Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604741A *I Air Defense Command, Control and Intelligence - Eng Dev*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	-	70.279	62.058	59.518	-	59.518	-	-	-	-	-	-
126: *PEO Electronic Protect*	-	14.110	15.049	3.827	-	3.827	-	-	-	-	-	-
146: *Air & Msl Defense Planning Control Sys*	-	12.135	8.085	2.877	-	2.877	-	-	-	-	-	-
149: *Counter-Rockets, Artillery & Mortar*	-	6.084	0.875	-	-	-	-	-	-	-	-	-
FG5: *Counter Unmanned Aerial Systems (UAS)*	-	37.950	38.049	52.814	-	52.814	-	-	-	-	-	-

Note

Decrease in Fiscal Year (FY) 2022 as a result of Forward Area Air Defense Command and Control (FAAD C2) transitioning to sustainment.

A. Mission Description and Budget Item Justification

The FY 2022 Direct War/Enduring Operations dollars in the amount of $0.494 million in Project 126 will continue to support the Army Long-Range Persistent Surveillance (ALPS), which is a passive sensor that provides long range surveillance against Cruise Missile (CM), Fixed Wing (FW), Rotary Wing (RW), and Unmanned Aircraft System (UAS) threats. Prototype systems will be provided to meet EUCOM, INDOPACOM, and CENTCOM (JUON-CC-0576) identified operational needs and to conduct an assessment via a report by the combatant commander(s). The objectives of this effort are to provide component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk into Joint and Army Command and Control systems.

The Air Missile Defense Planning and Control System (AMDPCS) provides integration of air and missile defense operations at all echelons. Specifically, the Air and Missile Defense Work Station (AMDWS) provides a correlated air picture using local radars, allowing the Commander the visibility and situational understanding of the airspace; automated defense design and staff planning tools in AMDWS afford soldiers horizontal and vertical collaborative planning with adjacent units. Air Defense System Integrator (ADSI) serves as a joint tactical data link gateway/air picture, and when correlated by FAAD C2 and displayed on AMDWS, provides a near real time, three dimensional air picture for the Commander. Joint Tactical Terminal (JTT) provides soldiers Theater Ballistic Missile (TBM) early warning, allowing them to take appropriate actions. AMDPCS is fielded to Army Air and Missile Defense Commands (AAMDC), Air Defense Artillery Brigades (ADA BDE), Air and Missile Defense Battalions (AMD BN), and Terminal High Altitude Area Air Defense Batteries (THAAD BTRY). Air Defense Airspace Management (ADAM), a variant of AMDPCS with similar capabilities, is fielded to Corps, Divisions, Brigade Combat Teams (BCT), and multi-functional support brigades. As part of the capability and technology reuse, AMDWS and FAAD C2 are core components of the Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems currently deployed in multiple areas of operation.

The C-RAM system-of-systems is an evolutionary program that detects RAM launches, provides localized warning to the defended area, intercepts rounds in flight, and enhances response to and defeat of enemy forces. C-RAM combines multi-service fielded and non-developmental item sensors, command and control (C2) equipment, warning systems, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System [LPWS]), all connected via a wireless local area

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604741A *I Air Defense Command, Control and Intelligence - Eng Dev*

network. The FAAD C2 system has been enhanced to integrate the sensors, weapons, and warning systems to provide C2 for the C-RAM system-of-systems. FAAD C2 software correlates the RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. FAAD C2 employs an agile software development, maintenance, and sustainment strategy, with Urgent Materiel Releases (UMR) every six (6) months and Full Materiel Releases (FMR) every 15-18 months to keep pace with rapidly fielding integrated systems to meet operational needs. C-RAM capability in theater is supported through the Overseas Contingency Operations (OCO) process. Base RDT&E supports FAAD C2 basic Air Defense functionality as well as directed enhancements to the C-RAM system-of-systems capability, such as development and integration of C-RAM network security enhancements and development of all-digital radar technology to address emerging threats.

The FY 2022 Direct War/Enduring Operations dollars in the amount of $35.177 million in Project FG5 will continue to support the Counter-small Unmanned Aircraft System (C-sUAS) efforts will provide forces at all echelons with cross domain capabilities, while supporting joint operational requirements. These combined arms solutions will support the full kill-chain and result in solutions addressing Fixed/Semi Fixed Site, Mobile platform, and Dismounted missions. Development efforts are aligned with Joint Requirements Oversight Council Memorandum (JROCM) 078-20, which codifies the threshold and objective capability requirements for C-sUAS development and focuses on technologies which increase capabilities to identify, classify, track, and defeat Group 1 through 3 UAS threats.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	33.502	70.651	49.051	-	49.051
Current President's Budget	70.279	62.058	59.518	-	59.518
Total Adjustments	36.777	-8.593	10.467	-	10.467
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-7.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	37.950	-			
• SBIR/STTR Transfer	-1.173	-1.593			
• Adjustments to Budget Years	-	-	10.467	-	10.467

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 149: *Counter-Rockets, Artillery & Mortar*		
Congressional Add: *Multi-Layered Tactical Protection System*	5.000	-
Congressional Add Subtotals for Project: 149	5.000	-
Congressional Add Totals for all Projects	5.000	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army	Date: May 2021
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604741A *I Air Defense Command, Control and Intelligence - Eng Dev*

Change Summary Explanation

FY 2022 Base increase of $10.467 million provided for increased interoperability and usability across multi-Service Counter-Unmanned Aircraft Systems (C-UAS) enduring solutions, to successfully execute Multi-Domain Operations, and for technological development of C-UAS capabilities supporting deployed systems, to keep pace with evolving threats in response to existing JUON CC-0558.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army											Date: May 2021	
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*				Project (Number/Name) 126 / *PEO Electronic Protect*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
126: *PEO Electronic Protect*	-	14.110	15.049	3.827	-	3.827	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Army Long-Range Persistent Surveillance (ALPS) is a passive sensor that provides long range surveillance against Cruise Missile (CM), Fixed Wing (FW), Rotary Wing (RW), and Unmanned Aircraft System (UAS) threats. Prototype systems will be provided to meet EUCOM, INDOPACOM, and CENTCOM (JUON-CC-0576) identified operational needs and to conduct an assessment via a report by the combatant commander(s). The objectives of this effort are to provide component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk into Joint and Army Command and Control systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: ALPS Development and Integration	14.110	15.049	3.827
Description: Provide ALPS systems to meet multiple Combatant Command (COCOM) operational needs and integrate ALPS into the Army Integrated Air and Missile Defense (AIAMD) architecture. Prototype systems are being provided to meet multiple Combatant Command operational needs and to conduct an assessment. The objectives of this effort are to prove component and subsystem maturity in a system-of-systems environment and to reduce subsequent integration risk. ALPS will also be integrated into the AIAMD architecture. ***FY 2021 Plans:*** Integrate, procure, deploy, and install ALPS Prototype systems to meet the urgent operational requirements of multiple combatant commands, specifically EUCOM, INDOPACOM, and CENTCOM. Site survey and operational activities will be supporting efforts to ensure mission success. ***FY 2022 Plans:*** Deploy and install ALPS prototype systems to meet the urgent operational requirements of multiple combatant commands, specifically EUCOM, INDOPACOM, and CENTCOM. Site survey and operational activities will support efforts to ensure mission success. Complete the combatant commander assessment. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY22 funding has decreased because prototype production was completed in FY21. Program funds will exhaust at the end of FY22.			
Accomplishments/Planned Programs Subtotals	14.110	15.049	3.827

