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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Army **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	<b>R-1 Program Element (Number/Name)</b> PE 0205456A / Lower Tier Air and Missile Defense (AMD) System
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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	-	93.743	-	0.182	-	0.182	-	-	-	-	-	-
EF9: System Integration and Test	-	93.743	-	0.182	-	0.182	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 505

**A. Mission Description and Budget Item Justification**

The PATRIOT system includes a family of hardware, software, interceptors (PAC-2, Guidance Enhanced Missiles, PAC-3 and PAC-3 Missile Segment Enhancement) and Ground Support Equipment. As software and hardware improvements are developed, there is a continuing need for system level modeling, simulation, integration and testing. Modeling and Simulation (M&S) allow for performance assessment against all threats that would not be possible in flight tests due to cost, target and range constraints. Flight testing is periodically required for validation of the modeling and simulation as well as satisfying Army Test and Evaluation Command/Director, Operational Test and Evaluation (ATEC/DOTE) requirements of segment improvements. The Lower Tier AMD System line also supports identification, analysis, design, and test materiel solutions to counter cyber security and electronic warfare shortcomings to all elements of the Lower Tier Battle Space.

PATRIOT is an integral part of the overall Air and Missile Defense (AMD) Architecture and enables the incremental fielding of the system capability for Army Air and Missile Defense Battalions.

Program Element (PE) 0205456A Lower Tier Air and Missile Defense (AMD) System funding will be realigned to PE 0607865A Patriot Product Improvement beginning of Fiscal Year (FY) 2021, to PE 0607865A Patriot Product Improvement and C12101000 Lower Tier Air and Missile Defense Sensor beginning of FY 2022.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	97.746	0.166	0.169	-	0.169
Current President's Budget	93.743	0.000	0.182	-	0.182
Total Adjustments	-4.003	-0.166	0.013	-	0.013
• Congressional General Reductions	-	-	-	-	-
• Congressional Directed Reductions	-	-0.166	-	-	-
• Congressional Rescissions	-	-	-	-	-
• Congressional Adds	-	-	-	-	-
• Congressional Directed Transfers	-	-	-	-	-
• Reprogrammings	-	-	-	-	-
• SBIR/STTR Transfer	-4.003	-	-	-	-
• Adjustments to Budget Years	-	-	0.013	-	0.013

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0205456A / Lower Tier Air and Missile Defense (AMD) System				<b>Project (Number/Name)</b> EF9 / System Integration and Test			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
EF9: System Integration and Test	-	93.743	-	0.182	-	0.182	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

The PATRIOT system includes a family of hardware, software, interceptors (PAC-2, Guidance Enhanced Missiles, PAC-3 and PAC-3 Missile Segment Enhancement) and Ground Support Equipment. As software and hardware improvements are developed, there is a continuing need for system level modeling, simulation, integration and testing. Modeling and Simulation (M&S) allow for performance assessment against all threats that would not be possible in flight tests due to cost, target and range constraints. Flight testing is periodically required for validation of the modeling and simulation as well as satisfying Army Test and Evaluation Command/Director, Operational Test and Evaluation (ATEC/DOE) requirements of segment improvements. The Lower Tier AMD System line also supports identification, analysis, design, and test materiel solutions to counter cyber security and electronic warfare shortcomings to all elements of the Lower Tier Battle Space.

PATRIOT is an integral part of the overall Air and Missile Defense (AMD) Architecture and enables the incremental fielding of the system capability for Army Air and Missile Defense Battalions.

Program Element (PE) 0205456A Lower Tier Air and Missile Defense (AMD) System funding was realigned to PE 0607865A Patriot Product Improvement beginning of Fiscal Year (FY) 2021, to PE 0607865A Patriot Product Improvement.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Program Development, Integration, and Support	31.256	-	0.182
<b>Description:</b> Funding provides program development, integration, and support for the Lower Tier Air and Missile Defense System.			
<b>FY 2022 Plans:</b> Beginning FY 2021, PE 0205456A / Lower Tier Air and Missile Defense (AMD) System funding will be realigned to PE 0607865A Patriot Product Improvement. The FY 2022 funds totaling \$182 thousand will be used for SMDC support.			
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Beginning FY 2021, PE 0205456A / Lower Tier Air and Missile Defense (AMD) System funding will be realigned to PE 0607865A Patriot Product Improvement; change from FY21 to FY22 is increase in funding for SMDC support.			
<b>Title:</b> Testing, Targets, Modeling and Simulation	62.487	-	-
<b>Accomplishments/Planned Programs Subtotals</b>	93.743	-	0.182

