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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040: Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.760	0.000	79.424	2.300	81.724	54.548	23.178	0.000	0.000	0.000	164.210
788: ATACMS PIP	-	4.760	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.760
DZ9: ATACMS Mods	-	0.000	0.000	62.440	-	62.440	54.548	23.178	0.000	0.000	0.000	140.166
VT9: Lethal Miniature Aerial Missile System (LMAMS)	-	0.000	0.000	0.000	2.300	2.300	0.000	0.000	0.000	0.000	0.000	2.300
VV2: TOW	-	0.000	0.000	16.984	-	16.984	0.000	0.000	0.000	0.000	0.000	16.984

Program MDAP/MAIS Code: PRE

Note
 Project DZ9 Army Tactical Missile System (ATACMS) Mods was previously funded under Program Element (PE) 0604768A Project P01 Multi-Mode Seeker Development and Test in addition to Strategic Capabilities Office (SCO) funding. Program transitions from the demonstration to product maturation and rapid fielding starting in Fiscal Year (FY) 2021.

Project VT9 Lethal Miniature Aerial Missile System (LMAMS) is a new start in FY 2021.

Project VV2 TOW is a new start in FY 2021.

A. Mission Description and Budget Item Justification
 ATACMS is the United States (U.S.) Army's primary all-weather, surface-to-surface long-range artillery precision guided missile used by Combatant Commanders to shape the battlefield with long-range fires against hard & soft targets in open, complex, and urban environments.

DZ9: Cross Domain (CD) ATACMS is a new variant which integrates a seeker into the ATACMS to expand its capabilities to allow it to search, detect, acquire and engage moving maritime and land targets. This capability is being developed as a SCO demonstration project scheduled to complete in Quarter 2 FY 2021. FY 2021 - FY 2023 funding matures and transitions this capability to the Army to provide a limited deployment to a combatant command in support of the Land Based Anti-Ship Missile Operational Needs Statement (ONS 17-22222).

Funding supports performance analysis, testing, and qualification of the CD ATACMS system design; integration with the command and control system; integration with the launcher; and system safety and supportability requirements necessary for a limited fielding.

VT9: Lethal Miniature Aerial Missile System (LMAMS) is a New Start Project. LMAMS is a single man-portable/operable, light-weight organic, beyond line-of-sight, precision guided, loitering aerial missile system capable of locating and engaging obscured and/or fleeing enemy targets that otherwise cannot be engaged by typical direct fire weapon systems.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army	Date: February 2020
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>
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Funding supports engineering and integration of capability improvements identified by trained operators during an Assessment of Operational Utility (AOU) conducted in 2018. Once integrated into the current LMAMS, Production Verification Testing will be conducted to demonstrate successful incorporation of new technology.

VV2: The TOW Weapon System includes the Improved Target Acquisition System (ITAS) launcher, TOW missiles (BGM-71 series), and associated tactical training aids/devices. The TOW Weapon System provides long-range, lethal anti-armor and precision assault fires capability for Army Infantry Brigade Combat Teams (IBCT), Stryker Brigade Combat Teams (SBCT) and Armor Brigade Combat Teams (ABCT) within the Active, Reserve, and National Guard components. The United States Marine Corps (USMC) employs the TOW missile from its ITAS derived M41A7 Saber launchers, anti-tank guided missile (ATGM) vehicles, and AH-1W Cobra helicopters.

The TOW Weapon System improvement program is a New Start Project to integrate US Army missile and ITAS modifications into the TOW Weapon System to improve missile safety (Insensitive Munition upgrades), increase system survivability (counter active protection systems), and increase system network capabilities. These capability improvements support Multi-Domain Operations (MDO) and the Functional Concept for Movement and Maneuver by providing precise lethal capabilities in multiple domains against armored threat systems.

