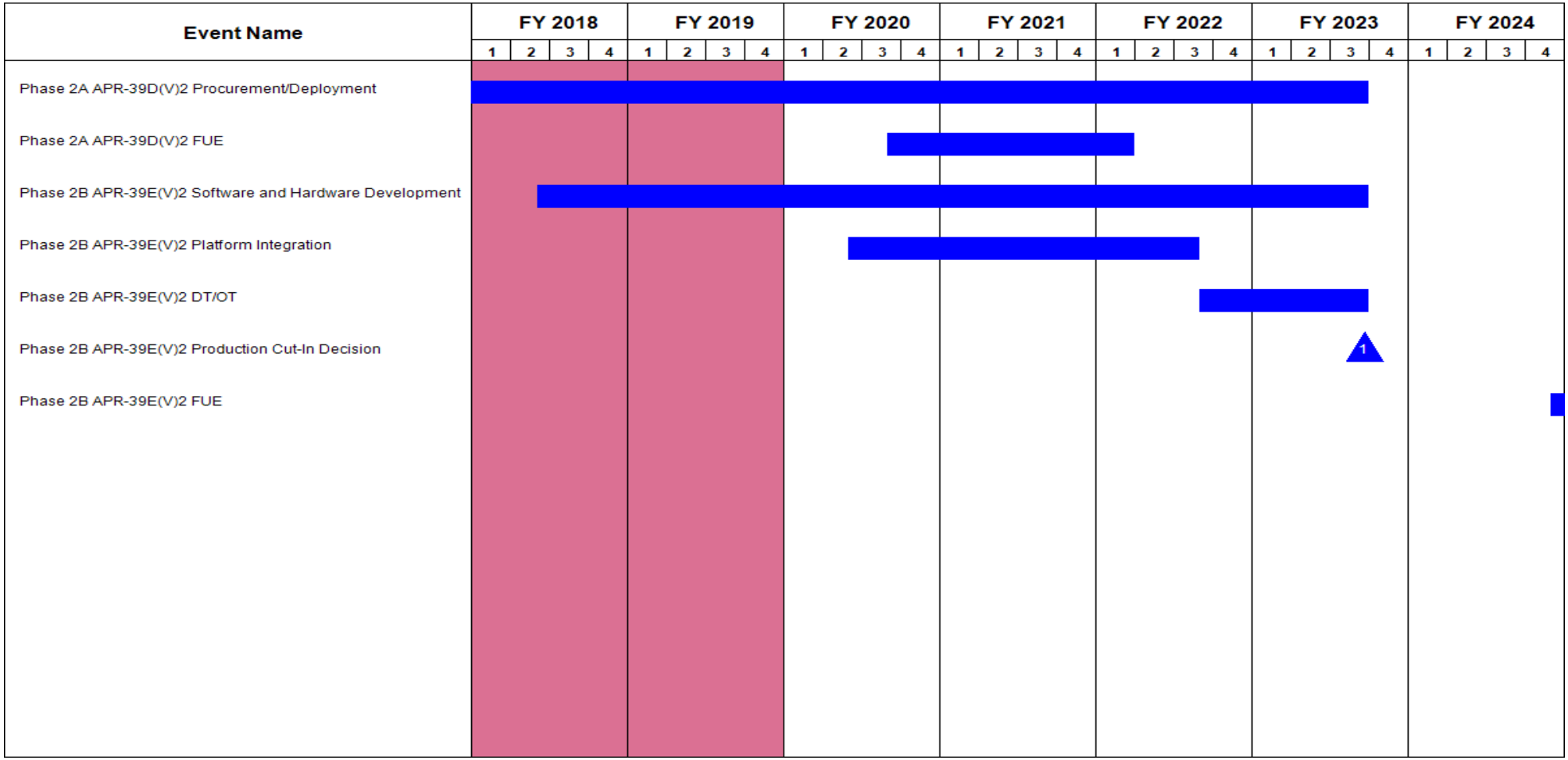

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER7 / *Aircraft Survivability Equipment Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Threat Vulnerability Analysis//SIL Updates	3	2016	4	2017
Phase 2A APR-39D(V)2 Procurement/Deployment	4	2017	3	2023
Phase 2A APR-39D(V)2 FUE	3	2020	1	2022
Phase 2B APR-39E(V)2 Software and Hardware Development	2	2018	3	2023
Phase 2B APR-39E(V)2 Platform Integration	2	2020	3	2022
Phase 2B APR-39E(V)2 DT/OT	3	2022	3	2023
Phase 2B APR-39E(V)2 Production Cut-In Decision	3	2023	3	2023
Phase 2B APR-39E(V)2 FUE	4	2024	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER8 / *Common Missile Warning System (CMWS)*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
ER8: *Common Missile Warning System (CMWS)*	-	144.632	40.728	5.785	77.420	83.205	82.516	6.748	6.886	7.946	0.000	372.661
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The CMWS program is a missile warning system that cues both flare and laser-based countermeasures to defeat incoming Inrared (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 ultraviolet (UV) missile detection data from Electro-Optic Missile Sensors (EOMS), which detect UV signals, 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 materiel release conditions to achieve a Full Materiel 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.

As a part of Phase 2a of the JUONS (SO-0010) program, the Army has now integrated the Department of the Navy Large Aircraft Infrared Countermeasure (DoN LAIRCM) system onto the Apache, Blackhawk, and Chinook platforms. Due to a number of challenges, circumstances, and variables, the Army updated the ATW/ CIRCM QRC and LIMWS Directed Requirements (dated 16 November 2018).
The updated requirements extend the utilization of ATW DoN LAIRCM on conventional Army aircraft and cancel the need for the ATW/CIRCM QRC system for the conventional Army. (It should be noted that the updated requirement maintains the need for ATW/CIRCM on the Special Operations aircraft.) As a result, the Army will no longer acquire the ATW sensors for use in Phase 3 of the JUONS effort. Instead, the Army will accelerate the procurement of the CIRCM QRC systems for use with the currently fielded Common Missile Warning System (CMWS) in preparation for transition to the Limited Interim Missile Warning System (LIMWS) system when available.

Phase 4 Limited Interim Missile Warning System (LIMWS) QRC: Phase 4 LIMWS QRC addressess the HQDA Directed Requirement to provide a greater capability than the current Program of Record (POR), CMWS, to bridge the gap between CMWS and the future POR.

