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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 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</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	-	30.540	28.905	30.169	-	30.169	24.697	26.804	26.770	27.013	Continuing	Continuing
EF5: <i>Joint Tactical Network (JTN)</i>	-	10.327	10.009	10.714	-	10.714	4.184	4.306	4.307	4.349	Continuing	Continuing
EX6: <i>Waveforms</i>	-	20.213	18.896	19.455	-	19.455	20.513	22.498	22.463	22.664	Continuing	Continuing

A. Mission Description and Budget Item Justification

This funding line is a key enabler of the Army Modernization Priorities in support of Army Network Modernization Strategy LOE 1, Unified Network.

EF5 project: This funding line is a key enabler of the Army Modernization Priorities in support of the network. This funding line is a key enabler of the Army Modernization Priorities in support of Unified Network (LOE 1) and Joint Interoperability/Coalition Accessible (LOE 3). The Joint Enterprise Network Manager (JENM) software provides a single, converged network management tool allowing the Warfighter to plan, configure, load, and manage the Joint Services' Tactical Radios and their networks in the field - a capability not available in legacy planning systems. JENM funding supports several types of tactical radios, such as the Manpack and Rifleman, enabling them to utilize Mobile Ad Hoc Networking (MANET) and other waveforms to include: Mobile User Objective System (MUOS) waveform, Demand Assigned Multiple Access (DAMA) Satellite Communications (SATCOM), Integrated Waveform (IW), and Single Channel Ground and Airborne Radio System (SINCGARS) waveform. Using its Over-the-Air-Management (OTAM) functionality, JENM provides the Commander the ability to quickly reconfigure critical networks. JENM enhances the S6's ability to conduct Course of Action (COA) Analysis and the Military Decision Making Process (MDMP), providing commanders critical information regarding their ability to communicate.

FY 2023 funding will continue radio planner development efforts to design, engineer, integrate and test of planning and management capabilities for the Tactical Radio network in support of the Advanced Networking Waveform (ANWf). Continued development provides further integration of the Integrated Tactical Network (ITN) and Network Management of its emerging systems to enable Soldiers the ability to effectively manage the ITN. Radio planner development efforts will also support MUOS Waveform Planning Continuing System Improvements and rapid provisioning of MUOS end-user terminals.

Planning applications are deployed on, and critically tied to the Ruggedized Application Platform - Tactical Radios (RAP-TR) hardware from Division to the Company level.

EX6 project: Product Manager (PdM) Waveforms provides the transport technologies necessary to support the overall connectivity of the Unified Network. PdM Waveforms' technology assessments, integration, and configuration management enable seamless updates and fluid communication between echelons of the Unified Network.

PdM Waveforms delivers, maintains, and upgrades portable, interoperable, MANET waveforms, Advanced Networking Waveforms (ANWf), and network enterprise services in support of the N-CFT capability set approach to achieve the network modernization strategy.

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>
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PdM Waveforms will remain agile to accommodate emerging warfighter needs by addressing the following:

- 1) Waveform (WF) analysis and system engineering activities for DoD as Lead Service Activity for Ground/Line of Sight (LoS) Waveforms (currently TSM, WREN, and SINCGARS) in accordance with Deputy Secretary of Defense memo for Enhancing DoD's Joint Tactical Networks and Datalink Modernization, 29 March 2019
- 2) Development and/or integration efforts of Broadcast Waveforms (i.e. SINCGARS, WREN, ANWf) and Radio Services (i.e. enterprise Over The Air Management (eOTAM)) in support of Army Network modernization, and agile mission support initiatives
- 3) Viability assessments of ANWf in support of the Integrated Tactical Network (ITN) and future capability sets to ensure waveform performance in advance of formal ITN experimentation and fielding activities

FY 2023 RDT&E dollars will fund next generation Government developed waveforms and Radio Service applications, system and architectural engineering for ANWf radio communications technologies, program management support and logistics in support of N-CFT Capability Set (CS) for the Unified Network LOE, and examine modular and open system architectures to decrease future integration and waveform porting costs.

B. Program Change Summary (\$ in Millions)	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>
Previous President's Budget	30.540	28.954	0.000	-	0.000
Current President's Budget	30.540	28.905	30.169	-	30.169
Total Adjustments	0.000	-0.049	30.169	-	30.169
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	30.169	-	30.169
• FFRDC Transfer	-	-0.049	-	-	-

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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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army										Date: April 2022		
Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>				Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</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
EF5: <i>Joint Tactical Network (JTN)</i>	-	10.327	10.009	10.714	-	10.714	4.184	4.306	4.307	4.349	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

JENM 655031EF5 funding is aligned with the Joint Service Agreement established with the Army, Navy and Air Force. \$10,714K reflects the Army, Navy and Air Force funding for JENM 655031EF5.