FY 2021 Base dollars in the amount of \$16.984 million will initiate systems engineering to integrate an improved Insensitive Munitions (IM) propulsion system, which will increase missile range, and add a Counter Active Protection System (CAPS) to the TOW missile to enhance missile safety and survivability. The effort will also initiate analysis of requirements for supporting test equipment, launcher, modeling and simulation hardware/software, and test planning for FY 2021.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	4.941	0.000	0.000	-	0.000
Current President's Budget	4.760	0.000	79.424	2.300	81.724
Total Adjustments	-0.181	0.000	79.424	2.300	81.724
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.181	-			
• Adjustments to Budget Years	-	-	79.424	2.300	81.724

Change Summary Explanation

\$62.440 million of the \$79.424 million base funding increase in FY 2021 due to initial funding for new start program ATACMS Mods (Program Element (PE) 0203802A Other Missile Product Improvement Programs Project DZ9 ATACMS Mods).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	
<p>\$2.300 million Overseas Contingency Operations (OCO) funding increase in FY 2021 due to initial funding for new start program LMAMS (PE 0203802A Other Missile Product Improvement Programs Project VT9 Lethal Miniature Aerial Missile System (LMAMS)).</p> <p>\$16.984 million base funding increase in FY 2021 due to initial funding for new start program TOW (PE 0203802A Other Missile Product Improvement Programs Project VV2 TOW).</p>		

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 788 / ATACMS PIP
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
788: ATACMS PIP	-	4.760	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.760
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Army Tactical Missile System (ATACMS) Product Improvement Program (PIP) focuses on safety, cost reduction, reliability, deficiency corrections, standardization, and new or improved operational capabilities. There is no funding in Fiscal Year (FY) 2021.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: PIP Activities	4.760	-	-	-	-
Description: PIP focuses on safety, cost reduction, reliability, deficiency corrections, standardization, and new or improved operational capabilities for ATACMS.					
Accomplishments/Planned Programs Subtotals	4.760	-	-	-	-

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• CA6700: ATACMS MODS	397.236	80.320	141.690	78.434	220.124	-	-	-	-	0.000	697.680

Remarks

CA6700 ATACMS Mods is the procurement funding line.

D. Acquisition Strategy

After successfully completing operational testing of the height of burst capability via proximity sensor, the Milestone Decision Authority approved in FY 2019 the production and cut in of this capability for unitary missiles. Insensitive munitions and M-code requirements will be addressed by the Army's follow-on long range missile program, Precision Strike Missile. This completes all planned ATACMS missile efforts under 788 ATACMS PIP.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 788 / ATACMS PIP
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Government Program Management	MIPR	AMRDEC : RSA	0.300	0.250	Nov 2018	-		-		-		-	0.000	0.550	-
Subtotal			0.300	0.250		-		-		-		-	0.000	0.550	N/A

Remarks
AMRDEC - U.S Army Research, Development and Engineering Command; RSA - Redstone Arsenal, Alabama

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Studies	Various	Various : Various	-	1.390	Nov 2018	-		-		-		-	0.000	1.390	-
Prototyping	C/CPFF	LMMFC : Dallas, TX	-	1.787	Mar 2019	-		-		-		-	0.000	1.787	-
Subtotal			-	3.177		-		-		-		-	0.000	3.177	N/A

Remarks
LMMFC - Lockheed Martin Missiles and Fire Control

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Test Support	Various	Various : Various	4.500	1.333	Nov 2018	-		-		-		-	0.000	5.833	-
Subtotal			4.500	1.333		-		-		-		-	0.000	5.833	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		4.800	4.760	0.000	-	-	-	0.000	9.560	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) 788 / ATACMS PIP

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Operational Test Planning & Execution	█				█																							
Prox Sensor Cut-In Decision	▲ 1																											
Insensitive Munitions Study	█																											
GPS M-Code Study, Qualification & Integration	█																											
Flight Test Support/Equipment (HWIL, Flight Termination System)	█																											
	█																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) 788 / <i>ATACMS PIP</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Operational Test Planning & Execution	1	2018	1	2019
Develop Test & Evaluation Master Plan (TEMP) for Height of Burst	1	2018	2	2018
HWIL Models & Simulation	2	2018	3	2018
Conduct Operational Test Flight Preparations & OT Flight Testing	2	2018	3	2018
Operational Test Reports	4	2018	4	2018
Prox Sensor Cut-In Decision	2	2019	2	2019
Insensitive Munitions Study	1	2019	4	2019
GPS M-Code Study, Qualification & Integration	1	2019	4	2019
Flight Test Support/Equipment (HWIL, Flight Termination Systems, Modeling & Sim)	1	2019	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs				Project (Number/Name) DZ9 / ATACMS Mods			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
DZ9: ATACMS Mods	-	0.000	0.000	62.440	-	62.440	54.548	23.178	0.000	0.000	0.000	140.166
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

CD ATACMS prior year funding from Fiscal Year (FY) 2018 to FY 2020 was under Program Element (PE) 0604768A Brilliant Anti-Armor Submunition (BAT) Project P01 P01 MULTI - MODE SEEKER DEVELOPMENT AND TEST. No previous funding was allocated to this PE.