Justification:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

CMWS: FY 2020 Base Research, Development, Test, and Evaluation (RDTE) dollars in the amount of $5.785 million will fund development engineering of Threat and Vulnerability Analysis and Systems Engineering Project Management (SEPM).

Phase 3 CIRCM QRC: FY 2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount of $2.220 million will fund System Test & Evaluation (ST&E), technical manual development, and integration efforts to support the Phase 3 Common Infrared Countermeasure Quick Reaction Capability (CIRCM QRC) efforts.

Phase 4 Limited Interim Missile Warning System (LIMWS) Quick Reaction Capability (QRC) : FY 2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount $75.200 million are estimated to fund system testing, design for lead platform, and development of follow-on platform designs.

Joint Staff, J-8 Deputy Director for Requirements (DOR) memorandum, April 24, 2015
SOCOM JUONs S0-0010, Joint Rapid Acquisition Cell (JRAC) memorandum, May 29, 2015 Directed Requirement for the Advanced Threat Warner and Common Infrared Countermeasure Quick Reaction Capability (ATW/CIRCM QRC) to Support Joint Urgent Operational Need (JUON) S0-0010, CIRCM Critical Intelligence Parameters Breach, December 18, 2015 Directed Requirement for the Limited Interim Missile Warning System (LIMWS) QRC, March 26, 2017.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: CMWS Product Development and Management Services ***Description:*** RDTE funding supports continuing development engineering threat and vulnerability analysis , salaries, and integration with other ASE Systems. ***FY 2019 Plans:*** FY 2019 Base RDTE dollars in the amount of $5.583 million will fund Product Development - Threat Analysis Detection (TAD), Future Sensor and Algorithm Analysis, and Vulnerability Analysis and Assessment of Technologies (VAAT); Management Services - CMWS Systems Engineering Program Management. ***FY 2020 Base Plans:*** FY 2020 Base RDTE dollars in the amount of $5.785 million will fund Product Development - Threat and Vulnerability Analysis and Management Services - CMWS Systems Engineering Program Management. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 includes decreased funding for CMWS Product Development and Management Services.	4.532	5.583	5.785	-	5.785
Title: Phase 3 CIRCM QRC OCO ***Description:*** Phase 3 CIRCM QRC will achieve a reduction in SWaP. ***FY 2019 Plans:***	30.100	5.110	0.000	2.220	2.220

