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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army **Date:** March 2023

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0604604A / <i>Medium Tactical Vehicles</i>
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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	-	9.177	22.163	28.226	-	28.226	15.058	6.517	6.556	3.574	0.000	91.271
BX8: <i>Cold Weather All-Terrain Vehicle (CATV)</i>	-	1.759	-	-	-	-	-	-	-	-	0.000	1.759
H07: <i>Family Of Med Tac Veh</i>	-	7.418	22.163	28.226	-	28.226	15.058	6.517	6.556	3.574	0.000	89.512

A. Mission Description and Budget Item Justification

This Program Element (PE) supports continued modernization of the Army's Medium Tactical Wheeled Vehicle fleets by investigating technology insertions including, but not limited to: Predictive Logistics, vetronics, vehicle electrification and other climate change initiatives, Victory Architecture, autonomous operations and other emerging technologies. Furthermore, the PE supports developing initial prototypes to enable refinement of Operational Requirements and early user feedback to support future sustainment and operational movement operating concepts to include developing technologies to improve safety, survivability and mobility in an arctic environment.

The Family of Medium Tactical Vehicles (FMTV) includes Cargo, Tractor, Load Handling System (LHS), Wrecker, Expandable Van, Shop Van, and Dump variants with payloads ranging from 3-tons to 10-tons and associated companion trailers. FMTV trucks perform over 55 percent of the Army's local haul, line haul, and unit resupply missions. It operates throughout theater as multi-purpose transportation vehicles in combat, combat support, and combat service support units. Funding from this Program Element will be used to support the continued evolution of the future FMTV fleet as well as tech insertion opportunities to keep the current FMTV fleet relevant on today's battlefield. This includes upgrades in survivability and crew protection, improved safety by leveraging advancements in commercial active safety technologies, modernizing the aging Low Velocity Air Drop (LVAD) fleet of vehicles, improved utilization through modularity, integration of advanced high efficiency powertrains and fuel saving technologies, and insertion of autonomous vehicle capabilities that will change the way transportation missions are conducted around the world.

FY 2024 Project H07 Base funds in the amount of \$25.500 million will be used for Climate Initiatives, Predictive Logistics and Improved Vehicle Safety Technologies.

FY 2024 Project H07 Base funds in the amount of \$2.726 million will be used to conduct Production Qualification Testing (PQT) of the FMTVA2 based LVAD. The three FMTV LVAD models (M1081, M1093, M1094) ended production in 2009 and represent the oldest vehicles in the FMTV fleet. These vehicles suffer from poor readiness due to maintenance and supply issues as many parts have gone obsolete. Updates to the LVAD fleet are needed to modernize the fleet.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	9.524	22.163	18.566	-	18.566
Current President's Budget	9.177	22.163	28.226	-	28.226
Total Adjustments	-0.347	0.000	9.660	-	9.660
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.347	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	9.660	-	9.660

Change Summary Explanation

Increase in Fiscal Year (FY) 2024 budget request from the previous budget request is to develop Anti-Idle capability for the Tactical Wheeled Vehicle Fleet

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604604A / <i>Medium Tactical Vehicles</i>				Project (Number/Name) BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>			
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
BX8: <i>Cold Weather All-Terrain Vehicle (CATV)</i>	-	1.759	-	-	-	-	-	-	-	-	0.000	1.759
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cold-weather All-Terrain Vehicle (CATV) is a tracked vehicle that will provide transportation for up to a 10-Soldier element, emergency medical evacuation, command and control capability, and general cargo transportation on- and off-road in an Arctic environment under a wide range of otherwise impassable terrain, to include frozen ice, and extreme cold weather conditions to support year-round training as well as to conduct Homeland Defense (HD), Homeland Security (HS), and Defense support of Civil Authorities (DSCA) mission. The CATV will employ two carrier variants: General-purpose carrier variant capable of providing transport for not less than 9 Soldiers, plus the driver within a cab/enclosure (10 Soldiers) with equipment and supplies to sustain three days of combat operations. The General Purpose variant will be reconfigurable to a casualty evacuation (CASEVAC) variant capable of transporting medical equipment, two caregivers, and not less than two litter patients or four ambulatory patients in addition to the driver within a cab/enclosure. The General Purpose variant will also be reconfigurable to a Command and Control (C2) variant providing the space weight and power to hosting standard Joint communications and common operating picture (COP) platforms. The C2 and COP equipment should be able to be used enroute or with minimal setup upon halt by six Soldiers in addition to the driver within a cab/enclosure. Cargo/flatbed capable of carrying outsized equipment and cargo. The cargo variant should allow for loading cargo with a forklift from either side (i.e. dropside or flatbed configuration) and have a cab/enclosure for two Soldiers (driver and vehicle commander).