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 126 / *PEO Electronic Protect*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• EF9: *System Integration and Test*	93.743	-	0.182	-	0.182	-	-	-	-	-	-
• EX2: *Lower Tier Air Missile Defense (LTAMD) Capability*	364.154	308.805	327.690	-	327.690	-	-	-	-	-	-
• C50016: *System Integration and Test Procurement*	107.157	-	-	-	-	-	-	-	-	-	-
• FM3: *Future Interceptor*	1.918	-	7.895	-	7.895	-	-	-	-	-	-
• C53101: *MSE Missile*	702.437	678.148	776.696	-	776.696	-	-	-	-	-	-
• C62002: *IFPC INC 2-I BLOCK 1 SYSTEM*	9.337	62.461	25.253	-	25.253	-	-	-	-	-	-
• 0604117A: *Maneuver - Short Range Air Defense (M-SHORAD)*	41.690	4.813	39.376	-	39.376	-	-	-	-	-	-
• C14300: *M-SHORAD - Procurement*	233.300	517.287	331.575	-	331.575	-	-	-	-	-	-
• 0604820A: *Radar Development*	91.782	105.271	127.919	-	127.919	-	-	-	-	-	-
• S40: *Army Integrated Air and Missile Defense*	211.634	206.850	157.873	-	157.873	-	-	-	-	-	-
• BZ5075: *IAMD Battle Command System*	29.629	198.587	301.872	-	301.872	-	-	-	-	-	-
• 0604741A: *Air Defense Command, Control and Intelligence - Eng Dev*	70.279	62.058	59.518	-	59.518	-	-	-	-	-	-
• AD5070: *AIR & MSL Defense Planning & Control Sys*	39.061	62.517	67.193	-	67.193	-	-	-	-	-	-
• 0605052A: *Indirect Fire Protection Capability Inc 2 - Block 1*	186.369	153.362	233.512	-	233.512	-	-	-	-	-	-
• 149: *Counter-Rockets, Artillery & Mortar*	6.084	0.875	-	-	-	-	-	-	-	-	-
• 146: *Air & Msl Defense Planning Control Sys*	12.135	8.085	2.877	-	2.877	-	-	-	-	-	-

Remarks

ALPS was previously funded under PE 0603327A.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 126 / *PEO Electronic Protect*

D. Acquisition Strategy

ALPS utilizes an existing Defense Ordnance Technology Consortium (DOTC) Other Transaction Authority (OTA) to develop and integrate prototype systems to meet multiple Combatant Command operational needs. An assessment of the prototype systems, provided in response to Combatant Command operational needs, will be used to refine requirements and assess the Army's longer-term strategy.

ALPS is executing an acquisition strategy to rapidly deliver commercial off-the-shelf (COTS)-based prototypes to COCOMs based on urgent, operational requirements. ASA(ALT) designated PEO MS as the office of primary responsibility (OPR) for ALPS (19 Jan 2018 memo).

The ALPS Acquisition Strategy consists of rapid integration and deployment activities. Site survey, procurement of prototype systems, deployment of those systems, and contractor logistics support are the primary subordinate tasks within the ALPS efforts to rapidly integrate and deploy systems. These tasks will end by fourth quarter FY22 due to the conclusion of Urgent Need. ALPS will seek Operations and Maintenance, Army (OMA) Other Contingency Operations (OCO) for contractor logistics support of the systems after the end of funding, assuming COCOMs continued need for ALPS capability. ALPS will participate yearly in an integration event at the PEO MS level to integrate with current C2 and Air and Missile Defense (AMD) systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 126 / *PEO Electronic Protect*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Government Agencies & Government Program Management	Various	Various : Various	-	1.161		1.461		1.200		-		1.200	Continuing	Continuing	Continuing
		Subtotal	-	1.161		1.461		1.200		-		1.200	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ALPS Development, Integration, and Installation	Various	Various : Various	-	12.949	May 2020	13.588	May 2021	2.627	May 2022	-		2.627	0.000	29.164	-
		Subtotal	-	12.949		13.588		2.627		-		2.627	0.000	29.164	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.110		15.049		3.827		-		3.827	Continuing	Continuing	N/A

Remarks

ALPS was previously funded under PE 0603327A.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 126 / *PEO Electronic Protect*

