Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army											Date: March 2023	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603327A *I Air and Missile Defense Systems Engineering*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	15.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
FG9: *Air and Missile Defense (AMD) Electronic Warfare*	-	15.000	15.000	-	-	-	-	-	-	-	Continuing	Continuing

Note

There is no requested funding for Project FG9: Air and Missile Defense (AMD) Electronic Warfare in FY 2024.

A. Mission Description and Budget Item Justification

Funding in this program supports Cyber and Electromagnetic Activities (CEMA) efforts to conduct operational realistic assessments of Army Integrated Fires performance, identify system vulnerabilities, and develop mitigations against threats across the Cyber and Electromagnetic spectrum. Army radars and sensors, integrated air and missile defense mission command and fire control, Radio Frequency (RF) data and voice networks, and Positioning, Navigation, and Timing (PNT) technology will be assessed against current and postulated threat systems and techniques. Potential solutions developed by the Army, other Services, and Defense agencies (for example Missile Defense Agency) to close identified gaps will be demonstrated and assessed in live and simulated CEMA environments. Assessment events will be conducted approximately every two years. Implementation of potential solutions will occur between events using system-specific funding. The proposed solutions will then be assessed at the next event after implementation.

Included in this line are funds to plan and execute periodic CEMA activities with Army Integrated Fires systems, to include other Service and other Agency radar and sensor systems as appropriate. Upon completion of CEMA demonstration analyses, funding will facilitate initial recommendations for potential mitigations and solutions to Army sensors, Command & Control (C2), and RF data link vulnerabilities. Efforts in this program will also develop tools for use by Army radar and sensor systems to improve overall system performance in contested environments, to include effects-based CEMA Modeling and Simulation (M&S) to assess Army CEMA concepts in Hardware-In-The-Loop (HWIL) environment. Additionally, virtual models of critical hardware and software are being developed and implemented to allow for destructive testing with advanced CEMA threats in a lab environment. There will be continual interface with intelligence communities to maintain cognizance of emerging CEMA threats and incorporate these threats in future CEMA demonstrations. These activities follow a time-phased roadmap that identifies the investments needed to improve the resiliency of Army radar and sensors, C2, and RF data and voice networks in contested CEMA environments.

FY 2023 funding supports Machine Learning (ML) for Integrated Fires which supports integration of ML technology into CEMA Detection algorithms. FY 2023 funding also supports the execution of prototype implementation of software memory protection methods to immunize missile programs and air and missile defense systems from cybersecurity threats.

There is no funding for FY 2024.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603327A *I Air and Missile Defense Systems Engineering*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	15.000	0.000	0.000	-	0.000
Current President's Budget	15.000	15.000	0.000	-	0.000
Total Adjustments	0.000	15.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	15.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: FG9: *Air and Missile Defense (AMD) Electronic Warfare*		
Congressional Add: *Program Increase - Machine Learning for Integrated Fires*	10.000	10.000
Congressional Add: *Program Increase - Software Memory Protection Methods*	5.000	5.000
Congressional Add Subtotals for Project: FG9	15.000	15.000
Congressional Add Totals for all Projects	15.000	15.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603327A / *Air and Missile Defense Systems Engineering*	Project (Number/Name) FG9 / *Air and Missile Defense (AMD) Electronic Warfare*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
FG9: *Air and Missile Defense (AMD) Electronic Warfare*	-	15.000	15.000	-	-	-	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding in this program supports Cyber and Electromagnetic Activities (CEMA) efforts to conduct operational realistic assessments of Army Integrated Fires performance, identify system vulnerabilities, and develop mitigations against threats across the Cyber and Electromagnetic spectrum. Army radars and sensors, integrated air and missile defense mission command and fire control, Radio Frequency (RF) data and voice networks, and Positioning, Navigation, and Timing (PNT) technology will be assessed against current and postulated threat systems and techniques. Potential solutions developed by the Army, other Services, and Defense agencies (for example Missile Defense Agency) to close identified gaps will be demonstrated and assessed in live and simulated CEMA environments. Assessment events will be conducted approximately every two years. Implementation of potential solutions will occur between events using system-specific funding. The proposed solutions will then be assessed at the next event after implementation.