Testing in ECW is necessary to prove the adequacy to the requirements with timing necessary to support planned Field Unit Equipped (FUE) in FY23. FUE is needed as soon as possible to replace the current capability that is reaching the end of life due to obsolescence

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

	FY 2022	FY 2023	FY 2024
Title: CATV Test and Evaluation	1.759	-	-
Description: Funding provided for endurance, performance, transportability testing and production verification testing for CATV.			
Accomplishments/Planned Programs Subtotals	1.759	-	-

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

Line Item	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
• D15620: <i>Family of Cold Weather All-Terrain Vehicle (CATV)</i>	16.450	36.472	28.745	-	28.745	39.810	39.895	39.867	1.078	0.000	202.317

Remarks

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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604604A / <i>Medium Tactical Vehicles</i>	Project (Number/Name) BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>

D. Acquisition Strategy

The Acquisition Strategy supports a two-step acquisition approach with an OTA based Prototype contract in 2QFY21 to two vendors for the prototype phase and a down select to one vendor on a Production contract in 3QFY22 that will support the production phase. The Army Procurement Objective (APO) is 110 Cold-weather All-Terrain Vehicles (CATV).

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0604604A / <i>Medium Tactical Vehicles</i>	Project (Number/Name) BX8 / <i>Cold Weather All-Terrain Vehicle (CATV)</i>

Event Name	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
CATV Endurance/Performance/Production Verification Testing	Testing																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army		Date: March 2023
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CATV OTA Prototype Contract Award	2	2021	2	2021
CATV Endurance/Performance/Production Verification Testing	3	2021	2	2022

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0604604A / <i>Medium Tactical Vehicles</i>				Project (Number/Name) H07 / <i>Family Of Med Tac Veh</i>			
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
H07: <i>Family Of Med Tac Veh</i>	-	7.418	22.163	28.226	-	28.226	15.058	6.517	6.556	3.574	0.000	89.512
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The FMTVA2 Production and Engineering Change Proposal (ECP) modernization effort restores vehicle performance that was lost due to the addition of armor protection kits as the threat to tactical vehicles and the FMTV has increased. The FMTVA2 also addresses Space, Weight, Power, and Cooling (SWaP-C) constraints from having to host an increasing amount of C4ISR and Counter-IED equipment. PD MTV is executing the FMTVA2 effort documented in a signed Acquisition Decision Memorandum by the AAE on 16 November 2015.

This Project also supports development of Climate Change initiatives such as Vehicle Electrification, Onboard Vehicle Power, Predictive Logistics (PL) and other climate change related technologies for the Tactical Wheeled Vehicle fleet.

The FMTVA1P2 ended production in 2021 and represents the highest density FMTV model with over 40,000 vehicles fielded to date. The FMTVA1P2 will remain in the tactical vehicle fleet until 2040 and beyond. To ensure supportability of the FMTVA1P2 through FY 2040 and beyond, the PD MTV, as lifecycle managers for the system, shall address potential obsolescence issues with the powertrain and Material Handling Equipment used on the FMTV.

Increasing survivability and crew protection of the FMTVA1P2 comes at the expense of decreased vehicle mobility and performance in soft soil and winter environments. The FMTVA1P2 is being asked to carry more weight than what it was originally designed for. Low risk, highly commercial improvements to the FMTVA1P2 driveline, suspension, and tires can be made to minimize the loss in mobility performance.

FY 2024 Project H07 Base funds in the amount of \$.500 million will be used for development and integration of Improved Vehicle Safety Technologies, including active safety technologies such as front collision warning, collision mitigation, lane keeping assist, adaptive cruise control, and 360 degree situational awareness.

FY 2024 Project H07 Base funds in the amount of \$2.726 million will be used for Low Velocity Air Drop (LVAD) Automotive Performance Qualification (PQT) testing.

FY 2024 Project H07 Base funds in the amount of \$25.000 million will be used to continue the development, test, and integration of Climate Change initiatives such as Tactical Vehicle Anti-Idle Retrofit Kit, On Board Vehicle Power, Hybrid Propulsion, Predictive Logistics (PL) development and other technologies associated with the combatting climate change for the Tactical Wheeled Vehicle fleet.