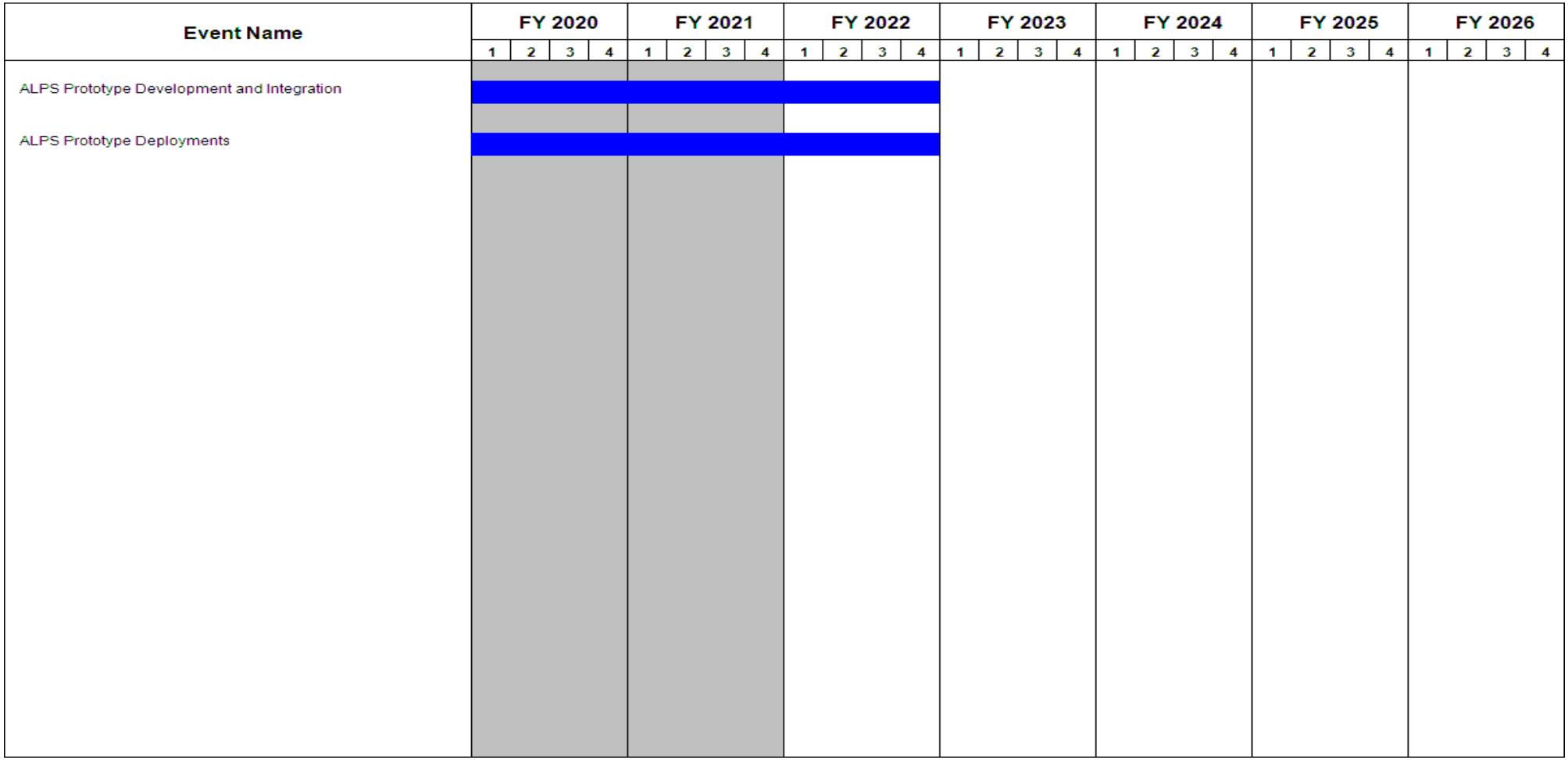

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 126 / *PEO Electronic Protect*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
ALPS Prototype Development and Integration	1	2017	4	2022
ALPS Prototype Deployments	3	2019	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 146 / *Air & Msl Defense Planning Control Sys*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
146: *Air & Msl Defense Planning Control Sys*	-	12.135	8.085	2.877	-	2.877	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air Missile Defense Planning and Control System (AMDPCS) provides integration of air and missile defense operations at all echelons. AMDPCS is comprised of the following major subsystems: Air Missile Defense Work Station (AMDWS) provides a correlated air picture using local radars, allowing the Commander the visibility and situational understanding of the airspace; tools in AMDWS afford Soldiers horizontal and vertical collaborative planning with adjacent units. Air Defense System Integrator (ADSI) serves as a joint tactical datalink gateway/air picture. Forward Area Air Defense Command and Control (FAAD C2), correlates the joint and local air picture and when displayed on AMDWS, provides a near real time, three dimensional air picture for the Commander. Joint Tactical Terminal (JTT) provides Soldiers Theater Ballistic Missile (TBM) early warning allowing them to take appropriate actions. AMDPCS are currently fielded to Army Air and Missile Defense Commands (AAMDC), Air Defense Artillery Brigades, (ADA BDE), Air and Missile Defense Battalions (AMD BN) and Terminal High Altitude Area Defense Batteries (THAAD BTRY). Air Defense Airspace Management (ADAM), a variant of AMDPCS, are fielded to Corps, Divisions, Brigade Combat Teams (BCTs) and multi-functional support brigades. AMDPCS is also being procured to support Interim Maneuver Short Range Air Defense (IM-SHORAD), European Deterrence Initiative (EDI), and Grow the Army (GTA) initiative. As part of the capability and technology reuse, AMDWS external interfaces are being leveraged by Integrated Battle Command System (IBCS) to avoid redevelopment of existing capabilities. AMDWS and FAAD C2 are core components of the Counter, Rocket, Artillery, Mortar (C-RAM) system-of-systems currently deployed in combat zones.

FY 2022 Base dollars in the amount of $2.887 million fund engineering, development, testing, and certification of AMDWS software, as well as accreditation of AMDPCS family-of-systems shelters and software.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: AMDWS Software Development	10.373	7.305	2.202
Description: Supports LandWarNet, Common Operating Environments (COE), and Defense Information Systems Agency (DISA) architecture framework. AMDWS software engineering and development ensures interoperability and integration with maneuver battle command elements. AMDWS will interface with Integrated Air and Missile Defense (IAMD) and serves as a planning tool for the system-of-systems, as well as providing external interfaces.			
FY 2021 Plans: Maintain interoperability with COE, Integrated Tactical Network (ITN), and DISA requirements. Enhance capabilities, ensure continued interoperability with Army, Joint, and Coalition planning systems in order to support warfighter functions, and maintain cyber compliance. Support engineering and improvements to threat sets and weapon platform capabilities for C-UAS planning			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 146 / *Air & Msl Defense Planning Control Sys*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
and defense design, and provide expanded integration with Integrated Air and Missile Defense Battle Command System (IBCS). Provide the ability to employ a non-tactical workstation connected to a distant server in order to receive and disseminate air tracks. ***FY 2022 Plans:*** Funding maintains cyber security compliance and interoperability updates. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 adjustment due to program progression through life cycle.			
Title: Engineering, Development, Test and Evaluation ***Description:*** Ensure interoperability and cyber compliance through engineering, development, test, and evaluation of the AMDPCS family-of-systems shelter objective configurations; execute evaluation and finalization of the AMDPCS tactical communications, data processing, and vehicle/shelter/power generation/environmental system block upgrade program for fielded systems. ***FY 2021 Plans:*** Continue evaluations and development of emerging technologies and hardware to ensure network and cyber compliance. Continue support, development, and evaluation of IBCS-ADAM COE configurations, ensuring equipment meets Army requirements IAW command post-directed requirement, 14 December 2017. ***FY 2022 Plans:*** Support updates to the AMDPCS family-of-systems shelter objective configurations and migration to Integrated Battle Command System (IBCS) configuration. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decrease due to program convergence with IBCS.	1.005	0.529	0.424
Title: Software System Certification Testing, Accreditation, and Approval of Authority-to-Operate (ATO) ***Description:*** Accomplish software system certification testing, accreditation, and approval of ATOs for the various software systems; BitLocker encryption and other authorized/approved G6 software implementation; Army and joint integration and interoperability assessments. ***FY 2021 Plans:***	0.757	0.251	0.251

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 146 / *Air & Msl Defense Planning Control Sys*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Conduct one Army Interoperability Certification (AIC) for each of the AMDPCS software sub-systems (AMDWS, ADSI, and CDS3), leading to ATO re-accreditation and Full Material Release (FMR), ensuring Army, joint, and coalition integration and interoperability compliance. ***FY 2022 Plans:*** Conduct one Army Interoperability Certification (AIC) test and test activities required to maintain Authority to Operate (ATO).			
Accomplishments/Planned Programs Subtotals	12.135	8.085	2.877

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• AD5070: *AIR & MSL Defense Planning & Control Sys*	39.061	62.517	67.193	-	67.193	-	-	-	-	-	-
• 0605457A: *Army Integrated Air and Missile Defense (AIAMD)*	211.634	206.850	157.873	-	157.873	-	-	-	-	-	-
• BZ5075: *IAMD Battle Command System*	29.629	198.587	301.872	-	301.872	-	-	-	-	-	-
• 0604117A: *Maneuver - Short Range Air Defense (M-SHORAD)*	41.690	4.813	39.376	-	39.376	-	-	-	-	-	-
• C14300: *M-SHORAD - Procurement*	233.300	517.287	331.575	-	331.575	-	-	-	-	-	-

Remarks

This program is an integral part of the Army Integrated Fires Mission Command (IFMC) convergence capability for Integrated Battle Command System (IBCS) architecture.

D. Acquisition Strategy

The acquisition strategy relies on non-development items (NDI) and evolutionary software development to rapidly meet the demands of air defense battle management command, control, communications, computers, and intelligence (BM/C4I) requirements and to keep pace with automated information technologies. The concept of evolutionary software development will be accomplished in a series of AMDWS block releases and upgrades. AMDPCS is being developed and fielded to both the Army's Active and Reserve components.