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
There is no FY 2019 Base funding for this effort. ***FY 2020 Base Plans:*** There is no FY 2020 Base funding for this effort. ***FY 2020 OCO Plans:*** Phase 3 Common Infrared Countermeasure Quick Reaction Capability (CIRCM QRC): FY 2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount of $2.220 million will fund System Test & Evaluation (ST&E), technical manual development, and integration efforts to support the CIRCM QRC efforts. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 funding decreased for CIRCM QRC OCO as development is nearing completion.					
Title: Phase 4 LIMWS QRC ***Description:*** Phase 4 Limited Interim Missile Warning System (LIMWS) is a follow-on bridging solution to the JUONS SO-0010 to provide a greater capability than the current Program of Record (POR), CMWS, until the future POR is available. LIMWS is a Chief of Staff of the Army approved Directed Requirement issued by Army G-8 on 26 Mar 2017. LIMWS QRC provides an enhanced missile warning system to detect emerging and evolving enemy Man Portable Air Defense Systems (MANPADS) threats. FY 2020 funding is required to complete system development and conduct integration and system level testing as well as develop and test platform specific hardware (A-kits) for integration of the LIMWS system onto Army aircraft. ***FY 2019 Plans:*** There is no FY 2019 Base funding for this effort. ***FY 2020 Base Plans:*** There is no FY 2020 Base funding for this effort. ***FY 2020 OCO Plans:*** FY 2020 Overseas Contingency Operations (OCO) RDTE dollars in the amount of $75.200 million are estimated to fund system testing,design for lead platform, and development of follow-on platform designs. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 includes increased OCO RDT&E funding to continue the development and testing of LIMWS QRC.	110.000	29.823	0.000	75.200	75.200
Title: FY 2019 SBIR / STTR Transfer	-	0.212	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Description: FY 2019 SBIR / STTR Transfer ***FY 2019 Plans:*** FY 2019 SBIR / STTR Transfer ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2019 SBIR / STTR Transfer					
Accomplishments/Planned Programs Subtotals	144.632	40.728	5.785	77.420	83.205

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• AZ3517: *CMWS*	197.467	97.883	13.999	130.219	144.218	140.796	10.040	8.277	8.514	0.000	607.195

Remarks

CIRCM QRC (Phase 3) is changing to maximize the Army fleet protection and meet operational requirements.

D. Acquisition Strategy

CMWS: The acquisition strategy includes buying CMWS B-Kits to support fielding requirements 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/Cost Plus Fixed Fee (CPFF) IDIQ contract is a 3 year firm fixed price contract to procure the remaining Generation 3 Electronic Control Unit (ECU) 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 ECUs will gradually replace all Gen 2 ECUs across the Aviation fleet between now and 2018.

Phase 2a JUONS DoN LAIRCM and Phase 3 CIRCM QRC: JUONS S0-0010 acquisition strategy includes aircraft prime contractor engineering support contracted to a Government test organization. Aircraft integration for JUONS will be handled through government operated organizations and industry partners.

Phase 4 Limited Interim Missile Warning System (LIMWS) QRC: Acquisition strategy includes a full and open competition for selection of prime vendor for development of B-Kit and development of A-Kit and support testing for the lead program. Additional platform A-Kit development will be handled by government organizations and industry partners.

Threat and Vulnerability Analysis combines the same efforts as Vulnerability Analysis and Assessment of Technologies (VAAT) and Threat Analysis Database (TAD).

