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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Army **Date:** April 2022

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	1.241	0.127	3.109	-	3.109	0.000	0.000	0.000	0.000	0.000	4.477
038: <i>Avenger PIP</i>	-	1.241	0.127	3.109	-	3.109	-	-	-	-	0.000	4.477

A. Mission Description and Budget Item Justification

This funding line is a key enabler of the Army Modernization Priorities in support of the Stinger missile program.

Avenger is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). The system protects against unmanned aircraft systems, cruise missiles, and fixed and rotary wing threats. Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability. It can be air dropped, lifted by helicopter and is air transportable. The system employs up to eight Stinger missiles to counter aerial threats and a .50 Caliber Machine Gun (M3P) for close-in ground and air threats. An Identification Friend or Foe (IFF) system aids in the identification of friendly aircraft in order to minimize the potential for fratricide. The Avenger fleet of 453 systems includes 169 systems that are equipped with a digital Slew-to-Cue (STC) capability to speed target detection and engagement.

The Avenger Modification - Service Life Extension Program (MOD-SLEP) consists of Project 038: Avenger Production Improvement Program (PIP) and Program Element CE8710: Avenger MODS. The ongoing MOD-SLEP addresses obsolescence of Avenger components to ensure Avenger maintains operational capability through Fiscal Year (FY) 2031. Five key MOD-SLEP components are: the Targeting Console (TC), the M3P, the Avenger Fire Control Computer (AFCC), the Mode 5 IFF and the Vehicle Internal Communications (VIC-5). Additional Obsolescence Mitigation Items include Avenger Organizational Maintenance Tool Kits, AN/PSM-95 Electronic Systems Test Set and the Avenger Remote Handheld Terminal Unit mounting kits.

The Avenger MOD-SLEP is fielded in two phases. Phase I fields the TC to 169 STC Avengers. The M3P is fielded as spares through the supply system. Phase II fields the AFCC to 169 STC Avengers and both the VIC-5 and the Mode 5 IFF to all 453 Avengers.

FY 2023 funding of \$3.109 million continues development, integration, prototyping and testing of technologies that will provide Assured Positioning Navigation and Timing (A-PNT) capability, including the Anti-Jam Antenna and DAGR Distributed Device (D3), which will provide M-Code capability.

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B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	1.241	0.127	0.000	-	0.000
Current President's Budget	1.241	0.127	3.109	-	3.109
Total Adjustments	0.000	0.000	3.109	-	3.109
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	3.109	-	3.109

Change Summary Explanation

FY 2023 funding increase reflects the fact that the FY 2022 President's Budget request did not include out-year funding.

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Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203801A / <i>Missile/Air Defense Product Improvement Program</i>				Project (Number/Name) 038 / <i>Avenger PIP</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
038: <i>Avenger PIP</i>	-	1.241	0.127	3.109	-	3.109	-	-	-	-	0.000	4.477
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Avenger is a lightweight, ground-to-air missile and gun weapon system mounted on a High Mobility Multi-purpose Wheeled Vehicle. The system protects against unmanned aircraft systems, cruise missiles, and fixed and rotary wing threats. Avenger provides day/night adverse weather operations, shoot on the move capability, rapid target engagement, and remote firing capability. It can be air dropped, lifted by helicopter and is air transportable. The system employs up to eight Stinger missiles to counter aerial threats and a .50 Caliber Machine Gun (M3P) for close-in ground and air threats. An Identification Friend or Foe (IFF) system aids in the identification of friendly aircraft in order to minimize the potential for fratricide. The Avenger fleet of 453 systems includes 169 systems that are equipped with a digital Slew-to-Cue (STC) capability to speed target detection and engagement.

The Avenger Modification - Service Life Extension Program (MOD-SLEP) consists of Project 038: Avenger Production Improvement Program (PIP) and Program Element CE8710: Avenger MODS. The ongoing MOD-SLEP addresses obsolescence of Avenger components to ensure Avenger maintains operational capability through Fiscal Year (FY) 2031. Five key MOD-SLEP components are: the Targeting Console (TC), the M3P, the Avenger Fire Control Computer (AFCC), the Mode 5 IFF and the Vehicle Internal Communications (VIC-5). Additional Obsolescence Mitigation Items include Avenger Organizational Maintenance Tool Kits, AN/PSM-95 Electronic Systems Test Set and the Avenger Remote Handheld Terminal Unit mounting kits.

The Avenger MOD-SLEP is fielded in two phases. Phase I fields the TC to 169 STC Avengers. The M3P is fielded as spares through the supply system. Phase II fields the AFCC to 169 STC Avengers and both the VIC-5 and the Mode 5 IFF to all 453 Avengers.

FY 2023 funding of \$3.109 million continues development, integration, prototyping and testing of technologies that will provide Assured Positioning, Navigation and Timing (A-PNT) capability, including the Anti-Jam Antenna and DAGR Distributed Device (D3), which will provide M-Code capability.