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

	FY 2022	FY 2023	FY 2024
Title: FMTVA2 Production and ECP Modernization Effort	2.300	2.354	0.500
Description: Funding used to support the continued evolution of the future FMTV fleet as well as tech insertion opportunities to keep the current FMTV fleet relevant on today's battlefield. The FMTVA2 production and ECP modernization effort restores			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>vehicle performance that was lost due to the addition of armor protection kits as the threat to tactical vehicles and the FMTV has increased. Live Fire test assets are needed to support Live Fire Testing required per Chapter 139, Title 10 USC. Operational Testing required per Chapter 141, Title 10 USC.</p> <p>FY 2023 Plans: FY 2023 will continue to fund the Operational Test (OT) and implementation of Predictive Logistics</p> <p>FY 2024 Plans: FY 2024 will continue to fund the development of Improved Vehicle Safety Technologies</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 decrease due to the completion of Operational Test in FY2023 and transition to development of Improved Vehicle Safety Technologies with emphasis towards Climate Change initiatives and Low Velocity Air Drop (LVAD) requirements.</p>				
<p>Title: FMTV LVAD Next Generation Model</p> <p>Description: Updates to the FMTV Low Velocity Air Drop (LVAD) are needed to address obsolescence issues and to modernize the fleet.</p> <p>FY 2023 Plans: FY 2023 budget activities include the LVAD STS Work Directive Task 2, conversion of nine prototype test assets (M1081 and M1093), production of four Live Fire trucks along with LVAD Survivability Live Fire testing.</p> <p>FY 2024 Plans: FY 2024 will fund the LVAD Automotive Production Qualification Testing, Transportation testing, LVAD Airdrop safety certification testing.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 decrease reflects completion of LVAD prototype build.</p>		5.118	4.000	2.726
<p>Title: Climate Change Initiatives</p> <p>FY 2023 Plans: FY2023 Project H07 Base funds in the amount of \$15.000 million will be used for Anti-idle retrofit kit prototype testing for MTV and the development and engineering of kits for the HTV fleet. It will fund the integration, start of test, and procure both On board vehicle Power and HTV anti-idle prototypes kits. Funds will also support development and engineering of FuelSense 2.0 technologies, and an electric M915 Study, as well as fund the development of other technologies associated with the combatting</p>		-	15.000	25.000

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
climate change, power and battery modernization strategies and the support of artic strategies for the Tactical Wheeled Vehicle fleet.			
FY 2024 Plans: FY2024 Project H07 Base funds in the amount of \$25.000 million will be used to develop engineer change proposals for the MTV Anti-Idle kits and continue to fund the HTV prototype development and test. It will procure On board vehicle Power prototypes kits, fund the integration and start of test. Funds will also support testing of FuelSense 2.0 technologies, as well as fund the development of other technologies associated with the combatting climate change, power and battery modernization strategies and the support of artic strategies for the Tactical Wheeled Vehicle fleet.			
FY 2023 to FY 2024 Increase/Decrease Statement: \$10M increase specifically intended to continue to develop Anti-Idle capability for the Tactical Wheeled Vehicle Fleet.			
Title: SBIR/STTR Transfer	-	0.809	-
FY 2023 Plans: SBIR/STTR Transfer			
FY 2023 to FY 2024 Increase/Decrease Statement: Decrease due to SBIR/STTR Transfer			
Accomplishments/Planned Programs Subtotals	7.418	22.163	28.226

C. Other Program Funding Summary (\$ in Millions)											
Line Item	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
• D15500: <i>Family Of Medium Tactical Veh (FMTV)</i>	136.152	120.636	110.734	-	110.734	117.668	110.073	112.160	107.172	0.000	814.595
• D04016: <i>MEDIUM TACTICAL VEHICLE PROTECTION KITS</i>	3.800	20.000	0.000	-	0.000	-	-	-	-	0.000	23.800

Remarks

D. Acquisition Strategy

The strategy for the FMTVA2 Production and Engineering Change Proposal (ECP) Modernization Effort led to award of a Firm-Fixed Price Requirements contract that will have a base award of five years (two years for vehicle testing and three production years) with two, one-year option production periods and to conduct FMTVA2 Live Fire and Operational Testing. These efforts will utilize Government test facilities.