The AMDWS software development contract is sole source (SS)/cost plus fixed fee (CPFF) to Northrop Grumman.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 146 / *Air & Msl Defense Planning Control Sys*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : Various	33.269	0.757	Dec 2019	0.839	Dec 2020	0.291	Dec 2021	-		0.291	Continuing	Continuing	Continuing
		Subtotal	33.269	0.757		0.839		0.291		-		0.291	Continuing	Continuing	N/A

Remarks

Not Applicable

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AMDWS Software Development and Engineering	SS/CPFF	Northrop Grumman : Huntsville AL	168.321	10.373	Oct 2019	6.432	Oct 2020	2.142	Oct 2021	-		2.142	Continuing	Continuing	Continuing
PIFF Development Engineering	C/FFP	Telephonics : Farmingdale NY	14.340	-		-		-		-		-	0.000	14.340	-
ADSI Software Development and Engineering	SS/T&M	Ultra Electronics : Austin, TX	6.859	-		-		-		-		-	0.000	6.859	-
Developmental Engineering	Various	Various : Various	46.454	0.885	Dec 2019	0.755	Dec 2020	0.383	Dec 2021	-		0.383	Continuing	Continuing	Continuing
		Subtotal	235.974	11.258		7.187		2.525		-		2.525	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Certification/Testing	Various	JITC : Ft Huachuca, AZ	1.433	0.051	Feb 2020	0.025	Feb 2021	0.026	Feb 2022	-		0.026	Continuing	Continuing	Continuing
Interoperability Assessment	Various	CTSF : Ft Hood, TX	1.861	0.069	May 2020	0.034	May 2021	0.035	May 2022	-		0.035	Continuing	Continuing	Continuing
		Subtotal	3.294	0.120		0.059		0.061		-		0.061	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 146 / *Air & Msl Defense Planning Control Sys*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	272.537	12.135		8.085		2.877		-		2.877	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 146 / *Air & Msl Defense Planning Control Sys*

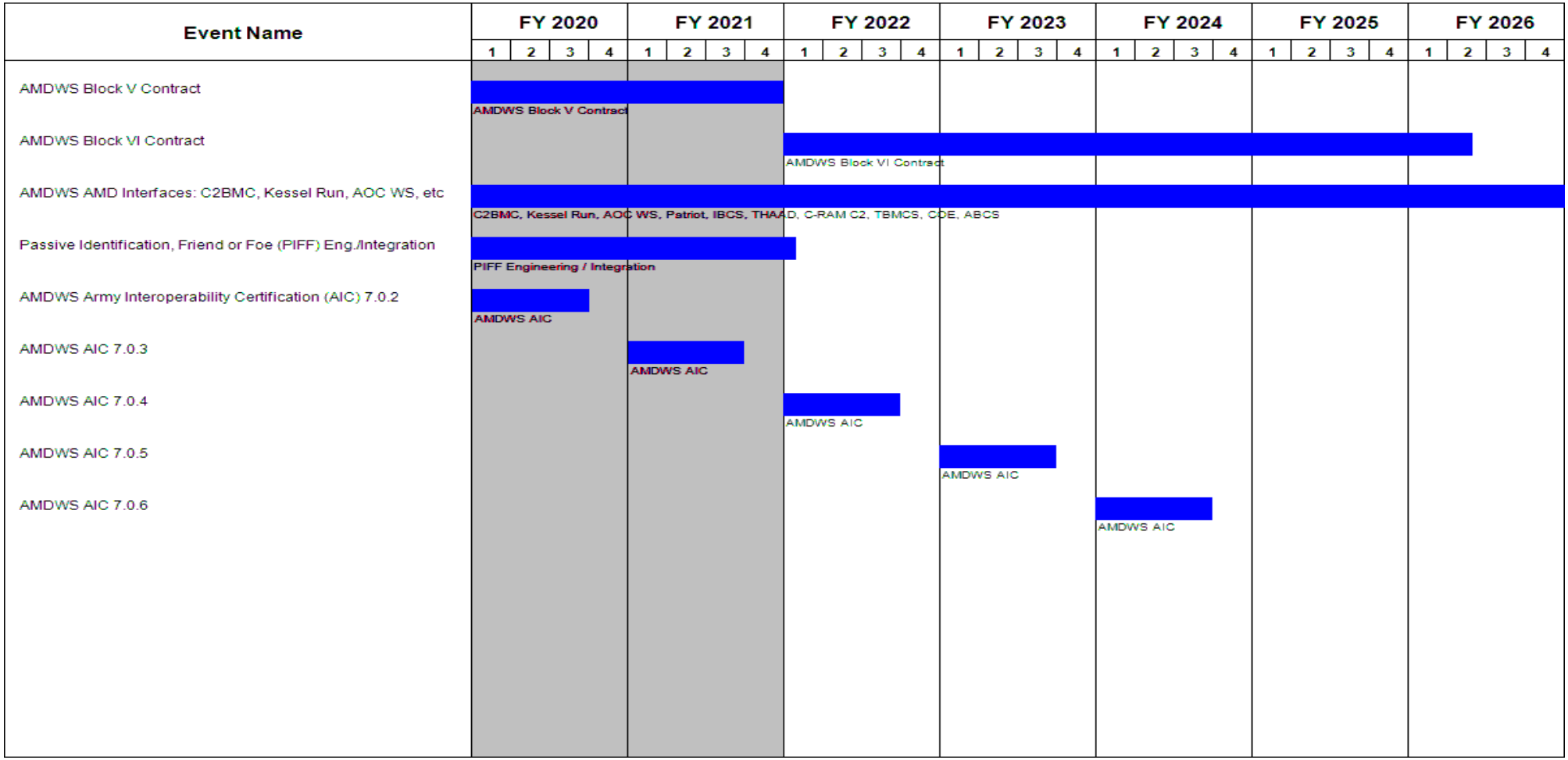

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 146 / *Air & Msl Defense Planning Control Sys*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
AMDWS Block V Contract	2	2011	4	2021
AMDWS Block VI Contract	1	2022	2	2026
AMDWS AMD Interfaces: C2BMC, Kessel Run, AOC WS, etc	4	2012	4	2030
Passive Identification, Friend or Foe (PIFF) Eng./Integration	4	2018	1	2022
ADSI Software Engineering Development and Test	1	2006	4	2017
AWA 16.1 (COE ADAM) DOTMLPF Eval / NIE 16.2	4	2015	4	2017
Army Warfighting Assessment (AWA) 17.1 / NIE 17.2	4	2016	3	2017
Army Warfighting Assess. 18.1 / Network Integration Eval. 18.2	4	2017	3	2018
AMDWS Software Certification Test (SCT) 7.0.2	3	2019	4	2019
AMDWS Army Interoperability Certification (AIC) 7.0.2	1	2020	3	2020
AMDWS AIC 7.0.3	1	2021	3	2021
AMDWS AIC 7.0.4	1	2022	3	2022
AMDWS AIC 7.0.5	1	2023	3	2023
AMDWS AIC 7.0.6	1	2024	3	2024

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 149 / *Counter-Rockets, Artillery & Mortar*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
149: *Counter-Rockets, Artillery & Mortar*	-	6.084	0.875	-	-	-	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease in Fiscal Year (FY) 2022 as a result of Forward Area Air Defense Command and Control (FAAD C2) transitioning to sustainment.

A. Mission Description and Budget Item Justification

The Counter-Rocket, Artillery, Mortar (C-RAM) system-of-systems detects RAM launches, provides localized warning to the defended area, intercepts rounds in flight, and enhances response to and defeat of enemy forces. C-RAM combines multi-service fielded and non-developmental item sensors, command and control (C2) equipment, warning systems, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System [LPWS]), all connected via a wireless local area network. The FAAD C2 system integrates the sensors, weapons, and warning systems to provide C2 for the CRAM system-of-systems. FAAD C2 software correlates the RAM sensor data, evaluates the threat, provides early warning, directs engagements, and cues counterfire systems and reaction forces. FAAD C2 employs an agile software development strategy, with Urgent Materiel Releases (UMR) every six months and Full Materiel Releases (FMR) every 15-18 months. Base RDT&E supports FAAD C2 basic Air Defense functionality and incorporation of new Link-16 messaging.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: FAAD C2 Software Development and Enhancements	1.084	0.875	-
Description: Funds system-of-systems development and upgrades based on the bi-annual release of the Integrated Air and Missile Defense (IAMD) Validated Online Lifecycle Threat (VOLT) and changes in threat, integration of emerging requirements from external PMs (Mission Command) and other services/agencies, technology insertions (Internet Protocol-based communications), and interoperability requirements (joint interoperability, military standard, information assurance compliance, external interface updates). Provides development and regression testing to ensure C-RAM C2 enhancements do not negatively impact the performance of the C-RAM system-of-systems. Includes continued development of electronic warfare capabilities to counter evolving threats. Includes product assurance and further incorporation of new Link-16 messaging.			
FY 2021 Plans: Support FAAD C2 development and enhancements based on changes in threat (e.g., air track algorithm and battle manager improvements) and incorporate Link-16 Military Standard updates.			
FY 2021 to FY 2022 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 149 / *Counter-Rockets, Artillery & Mortar*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Decrease in FY 2022 is a result of FAAD C2 transitioning to sustainment. In FY 2020 FAAD C2 was selected as an interim joint command and control solution for the Department of Defense counter-Unmanned Aircraft System (c-UAS) mission.			
Accomplishments/Planned Programs Subtotals	1.084	0.875	-