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

	FY 2021	FY 2022	FY 2023
Title: Avenger MOD-SLEP	1.241	0.122	-
Description: The Avenger MOD-SLEP consists of development activities for platform integration, software upgrades, and capability enhancements. Develops and executes test requirements and conducts limited contractor and government testing. Performs technical assessments, concept studies, cost reduction, risk reduction and development documentation.			
FY 2022 Plans:			

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
Funding provides for continuing mitigation of emerging obsolescence issues and maintains the viability of the Avenger system. This includes the continuing investigation of technologies that will provide A-PNT capability, including the Anti-Jam Antenna and DAGR D3, which will provide M-Code capability. FY 2022 to FY 2023 Increase/Decrease Statement: The decrease is due to completion of RDT&E efforts associated with MOD-SLEP.			
Title: A-PNT Description: This effort consists of development, integration, prototyping and testing of technologies that will provide Assured Positioning, Navigation and Timing (A-PNT) capability. The A-PNT capability, including the Anti-Jam Antenna and DAGR Distributed Device (D3), will provide M-Code capability to the Avenger system. FY 2023 Plans: Funding continues integration, prototyping and testing of the A-PNT capability, including the Anti-Jam Antenna and DAGR D3, which will provide M-Code capability. FY 2022 to FY 2023 Increase/Decrease Statement: Increase from \$0.000 million (FY 2022) to \$3.109 million (FY 2023) is due to requirements associated with A-PNT.	-	-	3.109
Title: FY 2022 SBIR / STTR Transfer FY 2022 Plans: SBIR / STTR transfer. FY 2022 to FY 2023 Increase/Decrease Statement: The decrease from 2022 to 2023 is due to a one-time 2022 SBIR / STTR transfer.	-	0.005	-
Accomplishments/Planned Programs Subtotals	1.241	0.127	3.109

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• CE8710: AVENGER MODS	13.942	11.227	0.000	-	0.000	-	-	-	-	0.000	25.169

Remarks
CE8710 Avenger MODS procures the MOD-SLEP components for the Avenger system. This ensures that Avenger is viable and sustainable through FY 2031. This program is an integral part of the Army Air and Missile Defense Modernization strategy.

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D. Acquisition Strategy

The Avenger MOD-SLEP addresses obsolescence of key components and ensures that Avenger is viable and sustainable through FY 2031.

The MOD-SLEP Phase I component is the TC.

The MOD-SLEP Phase II components are the AFCC, the Mode 5 IFF, the VIC-5 and the M3P machine gun. The M3P machine gun will be fielded through attrition. The other MOD-SLEP Phase II components will be installed in the field as a single installation package.

Development and testing of hardware and software modifications necessary to fully integrate the A-PNT capability into the Avenger will be performed by a combination of Government and Original Equipment Manufacturer efforts, using the existing and new Engineering Service contracts. Modifications will be completed with organic efforts with A-PNT hardware provided by Program Manager PNT.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Army **Date:** April 2022

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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Avenger Modification Management Services	Various	Various : Redstone Arsenal, AL	3.056	0.178	Oct 2020	-		-		-		-	0.000	3.234	-
FY 2019 SBIR / STTR Transfer	TBD	TBD : TBD	0.053	-		-		-		-		-	0.000	0.053	-
FY 2022 SBIR / STTR Transfer	TBD	TBD : TBD	-	-		0.005		-		-		-	0.000	0.005	-
Subtotal			3.109	0.178		0.005		-		-		-	0.000	3.292	N/A

Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Avenger Modification Product Development	SS/ Various	Raytheon, The Boeing Company and others : Aberdeen Proving Grounds, MD and Huntsville, AL	9.849	0.396	Oct 2020	0.122	Oct 2021	2.809	Oct 2022	-		2.809	Continuing	Continuing	-
Subtotal			9.849	0.396		0.122		2.809		-		2.809	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Avenger Modification Test Support	Various	The Boeing Company, U.S. Army Combat Capabilities Development Command Aviation and Missiles Center and others : Huntsville, AL and	7.351	0.667	Oct 2020	-		0.300	Oct 2022	-		0.300	Continuing	Continuing	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Army		Date: April 2022
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Event Name	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Materiel Release (MOD-SLEP Phase II)</p> <p>Future Modifications to Address Evolving Threats</p> <p>A-PNT Integration</p> </div> <div style="width: 65%;"> <div style="background-color: #cccccc; height: 100%; position: relative;"> <!-- FY 2021 --> <!-- FY 2022 --> <div style="position: absolute; top: 50px; left: 450px; color: red; font-size: 12px;"> ▲ 1 Materiel Release </div> <div style="position: absolute; top: 150px; left: 300px; color: red; font-size: 12px;"> Evolving Threat Mods </div> <div style="position: absolute; top: 250px; left: 450px; color: green; font-size: 12px;"> A-PNT Integration </div> </div> </div> </div>																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Army		Date: April 2022
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Integration and Testing (MOD-SLEP Phase II)	2	2018	2	2020
Live Fire Testing (MOD-SLEP Phase II)	4	2018	4	2018
Logistics Demo (MOD-SLEP Phase II)	2	2019	4	2019
Materiel Release (MOD-SLEP Phase II)	4	2022	4	2022
Future Modifications to Address Evolving Threats	1	2020	3	2022
A-PNT Integration	4	2022	4	2023

Note

MOD-SLEP Phase II components are the AFCC, IFF, VIC-5 and M3P machine gun.
 AFCC: Avenger Fire Control Computer
 IFF: Identification Friend or Foe
 MOD-SLEP: Modification - Service Life Extension Program
 VIC: Vehicle Internal Communications
 A-PNT: Assured Positioning, Navigation and Timing