Included in this line are funds to plan and execute periodic CEMA activities with Army Integrated Fires systems, to include other Service and other Agency radar and sensor systems as appropriate. Upon completion of CEMA demonstration analyses, funding will facilitate initial recommendations for potential mitigations and solutions to Army sensors, Command & Control (C2), and RF data link vulnerabilities. Efforts in this program will also develop tools for use by Army radar and sensor systems to improve overall system performance in contested environments, to include effects-based CEMA Modeling and Simulation (M&S) to assess Army CEMA concepts in Hardware-In-The-Loop (HWIL) environment. Additionally, virtual models of critical hardware and software are being developed and implemented to allow for destructive testing with advanced CEMA threats in a lab environment. There will be continual interface with intelligence communities to maintain cognizance of emerging CEMA threats and incorporate these threats in future CEMA demonstrations. These activities follow a time-phased roadmap that identifies the investments needed to improve the resiliency of Army radar and sensors, C2, and RF data and voice networks in contested CEMA environments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: Program Increase - Machine Learning for Integrated Fires	10.000	10.000
FY 2022 Accomplishments: Software memory protection and machine learning. Supports memory protection and machine learning in contested environment.		
FY 2023 Plans: Continues software memory protection and machine learning. Continues support of memory protection and machine learning in contested environment.		
Congressional Add: Program Increase - Software Memory Protection Methods	5.000	5.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Sy stems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2022 Accomplishments: - Develop technology transition paths for software memory protection methods that align with on-going missile programs and air and defense missile systems - Execute prototype implementation of software memory protection methods to immunize missile programs, and air and missile defense systems, from the primary cybersecurity threat to software today, memory corruption exploits		
FY 2023 Plans: Continue development of technology transition paths for software memory protection methods that align with on-going missile programs and air and defense missile systems. Execute prototype implementation of software memory protection methods to immunize missile programs, and air and missile defense systems, from the primary cybersecurity threat to software today, memory corruption exploits.		
Congressional Adds Subtotals	15.000	15.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Assessment events will be conducted approximately every two years in live and simulated CEMA environments. In addition to Government planning and conduct of assessments, funding will also be provided through various contracts for subject matter expertise.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 4	R-1 Program Element (Number/Name) PE 0603327A / *Air and Missile Defense Systems Engineering*	Project (Number/Name) FG9 / *Air and Missile Defense (AMD) Electronic Warfare*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Machine Learning for Integrated Fires	Various	Various : Various	-	10.000	Jun 2022	10.000		-		-		-	0.000	20.000	-
Software Memory Protection Methods	Various	Various : Various	-	5.000	Jun 2022	5.000		-		-		-	0.000	10.000	-
		Subtotal	-	15.000		15.000		-		-		-	0.000	30.000	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	15.000		15.000		-		-		-	0.000	30.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