	FY 2020	FY 2021
Congressional Add: Multi-Layered Tactical Protection System	5.000	-
FY 2020 Accomplishments: Multi-Layered Tactical Protection System		
Congressional Adds Subtotals	5.000	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• H30504: *C-RAM Enhancements*	9.127	20.069	6.153	-	6.153	-	-	-	-	-	-
• 146: *Air & Msl Defense Planning Control Sys*	12.135	8.085	2.877	-	2.877	-	-	-	-	-	-
• AD5070: *AIR & MSL Defense Planning & Control Sys*	39.061	62.517	67.193	-	67.193	-	-	-	-	-	-
• S40: *Army Integrated Air and Missile Defense*	211.634	206.850	157.873	-	157.873	-	-	-	-	-	-
• BZ5075: *IAMD Battle Command System*	29.629	198.587	301.872	-	301.872	-	-	-	-	-	-
• E10: *Sentinel*	91.782	105.271	127.919	-	127.919	-	-	-	-	-	-
• L86: *LIGHTWEIGHT COUNTER MORTAR RADAR (LCMR)*	4.711	5.179	-	-	-	-	-	-	-	-	-
• L88: *Enhanced AN/TPQ 36*	11.872	13.099	-	-	-	-	-	-	-	-	-
• B05201: *Lightweight Counter Mortar Radar*	5.400	5.332	-	-	-	-	-	-	-	-	-
• B05310: *AN/TPQ-53 Counterfire Target Acquisition Radar*	16.416	71.404	-	-	-	-	-	-	-	-	-
• FG5: *Counter Unmanned Aerial Systems (UAS)*	37.950	38.049	52.814	-	52.814	-	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 149 / *Counter-Rockets, Artillery & Mortar*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• H30505: *Counter Unmanned Aerial Systems (C-UAS) Efforts*	20.000	41.000	-	-	-	-	-	-	-	-	-
• 0604117A: *Maneuver - Short Range Air Defense (M-SHORAD)*	41.690	4.813	39.376	-	39.376	-	-	-	-	-	-

Remarks

This program is an integral part of the Army Integrated Air and Missile Defense (IAMD) architecture.

D. Acquisition Strategy

The C-RAM program is following an evolutionary acquisition strategy for rapid fielding of mature technology to the user. The objective of the strategy is to balance needs, available technology, and resources to quickly provide a robust capability to engage RAM threats. Multiple C-RAM systems have transitioned to acquisition programs, including C-RAM Intercept, which fields existing LPWS guns to two Indirect Fire Protection Capability/Avenger battalions, and RAM Warn, which provides early, localized warning to all maneuver brigade combat teams. Development and upgrade of FAAD/C-RAM C2 software, to include enhanced capability to support emerging mission command requirements, technology insertion, and interoperability, is accomplished through a five-year CPIF contract awarded to Northrop Grumman Mission Systems.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 149 / *Counter-Rockets, Artillery & Mortar*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : Various	26.751	0.078	Nov 2019	0.073	Nov 2019	-		-		-	Continuing	Continuing	Continuing
		Subtotal	26.751	0.078		0.073		-		-		-	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-RAM C2 Development and Enhancements	C/CPIF	Northrop Grumman : Redondo Beach, CA	107.489	1.006	Apr 2020	0.802	Apr 2021	-		-		-	Continuing	Continuing	Continuing
Secure Communications	SS/CPFF	Northrop Grumman : Huntsville, AL	9.578	-		-		-		-		-	0.000	9.578	-
Secure Communications (Next Gen)	C/CPFF	Northrop Grumman : Huntsville, AL	15.000	-		-		-		-		-	0.000	15.000	-
All-Digital Radar Development	C/FFP	Raytheon Company : Andover, MA	16.000	-		-		-		-		-	Continuing	Continuing	Continuing
LPWS Enhancements	C/CPIF	Raytheon Company : Tucson, AZ	10.307	-		-		-		-		-	0.000	10.307	-
Multi-Layered Tactical Protection System	SS/FFP	DOTC Kord - Rocky Research : Huntsville, AL	-	5.000	Sep 2020	-		-		-		-	0.000	5.000	-
		Subtotal	158.374	6.006		0.802		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Miscellaneous Test Support	Various	Various : Various	24.210	-		-		-		-		-	Continuing	Continuing	Continuing
End-to-End Modeling & Simulation	SS/CPFF	Northrop Grumman : Redondo Beach, CA	14.615	-		-		-		-		-	0.000	14.615	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) 149 / *Counter-Rockets, Artillery & Mortar*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	38.825	-		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	223.950	6.084		0.875		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 149 / *Counter-Rockets, Artillery & Mortar*