A. Mission Description and Budget Item Justification

EF5 project: This funding line is a key enabler of the Army Modernization Priorities in support of the network. This funding line supports the Army Network Modernization Strategy (LOE 1), Unified Network and Joint Interoperability/Coalition Accessible (LOE 3). Efforts are aligned to support the Network-Cross Functional Team capability set approach to achieve the network modernization strategy.

The Joint Enterprise Network Manager (JENM) software provides a single, converged network management tool allowing the Warfighter to plan, configure, load, and manage the Joint Services' Tactical Radios and their networks in the field - a capability not available in legacy planning systems. JENM funding supports several types of tactical radios, such as the Manpack and Rifleman, enabling them to utilize Mobile Ad Hoc Networking (MANET) and other waveforms to include: Mobile User Objective System (MUOS) waveform, Demand Assigned Multiple Access (DAMA) Satellite Communications (SATCOM), Integrated Waveform (IW), and Single Channel Ground and Airborne Radio System (SINCGARS) waveform. Using its Over-the-Air-Management (OTAM) functionality, JENM provides the Commander the ability to quickly reconfigure critical networks. JENM enhances the S6's ability to conduct Course of Action (COA) Analysis and the Military Decision Making Process (MDMP), providing commanders critical information regarding their ability to communicate.

FY 2023 funding will continue radio planner development efforts to design, engineer, integrate and test of planning and management capabilities for the Tactical Radio network in support of the Advanced Networking Waveform (ANWf). Continued development provides further integration of the Integrated Tactical Network (ITN) and Network Management of its emerging systems to enable Soldiers the ability to effectively manage the ITN. Radio planner development efforts will also support MUOS Waveform Planning Continuing System Improvements and rapid provisioning of MUOS end-user terminals.

Planning applications are deployed on, and critically tied to the Ruggedized Application Platform - Tactical Radios (RAP-TR) hardware from Division to the Company level.

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

	FY 2021	FY 2022	FY 2023
Title: JENM Program Office Support	2.236	2.418	3.671
Description: Program Management Office support in the development of the JENM software.			
FY 2022 Plans:			

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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
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<p>The JENM program office funding will continue to support JENM design, engineering, integration and test of planning and management capabilities for the Tactical Radio network. The JENM program office supports the vision of integrating lower and mid-tier Network Management capabilities to enable Soldiers to manage their entire consolidated tactical network in conjunction with network elements managed by Sailors, Marines, and Airmen. Program office funding will also support completion of MUOS waveform planning simplification and rapid provisioning of MUOS end-user terminals.</p>			
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<p>FY 2023 Plans: The JENM program office will continue to support the expansion of JENM design, engineering, integration and test of planning and management capabilities for the Tactical Radio Network in support of Joint Service requirements through the use of Matrix and Contractor support. The JENM program office supports the vision of integrating lower and mid-tier Network Management capabilities to enable Soldiers to manage their entire consolidated tactical network in conjunction with network elements managed by Sailors, Marines, and Airmen. Program office funding will also support completion of MUOS waveform planning simplification and rapid provisioning of MUOS end-user terminals and expansion for deployment onto the Top Secret Enclave.</p>			
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<p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase driven by the expansion of software integration for the Joint Services and deployment onto the Top Secret Enclave.</p>			
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<p>Title: JENM Development</p>	8.091	7.226	7.043
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<p>Description: JENM provides consolidated communications planning, network configuration, network activation, position reporting, fault management, security management, and network health and status reporting needed to establish and maintain a mobile wireless network comprised of SW defined network waveforms. JENM interfaces with other external network managers, mission planning systems, network planning systems, key management systems, and spectrum planning systems. JENM is considered a mission essential system. JENM is also considered a critical element within the Ruggedized Application Platform ? Tactical Radios (RAP-TR) hardware configuration management tool kit.</p>			
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<p>FY 2022 Plans: Development funding will continue design, engineering, integration and test of planning and management application for the Tactical Radio network. Support to align with Army Network Modernization to provide further integration of the lower and mid-tier Network Management with that of PM TN to enable Soldiers the ability to manage the entire, consolidated, tactical network. Development funding will also support completion of MUOS waveform planning simplification and rapid provisioning of MUOS end-user terminals for joint service requirements.</p>			
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<p>JENM planning applications are deployed on, and critically tied to the RAP-TR hardware from Division to the Company level.</p>			
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<p>FY 2023 Plans: Development funding will continue design, engineering, integration and test of planning and management application for the Tactical Radio network. Support to align with Army Network Modernization to provide further integration of the lower and mid-</p>			
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Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<p>tier Network Management for Integrated Tactical Network (ITN) to enable Soldiers the ability to manage the entire consolidated tactical network in conjunction with network elements managed by Sailors, Marines, and Airmen. Development funding will also support completion of MUOS waveform planning simplification and rapid provisioning of MUOS end-user terminals for joint service requirements.</p> <p>JENM planning applications are deployed on, and critically tied to the RAP-TR hardware from Division to the Company level.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: As the product has matured, the continuing system improvement requirement has decreased.</p>			
<p>Title: FY22 SBIR / STTR Transfer</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2022 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638</p>	-	0.365	-
Accomplishments/Planned Programs Subtotals	10.327	10.009	10.714