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

Future Sensor Algorithm Analysis is critically important because this line support the entire Missile Warning Portfolio. Funds supporting future sensor algorithm analysis and development equally supports MANPADS and Hostile Fire overmatch for the entire Missile Warning Portfolio.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER8 / *Common Missile Warning System (CMWS)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CMWS Systems Engineering Program Management	Various	Various : PM ASE, HSV, AL	8.554	0.331		0.586	Jan 2019	0.587	Jan 2020	-		0.587	Continuing	Continuing	Continuing
Advanced Missile Warning System Systems Engineering Program Management	TBD	TBD : TBD	2.000	-		-		-		-		-	0.000	2.000	-
JUONS SO-0010 Systems Engineering Program Management	Various	Various : PM ASE, HSV, AL	1.627	-		-		-		-		-	0.000	1.627	-
CIRCM QRC Systems Engineering Program Management	Various	Various : PM ASE, HSV, AL	7.144	1.000		-		-		-		-	Continuing	Continuing	Continuing
LIMWS - SEPM	Various	Various : PM ASE, HSV, AL	5.634	1.222		0.489		0.000		0.494	Jan 2019	0.494	0.000	7.839	-
FY 2019 SBIR / STTR Transfer	TBD	Various : Various	-	-		0.212		-		-		-	0.000	0.212	-
		Subtotal	24.959	2.553		1.287		0.587		0.494		1.081	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 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	-		-		-		-		-	0.000	0.455	-
CMWS Threat Analysis Database (TAD)	Various	BAE : Various	6.119	-		-		-		-		-	0.000	6.119	-
CMWS Enhanced Sensor Study & Evaluation	Various	Various : -	11.466	-		-		-		-		-	0.000	11.466	-
CMWS Data Modeling	TBD	Various : Various	0.688	-		-		-		-		-	0.000	0.688	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER8 / *Common Missile Warning System (CMWS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CMWS Future Sensor and Algorithm Analysis	Various	Various : TBD	1.035	1.589		1.938	Mar 2019	2.150	Mar 2020	-		2.150	0.000	6.712	-
CMWS Prime Contractor--Integration Engineering	TBD	TBD,TBD : TBD	7.787	-		-		-		-		-	Continuing	Continuing	Continuing
CMWS Aircraft Integration	TBD	Various : Various	19.974	-		-		-		-		-	Continuing	Continuing	Continuing
CMWS Software	TBD	Various : Various	3.000	-		-		-		-		-	Continuing	Continuing	Continuing
JUONS SO-0010 Prime Contractor -- Integration Engineering	Various	Various : Various	8.842	-		-		-		-		-	0.000	8.842	-
JUONS SO-0010 Software	Various	Various : Various	1.534	-		-		-		-		-	0.000	1.534	-
JUONS SO-0010 Training	Various	Various : Various	0.200	-		-		-		-		-	0.000	0.200	-
CIRCM QRC Development Engineering	Various	Northrup Grumman : Rolling Meadow, IL	-	5.100		-		-		-		-	0.000	5.100	-
CIRCM QRC System Development and Qualification	Various	Various : Various	53.474	-		-		-		-		-	Continuing	Continuing	Continuing
CIRCM QRC Aircraft Integration	Various	Various : Various	24.223	-		-		-		-		-	Continuing	Continuing	Continuing
Limited Interim Missile Warning System (LIMWS) - Development Engineering	Various	Various : PM ASE, HSV, AL	21.234	97.029		10.893		0.000		48.840	Mar 2020	48.840	0.000	177.996	-
CMWS Threat and Vulnerability Analysis	Various	Various : TBD	-	2.612		3.059	Mar 2019	3.048	Mar 2020	-		3.048	Continuing	Continuing	Continuing
		Subtotal	162.031	106.330		15.890		5.198		48.840		54.038	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LIMWS - Matrix Support	Various	Various : PM ASE, HSV, AL	2.433	4.005		3.260		0.000		3.161	Jan 2020	3.161	0.000	12.859	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605051A / *Aircraft Survivability Development*	Project (Number/Name) ER8 / *Common Missile Warning System (CMWS)*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LIMWS - Contractor Support	Various	Various : PM ASE, HSV, AL	2.433	3.599		6.086		0.000		3.865	Jan 2020	3.865	0.000	15.983	-
		Subtotal	4.866	7.604		9.346		0.000		7.026		7.026	0.000	28.842	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CMWS Test and Evaluation	TBD	Various : Various	16.156	-		-		-		-		-	Continuing	Continuing	Continuing
JUONS SO-0010 Test and Evaluation	Various	Various : Various	26.709	-		-		-		-		-	0.000	26.709	-
CIRCM QRC Test and Evaluation/Tech Manuals	Various	Various : Various	3.720	24.000		5.110		0.000		2.220	Mar 2020	2.220	Continuing	Continuing	Continuing
LIMWS - Government Testing	Various	Various : PM ASE, HSV, AL	-	4.145		9.095		0.000		18.840	Mar 2020	18.840	0.000	32.080	-
		Subtotal	46.585	28.145		14.205		0.000		21.060		21.060	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	238.441	144.632		40.728		5.785		77.420		83.205	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