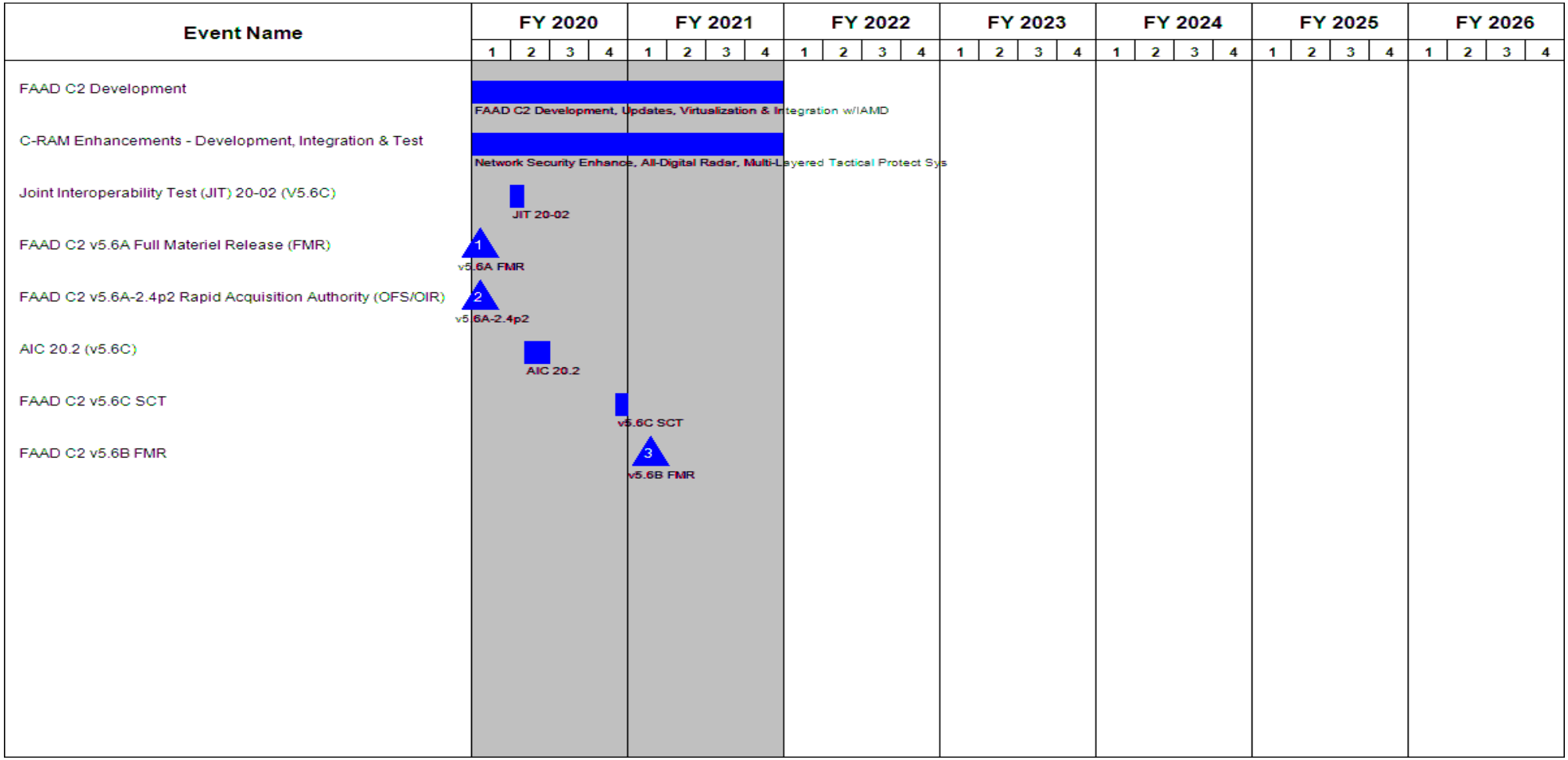

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** 149 / *Counter-Rockets, Artillery & Mortar*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
C-RAM C2 v5.5C-2.0 Full Material Release (FMR)	2	2016	2	2016
FAAD C2 Development	1	2013	4	2021
C-RAM Directed Enhancements - Integration & Test	1	2012	4	2017
C-RAM Enhancements - Development, Integration & Test	1	2016	4	2021
LPWS Sp. 6.4.1 Urgent Materiel Release (UMR)	4	2017	4	2017
C-RAM C2 v5.5C-2.2p3 Full Software Release	3	2018	3	2018
C-RAM C2 v5.6A-1.0p1.1 and v5.6A-1.0p3 Urgent Materiel Release (UMR)	4	2018	4	2018
LPWS Sp. 6.4.3.1 and FAAD C2 v5.6A-2.2 UMR	2	2019	2	2019
FAAD C2 v5.6A-2.4 UMR	3	2019	3	2019
FAAD C2 v5.6B System Certification Test (SCT)	3	2019	3	2019
Army Interoperability Certification (AIC) T11.24 (v5.6B)	4	2019	4	2019
Joint Interoperability Test (JIT) 20-02 (V5.6C)	1	2020	2	2020
FAAD C2 v5.6A Full Materiel Release (FMR)	1	2020	1	2020
C-RAM C2 v5.5C-2.0 Full Materiel Release (FMR)	2	2016	2	2016
C-RAM Intercept Operational Assessment (OA)	2	2015	2	2015
C-RAM Intercept (LPWS Spiral 6.0) Materiel Release	3	2016	3	2016
FAAD C2 v5.6A-2.4p2 Rapid Acquisition Authority (OFS/OIR)	1	2020	1	2020
AIC 20.2 (v5.6C)	2	2020	2	2020
FAAD C2 v5.6C SCT	4	2020	4	2020
FAAD C2 v5.6B FMR	1	2021	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army			Date: May 2021
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	Project (Number/Name) FG5 / *Counter Unmanned Aerial Systems (UAS)*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
FG5: *Counter Unmanned Aerial Systems (UAS)*	-	37.950	38.049	52.814	-	52.814	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Counter-small Unmanned Aircraft System (C-sUAS) efforts will provide forces at all echelons with cross domain capabilities, while supporting joint operational requirements. These combined arms solutions will support the full kill-chain and result in solutions addressing Fixed/Semi Fixed Site, Mobile platform, and Dismounted missions. Development efforts are aligned with Joint Requirements Oversight Council Memorandum (JROCM) 078-20, which codifies the threshold and objective capability requirements for C-sUAS development and focuses on technologies which increase capabilities to identify, classify, track, and defeat Group 1 through 3 UAS threats. Funding supports:

Fixed/Mobile System Development

FY 2022 Base dollars in the amount of $15.965 million will support development, integration, and testing of C-UAS solutions.

Tech Refresh for Army JUON/JEON Efforts:

FY 2022 Base dollars in the amount $1.690 million provide technology refreshes in support of existing Army JEON system improvements in response to ST-0008, to provide Army priority fixed sites with the ability to detect, engage and defeat group 1 and 2 UAS (managed by PEO Intelligence, Electronic Warfare and Sensors (IEWS)).

FY 2022 Base dollars in the amount of $5.050 million support technological development of C-UAS capabilities supporting deployed systems, to keep pace with evolving threats in response to existing JUON CC-0558 (managed by PEO MS).

FY 2022 Base dollars in the amount of $30.234 million JUON CC-0558 support prototype development, evaluation and test of a UAS detection system with Man-Out-of-the-Loop (MOTL) operations providing passive UAS search, target interrogation and verification.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: JCO OMNIBUS Funding ***Description:*** FY20 OMNIBUS reprogramming approved by Congress.	37.950	-	-
Title: Fixed/Mobile System Development	-	9.673	15.965

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Description: Development, integration, and testing of incremental improvements to existing Counter-Unmanned Aircraft Systems (C-UAS) solutions, including test planning to support an annual PEO MS-led Multi-Domain Operations test/demonstration event beginning in FY23, to include biennial Survivability Resiliency/Cyber-Electromagnetic Activities exercises with an event planned in FY22. ***FY 2021 Plans:*** FY 2021 Base funding will support software and firmware enhancements to the Low, slow, small-UAS Integrated Defeat System (LIDS) Position Navigation and Timing (PNT) kit, to improve detection of mid- and high-band threats, and development of a LIDS cognitive radio frequency machine learning/artificial intelligence application able to adapt to electromagnetic environment conditions and discriminate signals of interest in cluttered environments. Also supports twice-yearly C-UAS System of Systems integration/record tests for new and enhanced components, systems, and subsystems. ***FY 2022 Plans:*** FY 2022 Base funding will support efforts aligned with JROCM 078-20 and Army Requirements, including hardware and software development for a small, flat-panel fire control radar to provide Fixed Site LIDS (FS-LIDS) and mounted systems with an enhanced air surveillance capability against fixed wing, rotary wing, and Groups 1-3 UASs. Also supports twice-yearly CUAS System of Systems integration/record tests for new and enhanced components, systems, and subsystems. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 Base funds increase due to continuing C-UAS mission requirements.			
Title: OSD Universal C2 Demonstration Support ***Description:*** Development, integration, testing, and demonstration of C-sUAS C2 interoperability improvements for multi-domain C-UAS engagements. ***FY 2021 Plans:*** FY 2021 Base funding will support a demonstration of Universal C2 protocols and interfaces into the existing C-sUAS C2 system. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 decrease due to completion of demonstration.	-	8.376	-
Title: Tech Refresh for Army JUON/JEON Efforts ***Description:*** This effort provides technology refreshes in response to ST-0008 and continues technological development of C-UAS capabilities supporting deployed systems in response to JUON CC-0558. ***FY 2021 Plans:***	-	5.000	6.722