A. Mission Description and Budget Item Justification

Army Tactical Missile System (ATACMS) is the United States (U.S.) Army's primary 24/7, all-weather, and surface-to-surface artillery precision missile used by current and future Combatant Commanders to shape the battlefield with long-range fires against hard and soft stationary targets in open, complex, and urban environments. Cross Domain (CD) ATACMS is a new variant which integrates a seeker into the ATACMS to expand its capabilities to allow it to search, detect, acquire and engage moving maritime and land targets. This capability is being developed as a SCO demonstration project scheduled to complete in Quarter 2 FY 2021. FY 2021 - FY 2023 funding matures and transitions this capability to the Army to provide a limited deployment to a combatant command in support of the Land Based Anti-Ship Missile Operational Needs Statement (ONS17-22222).

Funding supports performance analysis, testing, and qualification of the CD ATACMS system design, integration with the command and control system, integration with the launcher, and system safety and supportability requirements necessary for a limited fielding. CD ATACMS prior year funding from FY 2018 to FY 2020 was under PE 0604768A Brilliant Anti-Armor Submunition (BAT) Project P01 P01 MULTI - MODE SEEKER DEVELOPMENT AND TEST. No previous funding was allocated to this PE.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Transition of SCO demonstrated capabilities to defeat maritime and land targets	-	-	62.440	-	62.440
Description: Begin the transition and development of an interim capability to effectively engage moving maritime and land targets out to a range of 300 kilometer. Supports the long range precision fires requirements of the Multi-Domain Task Force in response to the Land Based Anti-Ship Missile Operational Needs Statement (ONS 17-22222).					
FY 2021 Base Plans: Funding supports performance analysis, testing, and qualification of the CD ATACMS system design; integration with the command and control system; integration with the launcher; and system safety and supportability requirements necessary for a limited fielding.					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) DZ9 / <i>ATACMS Mods</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Increased funding of \$62.500 million funds transition of CD ATACMS from Strategic Capabilities Office to the Army and matures the prototype to a tactical configuration of CD ATACMS suitable for a limited fielding as an urgent material release to a combatant command. This effort was previously funded under PE 0604768A Brilliant Anti-Armor Submunition (BAT) Project P01 Multi-Mode Seeker Development and Test.					
Accomplishments/Planned Programs Subtotals	-	-	62.440	-	62.440

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• CA6700: <i>ATACMS MODS</i>	397.236	80.320	141.690	78.434	220.124	-	-	-	-	0.000	697.680

Remarks
Limited procurement of up to 102 CD ATACMS variant missiles is planned to be funded under Procurement's CA6700 ATACMS MODS.

D. Acquisition Strategy
The CD ATACMS program leverages prototypes under development to support an Office of Secretary of Defense (OSD) Strategic Capabilities Office demonstration in FY 2020 and FY 2021; the CD ATACMS program begins a qualification effort in FY 2021 of the design to support limited production to meet an urgent operational requirement. The qualification effort identifies capabilities and limitations of the prototypes, adds operational systems not included in the demonstration, and addresses critical updates needed for fielding. Lockheed Martin Missile and Fire Control (LMMFC) will develop, integrate, qualify and flight test CD ATACMS missiles under this effort.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) DZ9 / ATACMS Mods
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Government Program Management	Various	Various : RSA	-	-		-		4.390	Nov 2020	-		4.390	19.200	23.590	-
Subtotal			-	-		-		4.390		-		4.390	19.200	23.590	N/A

Remarks
RSA - Redstone Arsenal

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Command & Control	MIPR	Various : Various	-	-		-		2.500	Nov 2020	-		2.500	1.600	4.100	-
Modeling & Simulation	MIPR	CCDC AvMC : RSA	-	-		-		3.710	Nov 2020	-		3.710	12.080	15.790	-
Engineering, System Safety & Supportability	MIPR	Various : RSA	-	-		-		2.150	Nov 2020	-		2.150	14.810	16.960	-
System Maturation & Qual	C/FFP	LMMFC : Dallas, TX	-	-		-		40.990	Nov 2020	-		40.990	106.913	147.903	-
Subtotal			-	-		-		49.350		-		49.350	135.403	184.753	N/A