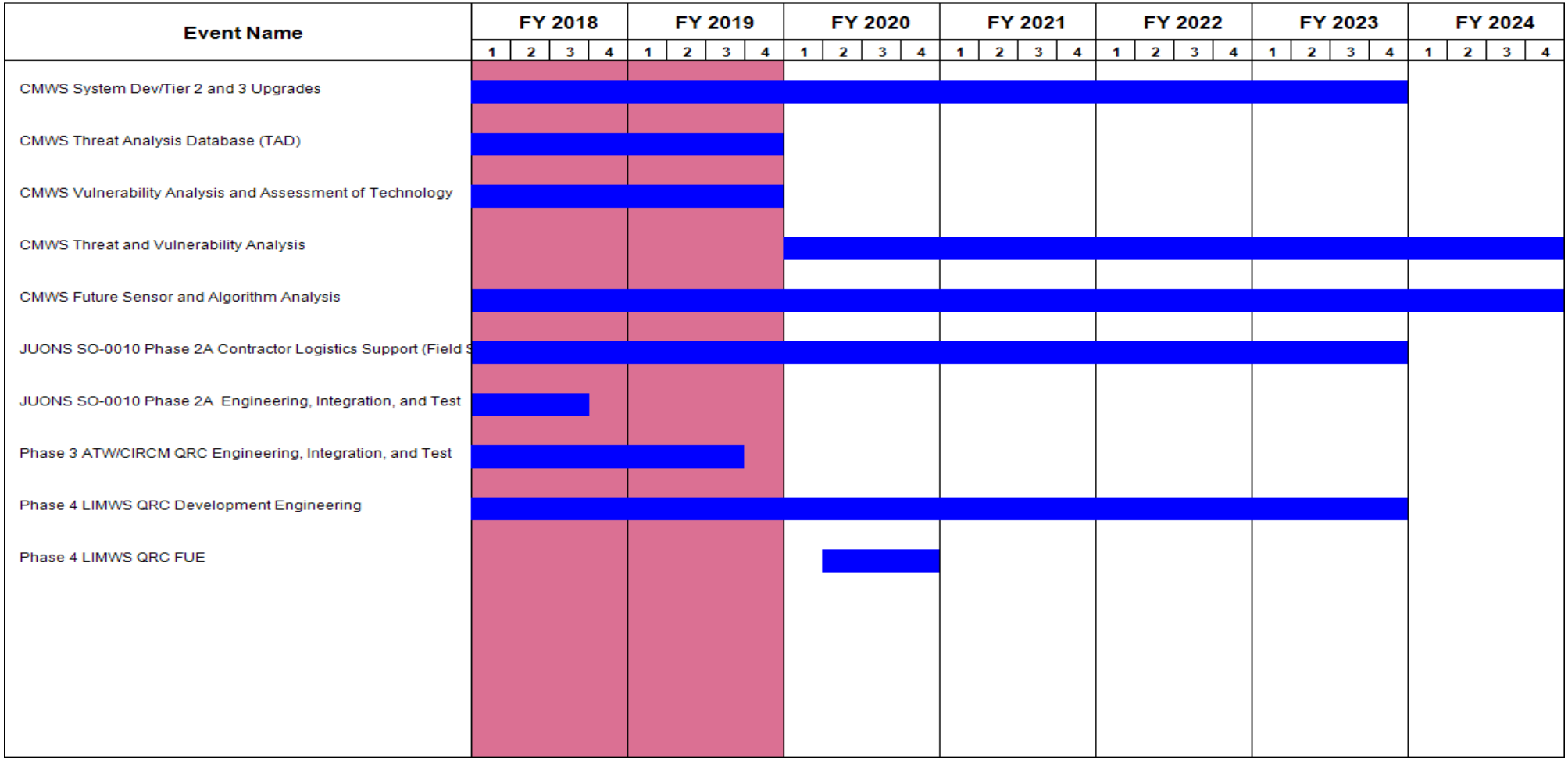

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0605051A / *Aircraft Survivability Development*	**Project (Number/Name)** ER8 / *Common Missile Warning System (CMWS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CMWS System Dev/Tier 2 and 3 Upgrades	2	2011	4	2023
CMWS Gen 3 Production	3	2012	4	2016
CMWS Threat Analysis Database (TAD)	2	2012	4	2019
CMWS Vulnerability Analysis and Assessment of Technology	2	2015	4	2019
CMWS Threat and Vulnerability Analysis	1	2020	4	2024
CMWS Future Sensor and Algorithm Analysis	1	2017	4	2024
JUONS SO-0010 Phase 2A Contractor Logistics Support (Field Support)	1	2017	4	2023
JUONS SO-0010 Phase 2A Engineering, Integration, and Test	1	2016	3	2018
Phase 3 ATW/CIRCM QRC Engineering, Integration, and Test	2	2016	3	2019
Phase 4 LIMWS QRC Development Engineering	3	2017	4	2023
Phase 4 LIMWS QRC FUE	2	2020	4	2020