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
FY 2021 OCO funding will support technological development of C-UAS systems, to keep pace with evolving threats in response to existing JUON CC-0558. ***FY 2022 Plans:*** FY 2022 Base funding will provide technology refreshes in support of existing Army JEON system improvements in response to ST-0008 to provide Army priority fixed sites with the ability to detect, engage and defeat group 1 and 2 UAS. This funding will also support technological development of C-UAS systems deployed under existing JUON CC-0558, to include improvements to electronic warfare effectiveness against current and future threats. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 Base funds increase due to continuing C-UAS mission requirements.			
Title: Family of Counter UAS Systems (FoCUS) ***Description:*** This effort continues work started under C-UAS Capability Development. FoCUS is a passive, platform agnostic, medium-range, day/night, modular UAS detection prototype system with Man-Out-of-the-Loop (MOTL) operations that provides passive UAS search, target interrogation and verification. ***FY 2021 Plans:*** FY 2021 funding provides next evolution SIM revisions, advanced component development, safety improvements, vehicle integration, component MIL STD testing, user evaluations, prototype operation, independent testing, and delivery of two Inc 1A prototypes. ***FY 2022 Plans:*** FY 2022 Base funding continues software development efforts increasing Artificial Intelligence and Machine Learning Algorithms used by JCO-identified "C2 Decision Aids" solutions, integrates additional passive sensor capabilities (e.g., passive radar and DRVID), and increases other prototype user interfaces. Continues to integrate advanced sensor input devices and output capabilities needed for a passive capability. Delivers two Inc 1B prototypes, resets Inc 1A prototypes, and provides sparing for transition of the prototypes to ARSOF for sustainment and CONOPS/TTP development. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2022 Base funds increase due to continuing C-UAS mission requirements and completing development of Inc 1B prototypes.	-	15.000	30.127
Accomplishments/Planned Programs Subtotals	37.950	38.049	52.814

Exhibit R-2A, RDT&E Project Justification: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• H30505: *Counter Unmanned Aerial Systems (C-UAS) Efforts*	20.000	41.000	-	-	-	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The C-UAS program is transitioning from rapid deployment of interim capabilities, in response to Joint Urgent Operational Need (JUON) CC-0558 and ST-0008, to a formalized acquisition approach. Technical refreshes will enable the JUONs capabilities to remain current, and incremental improvements will mitigate gaps created by threat sUAS Groups 1-3 until they can be acquired using a formal Program of Record based on a Capabilities Development Document (CDD). An Abbreviated-Capabilities Development Document (A-CDD) will address future C-sUAS requirements, creating enduring next generation C-UAS solutions. The C-UAS program will leverage the flexibility of the Adaptive Acquisition Framework by pursuing a combination of acquisition pathways, including Middle Tier of Acquisition (i.e., rapid prototyping and rapid fielding) and Major Capability Acquisition, where appropriate.

The C-UAS program incorporates development and test for survivability and resiliency in denied environments and will incorporate emerging technologies as they mature.

C-UAS efforts utilize multiple contract vehicles, types, and vendors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management - JUON CC-0558	Various	Various : Various	31.800	-		0.769	Dec 2020	1.928	Nov 2021	-		1.928	Continuing	Continuing	-
Program Management - FoCUS	Various	Various : Various	-	-		-		3.050	Nov 2021	-		3.050	0.000	3.050	-
		Subtotal	31.800	-		0.769		4.978		-		4.978	Continuing	Continuing	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fixed/Mobile System Development	Various	Various : Various	85.149	-		7.717	Mar 2021	12.776	Mar 2022	-		12.776	Continuing	Continuing	-
Kinetic Defeat Development	Various	Various : Various	138.953	-		-		-		-		-	0.000	138.953	-
Sensor Development	Various	Various : Various	94.439	-		-		-		-		-	0.000	94.439	-
C-UAS C2 Software Development	C/CPIF	Northrop Grumman : Redondo Beach, CA	30.490	-		8.376	Apr 2021	-		-		-	Continuing	Continuing	-
Dismounted/Handheld Systems Development	Various	Various : Various	19.022	-		-		-		-		-	0.000	19.022	-
Family of Counter UAS Systems (FoCUS)	Various	Various : Various	-	-		15.000	Jan 2022	23.077	Jan 2022	-		23.077	Continuing	Continuing	-
FY20 OMNIBUS Funding	Various	Various : Various	-	37.950		-		-		-		-	0.000	37.950	-
Tech Refresh for Army JUON/JEON Efforts	TBD	Various : Various	-	-		5.000	Mar 2021	6.722	Mar 2022	-		6.722	Continuing	Continuing	-
		Subtotal	368.053	37.950		36.093		42.575		-		42.575	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support - JUON CC-0558	Various	Various : Various	64.622	-		1.187		1.261	Dec 2021	-		1.261	Continuing	Continuing	-
Test Support - FoCUS	Various	Various : Various	-	-		-		4.000	Dec 2021	-		4.000	0.000	4.000	-
		Subtotal	64.622	-		1.187		5.261		-		5.261	Continuing	Continuing	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	464.475	37.950		38.049		52.814		-		52.814	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