Remarks
LMMFC - Lockheed Martin Missiles and Fire Control; CCDC AvMC - Combat Capabilities Development Command Aviation and Missile Center

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Test Support	Various	Various : Various	-	-		-		8.700	Apr 2021	-		8.700	24.264	32.964	-
Subtotal			-	-		-		8.700		-		8.700	24.264	32.964	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	-	0.000	62.440	-	62.440	178.867	241.307	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) DZ9 / ATACMS Mods

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Demonstration Phase (SCO)	[Blue bar]																											
Subsystem Qual, Test Support Articles	[Grey bar]												[Blue bar]															
EDT Flight Tests	[Grey bar]																[Blue bar]											
SQT Flight Tests	[Grey bar]																				[Blue bar]							
User Demo	[Grey bar]																								[Blue bar]			
System Maturation/Safety/Supportability	[Grey bar]																				[Blue bar]							
Command and Control Software Updates (Launcher and AFATDS)	[Grey bar]																[Blue bar]											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) DZ9 / <i>ATACMS Mods</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Demonstration Phase (SCO)	1	2019	2	2021
Subsystem Qual, Test Support Articles	1	2022	4	2022
EDT Flight Tests	1	2023	2	2023
SQT Flight Tests	3	2023	1	2024
User Demo	3	2024	3	2024
System Maturation/Safety/Supportability	2	2020	2	2024
Command and Control Software Updates (Launcher and AFATDS)	1	2020	2	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army										Date: February 2020		
Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs				Project (Number/Name) VT9 / Lethal Miniature Aerial Missile System (LMAMS)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
VT9: Lethal Miniature Aerial Missile System (LMAMS)	-	0.000	0.000	0.000	2.300	2.300	0.000	0.000	0.000	0.000	0.000	2.300
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY2021.

Project VT9 Lethal Miniature Aerial Missile System (LMAMS) is a new start project in Fiscal Year (FY) 2021.

A. Mission Description and Budget Item Justification

VT9: Lethal Miniature Aerial Missile System (LMAMS) is a single man-portable/operable, light-weight organic, beyond line-of-sight, precision guided, loitering aerial missile system capable of locating and engaging obscured and/or fleeing enemy targets that otherwise cannot be engaged by typical direct fire weapon systems.

Funding supports engineering and integration of capability improvements identified by trained operators during an Assessment of Operational Utility (AOU) conducted in 2018. Once integrated into the current LMAMS, Production Verification Testing will be conducted to demonstrate successful incorporation of new technology.

New start project in FY 2021.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: LMAMS Capability Improvements	-	-	0.000	2.300	2.300
Description: Joint Urgent Operational Need (JUON) User Required Capability Improvements supporting CC-0556.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: Develop improved image processing and integrate upgraded optics package to include upgraded tablet controller.					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) VT9 / Lethal Miniature Aerial Missile System (LMAMS)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
New start project.					
Accomplishments/Planned Programs Subtotals	-	-	0.000	2.300	2.300

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• C88001: LETHAL MINIATURE AERIAL MISSILE SYSTEM (LMAMS)	104.973	83.300	0.000	84.993	84.993	-	-	-	-	0.000	273.266

Remarks

D. Acquisition Strategy

This effort will be awarded through competition. Analysis to determine the Acquisition Strategy is ongoing.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Army												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
2040 / 7				PE 0203802A / Other Missile Product Improvement Programs				VT9 / Lethal Miniature Aerial Missile System (LMAMS)							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
System Engineering / Program Management	MIPR	CCDC Aviation & Missile Center : Redstone Arsenal, AL	-	-		-		0.000		0.193	Jan 2021	0.193	0.000	0.193	-
Subtotal			-	-		-		0.000		0.193		0.193	0.000	0.193	N/A
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Improve Image Processing and Upgrade Optics Package	C/FFP	TBD : TBD	-	-		-		0.000		2.061	Mar 2021	2.061	0.000	2.061	-
Subtotal			-	-		-		0.000		2.061		2.061	0.000	2.061	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Product Verification Testing	MIPR	Dugway Proving Grounds : Dugway, UT	-	-		-		0.000		0.046	Sep 2021	0.046	0.000	0.046	-
Subtotal			-	-		-		0.000		0.046		0.046	0.000	0.046	N/A
Project Cost Totals			-	-		0.000		0.000		2.300		2.300	0.000	2.300	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army			Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) VT9 / Lethal Miniature Aerial Missile System (LMAMS)	