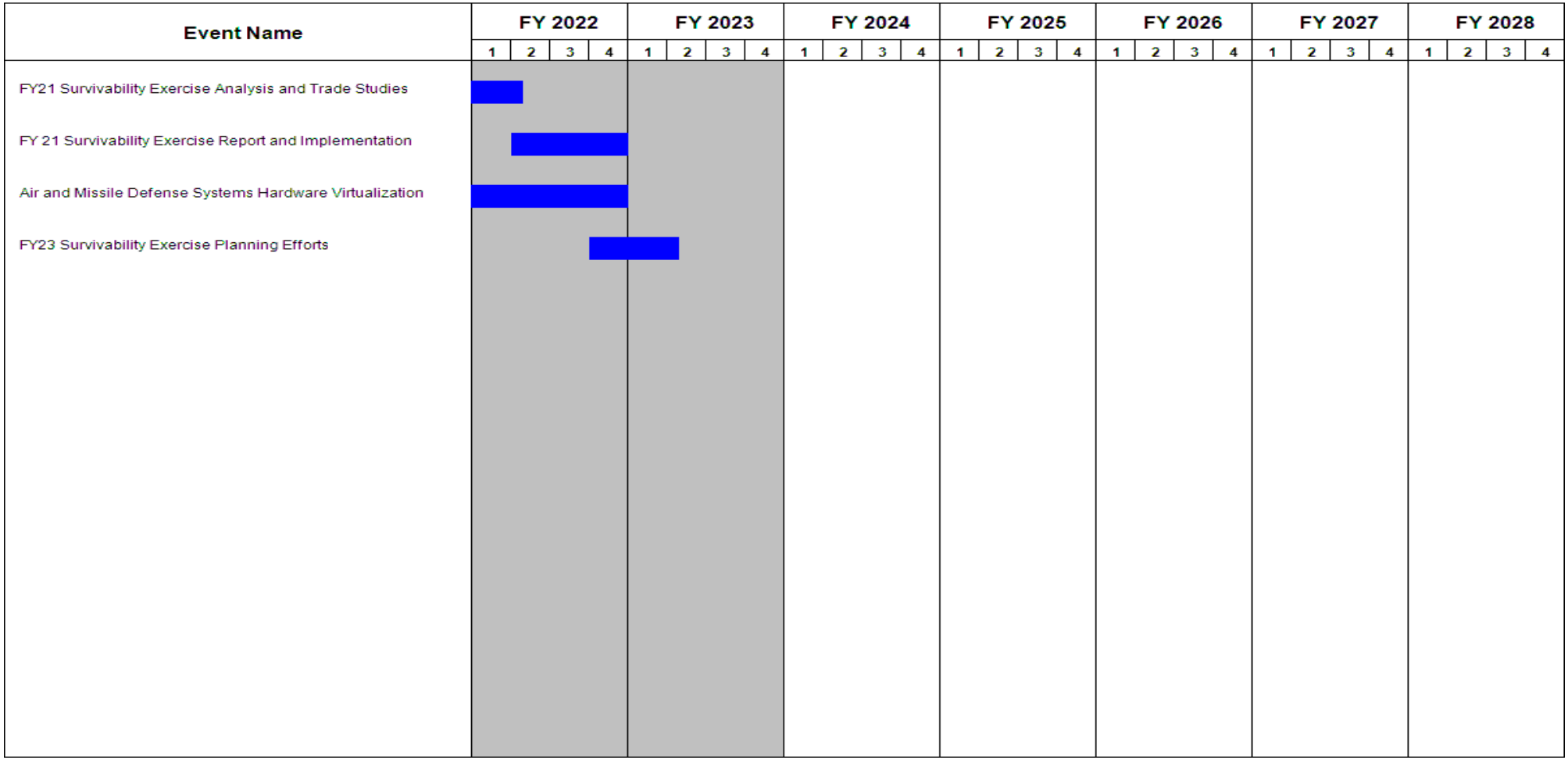

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 4	**R-1 Program Element (Number/Name)** PE 0603327A / *Air and Missile Defense Systems Engineering*	**Project (Number/Name)** FG9 / *Air and Missile Defense (AMD) Electronic Warfare*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
P-11 Demonstration	2	2018	3	2018
P-11 Analysis Efforts, Trade Studies, and Implementation	3	2018	1	2019
P-12 Demonstration Planning Efforts	4	2018	4	2019
P-12 Demonstration	4	2019	1	2020
P-12 Analysis Efforts, Trade Studies, and Implementation	1	2020	4	2020
FY21 Survivability Exercise Planning Efforts	4	2020	2	2021
FY21 Survivability Exercise	2	2021	3	2021
FY21 Survivability Exercise Analysis and Trade Studies	3	2021	1	2022
FY 21 Survivability Exercise Report and Implementation	2	2022	4	2022
Air and Missile Defense Systems Hardware Virtualization	2	2019	4	2022
Interoperabiilty of Integrated Air and Missile Defense (Congressional Adds)	4	2018	2	2021
FY23 Survivability Exercise Planning Efforts	4	2022	2	2023