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	<b>Project (Number/Name)</b> EF9 / System Integration and Test
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• C53101: MSE Missile	702.437	678.148	776.696	-	776.696	-	-	-	-	-	-
• C50016: System Integration and Test Procurement	107.157	-	-	-	-	-	-	-	-	-	-
• 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	-	-	-	-	-	-
• EX2: Lower Tier Air Missile Defense (LTAMD) Capability	364.154	308.805	327.690	-	327.690	-	-	-	-	-	-
• C62002: IFPC INC 2- I BLOCK 1 SYSTEM	9.337	62.461	25.253	-	25.253	-	-	-	-	-	-
• EY7: IFPC Increment 2 - Block 1	186.369	153.362	233.512	-	233.512	-	-	-	-	-	-

**Remarks**

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

**D. Acquisition Strategy**

The ongoing design and developmental activities enable modeling and simulation infrastructure maintenance and upgrades coupled with end to end testing of the Lower Tier architecture against the evolving threat as an element of an integrated Air and Missile Defense system. This strategy minimizes technological risks and provides a means of enhancing system capability through planned upgrades of deployed systems. Lower Tier system development efforts enable further improvement of system capabilities against emerging and reactive threats. Developing, fabricating and testing hit to kill surface to air missile and associated ground support equipment provides essential increases in battle space, accuracy, lethality and firepower to counter and destroy evolving air defense threats. These state-of-the-art capabilities and enhancements require ongoing demonstration through a series of flight tests and modeling and simulation activities.

Beginning in FY 2021, these efforts will be funded through PE 0607865A Patriot Product Improvement.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Army												Date: May 2021			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0205456A / Lower Tier Air and Missile D efense (AMD) System				EF9 / System Integration and Test							
Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	MIPR	Various : Huntsville, Alabama	5.551	1.890	Dec 2019	-		-		-		-	0.000	7.441	-
PAC-3 Product Office	RO	Project Office : Huntsville, AL	5.167	1.331	Oct 2019	-		-		-		-	0.000	6.498	-
SMDC DA Civilian Labor	IA	SMDC : SMDC	-	-		-		0.182		-		0.182	0.000	0.182	-
<b>Subtotal</b>			10.718	3.221		-		0.182		-		0.182	0.000	14.121	N/A
Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Integration MSE LMMFC	Various	Lockheed Martin Missiles and Fire Control (LMMFC) : Dallas, Texas	55.420	16.032	Feb 2020	-		-		-		-	0.000	71.452	-
MSE/PAC-3 Raytheon	Various	Raytheon : Waltham, Massachusetts	25.347	7.332	Feb 2020	-		-		-		-	0.000	32.679	-
SETA Contracts	Various	Multiple : Multiple	7.987	2.377	Feb 2020	-		-		-		-	0.000	10.364	-
U.S. Other Government Agencies (OGAs)	MIPR	Various : Huntsville, Alabama	34.489	6.252	Dec 2019	-		-		-		-	0.000	40.741	-
<b>Subtotal</b>			123.243	31.993		-		-		-		-	0.000	155.236	N/A
Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Targets/Threats Simulators	MIPR	Various : Huntsville, Alabama	107.271	25.192	Feb 2020	-		-		-		-	0.000	132.463	-
Modeling and Simulation	MIPR	Various : Huntsville, Alabama	17.253	3.132	Jan 2020	-		-		-		-	0.000	20.385	-
Contractor T&E	Various	Multiple : Multiple	18.958	9.362	Feb 2020	-		-		-		-	0.000	28.320	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2022 Army</b>		<b>Date: May 2021</b>
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	<b>Project (Number/Name)</b> EF9 / System Integration and Test

Event Name	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>PATRIOT System Testing, Integration and Evaluation</b>																												
Program Development, Integration, and Support	[Redacted]				[Redacted]																							
Testing, Targets, Modeling and Simulation	[Redacted]				[Redacted]																							
PDB-8 Fielding	[Redacted]				[Redacted]																							
PDB 8.1	[Redacted]				[Redacted]																							
Developmental/Operational Flight Testing	[Redacted]				[Redacted]																							

**Note**  
Please note, beginning in FY21 these activities will be funded through 0607865A / Patriot Product Improvement.

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0205456A / Lower Tier Air and Missile Defense (AMD) System	<b>Project (Number/Name)</b> EF9 / System Integration and Test

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
PATRIOT System Testing, Integration and Evaluation	1	2015	4	2020
Program Development, Integration, and Support	1	2015	4	2020
Testing, Targets, Modeling and Simulation	1	2015	4	2020
PDB-8.0.5 Agile Build	1	2017	4	2018
PDB-8 Fielding	2	2018	4	2020
PDB-8 IOC	3	2018	3	2018
PDB 8.1	1	2018	4	2020
Developmental/Operational Flight Testing	3	2020	4	2020