The strategy for the Next Generation FMTV LVAD Model Configuration is to address obsolescence issues and bring the configuration up to today's standards. This effort

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will utilize a System Technical Support (STS) contract with the current FMTV Original Equipment Manufacturer (OEM).

The strategy to develop, integrate, and test Improved Vehicle Safety Technologies is to leverage active safety capabilities developed commercially and adapt for military use on the FMTV. The development and integration will be conducted either via STS Task Order with the vehicle OEM or an Other Transaction Authority (OTA) with industry.

The FMTV program will continually monitor emerging technologies and capabilities and leverage existing partnerships within the science and technology centers as well as through industry market research and partnerships in order to support the Army's Climate Change strategy . The anticipated outcomes of these efforts are fully validated Engineering Change Proposals that can be applied to the current and future FMTV fleet.

The FMTV program will procure prototypes via Other Transaction Authority (OTA) Agreements for test and evaluation, including soldier touch points to gain user feedback. The OTAs then offer a path to transition to production.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Army **Date:** March 2023

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Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
SBIR/STTR Transfer	TBD	SBIR/STTR Transfer : USAARMY HQDA	-	-		0.809		-		-		-	0.000	0.809	-
Subtotal			-	-		0.809		-		-		-	0.000	0.809	N/A

Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
FMTV LVAD Next Generation Development / Prototypes	SS/CPFF	Oshkosh Defense : Oshkosh, WI	0.750	3.991	Jun 2022	-		-		-		-	0.000	4.741	-
FMTV Improved Vehicle Safety Technologies	MIPR	ATEC : ABERDEEN PROVING GROUNDS, MD	2.700	-		1.883	Mar 2023	0.500	Mar 2024	-		0.500	0.000	5.083	-
FMTV Climate Change Initiatives	TBD	tbd : tbd	-	-		15.000	Mar 2023	25.000	Jun 2024	-		25.000	0.000	40.000	-
FMTV Implementation of Predictive logistics	TBD	tbd : tbd	-	0.300	Jun 2022	0.471	Mar 2023	-		-		-	0.000	0.771	-
Subtotal			3.450	4.291		17.354		25.500		-		25.500	0.000	50.595	N/A

Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
FMTVA2 Operational Testing	MIPR	OTC : TBD	-	2.000	Nov 2022	-		-		-		-	0.000	2.000	-
FMTV LVAD Test Assets	SS/FFP	Oshkosh Defense : Oshkosh, WI	-	0.365	Jun 2022	-		-		-		-	0.000	0.365	-
FMTV LVAD Live Fire Testing	MIPR	Army Test Center (ATC) : Aberdeen Proving Grounds, MD	-	0.477	Jun 2022	0.400	Nov 2022	-		-		-	0.000	0.877	-

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Army **Date:** March 2023

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
FMTVA2	1	2019	4	2024
FMTVA2 Contract Award/Delivery Order 1	2	2018	2	2018
FMTVA2 Allocated Baseline Review (ABR)	3	2018	3	2018
FMTVA2 Product Baseline Review (PBR)	4	2018	4	2018
FMTVA2 Delivery Order 2 (DO2)	4	2021	4	2021
FMTVA2 Production Validation Testing (PVT)	3	2019	4	2021
FMTVA2 Live Fire Test & Evaluation (LFT&E)	3	2019	4	2019
FMTVA2 Delivery Order 3 (DO3)	4	2021	4	2021
FMTVA2 Operational Testing (OT)	4	2022	2	2023
FMTVA2 Type Classification and Material Release (TC/MR)	4	2023	4	2023
FMTVA2 First Unit Equipped (FUE)	4	2023	4	2023
FMTVA1P2	1	2019	4	2019
FMTVA1P2 FY 2018 Vehicle Delivery	4	2018	4	2019
FMTV LVAD NEXT GENERATION MODEL	3	2020	2	2025
FMTV LVAD Next Generation Model Analysis	4	2021	4	2024
FMTV LVAD Live Fire Test	3	2022	3	2023
FMTV LVAD Air Drop / Production Qualification Testing (PQT)	3	2022	4	2025
FMTV LVAD TRANSITION TO PROCUREMENT	1	2025	1	2025
FMTV Improved Vehicle Safety Development Integration Testing	2	2023	4	2025
FMTV Climate Change Initiatives	2	2023	4	2025
Electrification	2	2023	4	2025
Anti -idle / Hybridization	4	2025	4	2025