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	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				
Product Development and Integration									■																							
Production Verification Testing													■																			
Test Reporting																	■															
Engineering Change Proposal Incorporation																					▲ 1											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) VT9 / <i>Lethal Miniature Aerial Missile System (LMAMS)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Product Development and Integration	2	2021	1	2022
Production Verification Testing	4	2021	1	2022
Test Reporting	1	2022	2	2022
Engineering Change Proposal Incorporation	3	2022	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040 / 7					R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs				Project (Number/Name) VV2 / TOW			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
VV2: TOW	-	0.000	0.000	16.984	-	16.984	0.000	0.000	0.000	0.000	0.000	16.984
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is a new start in FY2021.

Project VV2 TOW is a new start in Fiscal Year (FY) 2021.

A. Mission Description and Budget Item Justification

Project VV2 TOW Weapon System includes the ITAS launcher, TOW missiles (BGM-71 series), and associated tactical training aids/devices. The TOW Weapon System provides long-range, lethal anti-armor and precision assault fires capability for Army Infantry Brigade Combat Teams (IBCT), Stryker Brigade Combat Teams (SBCT) and Armor Brigade Combat Teams (ABCT) within the Active, Reserve, and National Guard components. The United States Marine Corps (USMC) employs the TOW missile from its ITAS derived M41A7 Saber launchers, ATGM vehicles, and AH-1W Cobra helicopters.

The TOW Weapon System improvement program is a New Start Project to integrate US Army missile and ITAS modifications into the TOW Weapon System to improve missile safety (Insensitive Munition upgrades), increase system survivability (counter active protection systems), and increase system network capabilities. These capability improvements support Multi-Domain Operations (MDO) and the Functional Concept for Movement and Maneuver by providing precise lethal capabilities in multiple domains against armored threat systems.

FY 2021 Base dollars in the amount of \$16.984 million will initiate systems engineering to integrate an improved Insensitive Munitions (IM) propulsion system, which will increase missile range, and add a Counter Active Protection System (CAPS) to the TOW missile to enhance missile safety and survivability. The effort will also initiate analysis of requirements for supporting test equipment, launcher, modeling and simulation hardware/software, and test planning for FY 2021.

Supports Next Generation Combat Vehicle (NGCV) Optionally Manned Fighting Vehicle (OMFV) Multi-purpose Guided Missile (MPGM) requirements.

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

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: TOW Kilo (BGM-71K) Integration and Qualification	-	-	16.984	-	16.984
FY 2021 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Army	Date: February 2020
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Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) VV2 / TOW
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Conduct competitive acquisition through model based system engineering to deliver analysis, technical requirements/design documentation, and key components for integration of Insensitive Munitions (IM) Motor and CAPS improvements. FY 2020 to FY 2021 Increase/Decrease Statement: VV2 / TOW is a New Start Project.					
Accomplishments/Planned Programs Subtotals	-	-	16.984	-	16.984

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• C59300: <i>TOW 2 System Summary</i>	119.062	118.458	121.074	-	121.074	90.708	153.176	178.104	176.010	0.000	956.592
• C61700: <i>ITAS/TOW Mods</i>	3.173	3.469	5.666	-	5.666	-	-	-	-	0.000	12.308

Remarks

D. Acquisition Strategy
Analysis to determine the Acquisition Strategy for this competitive effort is ongoing.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / Other Missile Product Improvement Programs	Project (Number/Name) VV2 / TOW

Event Name	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Component Design Engineering																												
Component Design Review									▲																			
Component Prototype Hardware Build																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Army		Date: February 2020
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0203802A / <i>Other Missile Product Improvement Programs</i>	Project (Number/Name) VV2 / TOW

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Component Design Engineering	2	2021	1	2022
Component Design Review	4	2021	4	2021
Component Prototype Hardware Build	4	2021	2	2022