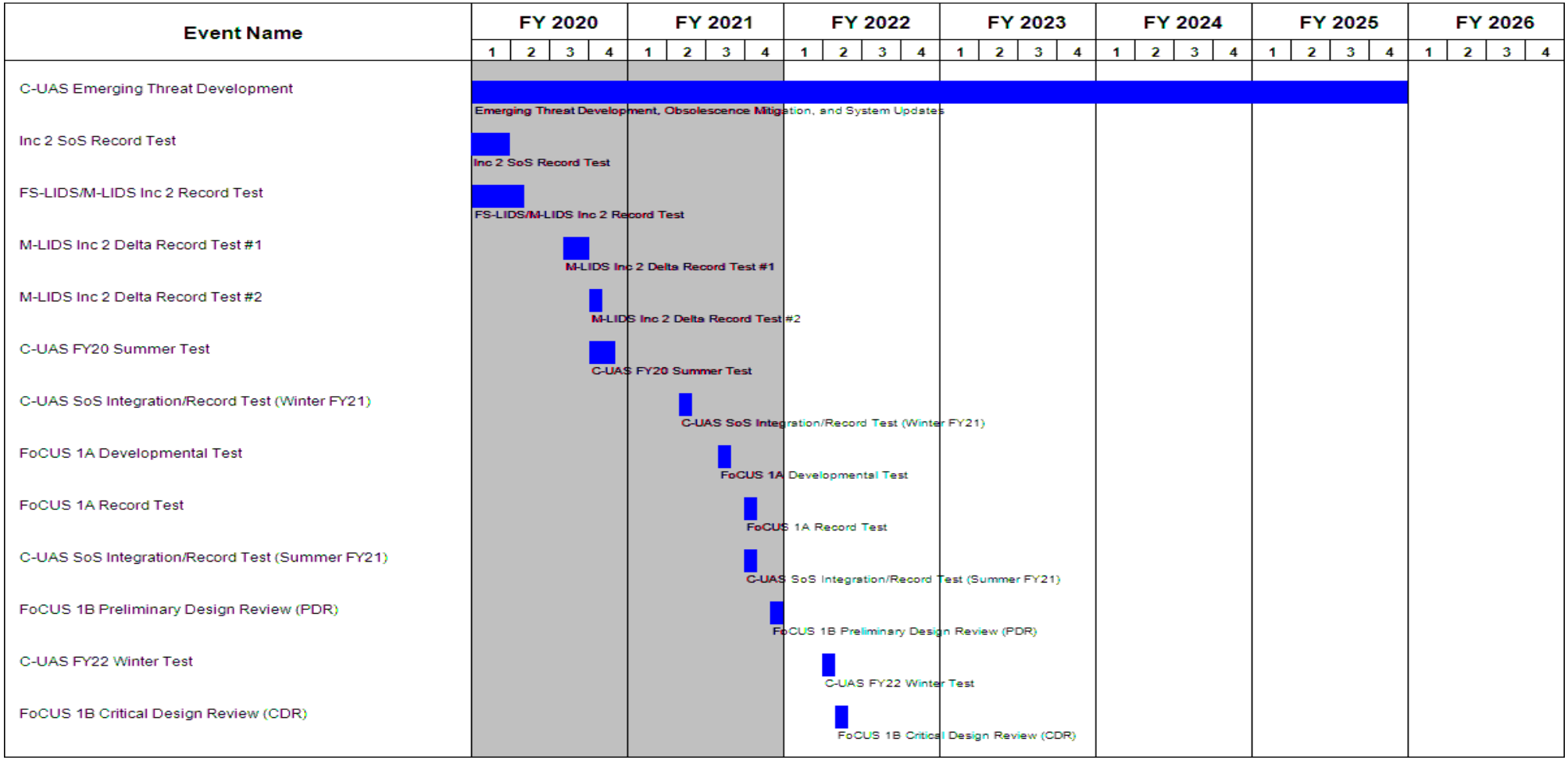

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

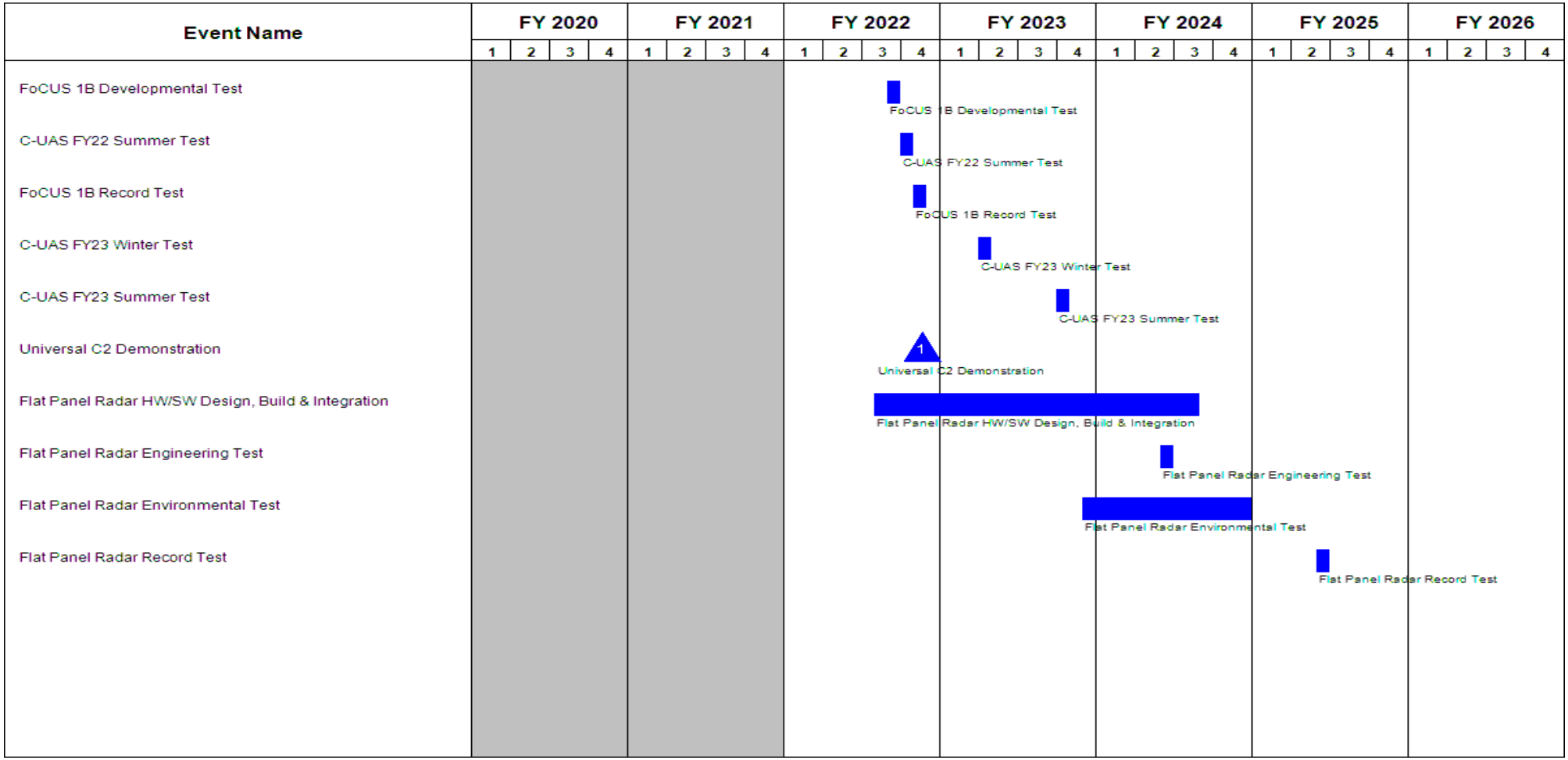

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
C-UAS Emerging Threat Development	1	2017	4	2025
Mobile LIDS (M-LIDS) Inc 1 Testing and Downselect	1	2018	1	2018
Expeditionary LIDS (E-LIDS) Engineering and Record Test	2	2018	2	2018
M-LIDS Inc 1 Engineering and Record Test	3	2018	4	2018
LIDS System-of-Systems (SoS) Record Test	4	2018	1	2019
E-LIDS/M-LIDS Inc 1 Engineering Test	3	2019	3	2019
LIDS Advanced Position, Navigation & Timing (PNT) Test	4	2019	4	2019
Inc 2 SoS Record Test	1	2020	1	2020
FS-LIDS/M-LIDS Inc 2 Record Test	1	2020	2	2020
M-LIDS Inc 2 Delta Record Test #1	3	2020	3	2020
M-LIDS Inc 2 Delta Record Test #2	4	2020	4	2020
C-UAS FY20 Summer Test	4	2020	4	2020
C-UAS SoS Integration/Record Test (Winter FY21)	2	2021	2	2021
FoCUS 1A Developmental Test	3	2021	3	2021
FoCUS 1A Record Test	4	2021	4	2021
C-UAS SoS Integration/Record Test (Summer FY21)	4	2021	4	2021
FoCUS 1B Preliminary Design Review (PDR)	4	2021	4	2021
C-UAS FY22 Winter Test	2	2022	2	2022
FoCUS 1B Critical Design Review (CDR)	2	2022	2	2022
FoCUS 1B Developmental Test	3	2022	3	2022
C-UAS FY22 Summer Test	4	2022	4	2022
FoCUS 1B Record Test	4	2022	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Army		Date: May 2021
Appropriation/Budget Activity 2040 / 5	**R-1 Program Element (Number/Name)** PE 0604741A / *Air Defense Command, Control and Intelligence - Eng Dev*	**Project (Number/Name)** FG5 / *Counter Unmanned Aerial Systems (UAS)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
C-UAS FY23 Winter Test	2	2023	2	2023
C-UAS FY23 Summer Test	4	2023	4	2023
Universal C2 Demonstration	4	2022	4	2022
Flat Panel Radar HW/SW Design, Build & Integration	3	2022	3	2024
Flat Panel Radar Engineering Test	2	2024	2	2024
Flat Panel Radar Environmental Test	4	2023	4	2024
Flat Panel Radar Record Test	2	2025	2	2025