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• 0605031N: 0605031N; JTN, RDTE,N	2.705	-	0.000	-	0.000	-	-	-	-	-	Continuing
• 0605031F: 0605031F; JTNC, RDTE,F	3.844	-	0.000	-	0.000	-	-	-	-	-	Continuing
• B99318: Joint Network Management System	3.904	0.930	1.967	-	1.967	2.028	2.106	2.112	2.110	-	Continuing

Remarks
PE 0605031A contains only the JTN (PdM Waveforms and PdM TCNO (JENM)) RDTE funding. Joint Enterprise Network Manager (JENM) is funded using a Joint budget strategy. Each Military Department (MILDEP) budgets for approximately one-third of the total program RDT&E requirements for joint efforts. Out-year funding is programmed in PE 0605031A by the Army, PE 0605031N by the Navy and PE 0605031F by the Air Force. JENM and baseline planning applications are deployed on the RAP-TR hardware from Division to the Company level. JENM Logistics & Training capabilities are captured under the Joint Network Management System OPA-2 line (JNMS B99318)

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D. Acquisition Strategy

Joint Tactical Network Center (JTNC) Acquisition Decision Memorandum (ADM) (July 2012) (JENM Supporting Role). Per the December 2014 Joint Tactical Network (JTN) Select Acquisition Report (SAR), JTN was 90% expended and changed to inactive. Defense Acquisition Management Information Retrieval (DAMIR) reflected the inactive status on 3 June 2015 JTN APB (13 October 2015) (JENM Supporting Role).

Product Manager Tactical Cyber & Network Operations (TCNO) manages a Government Owned, Government Operated (GOGO) Software Development & Integration Facility which employs competitive contracting strategies for software development & sustainment of the network manager components to ensure warfighter access to the best technology and innovative capabilities while addressing emerging threats and future requirements via an affordable, operationally effective, and timely framework.

The Army will continue a radio planner effort that will plan, manage, and provision capabilities for simplified workflow based planning solutions to rapidly meet emerging capability requirements stemming from Network Cross Functional Team (CFT) initiatives and directed requirements.

JENM will support continuing system improvements for JENM v3.5 development, which includes upgrades of MUOS, upgrades to JENM Public Key Infrastructure (PKI) certificate management, and cyber enhancements.

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</i>
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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			
JENM Program Management Support	MIPR	Various : Various	7.641	2.236	Jan 2021	2.418	Oct 2021	3.671	Oct 2022	-		3.671	Continuing	Continuing	Continuing
FY22 SBIR/STTR Transfer	TBD	TBD : TBD	-	-		0.365		-		-		-	0.000	0.365	-
Subtotal			7.641	2.236		2.783		3.671		-		3.671	Continuing	Continuing	N/A

Remarks
Increase of Management Services support driven by the expansion of software integration for the Joint Services and deployment onto the Top Secret Enclave.

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			
JENM NMRIL Development CIT II	MIPR	NM RIL : San Diego, CA	3.970	2.429	Jan 2021	2.575	Dec 2021	2.685	Dec 2022	-		2.685	Continuing	Continuing	Continuing
JENM NMRIL Development	MIPR	NMRIL : San Diego, CA	19.081	3.140	Jan 2021	2.672	Oct 2021	1.111	Oct 2022	-		1.111	Continuing	Continuing	Continuing
JENM NMRIL Development SSA	MIPR	TBD : TBD	5.536	2.522	Jan 2021	1.979	Jan 2022	3.247	May 2023	-		3.247	Continuing	Continuing	Continuing
Subtotal			28.587	8.091		7.226		7.043		-		7.043	Continuing	Continuing	N/A

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		36.228	10.327	10.009	10.714	-	10.714	Continuing	Continuing	N/A

Remarks

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</i>
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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
JENM v3.5 Continuing System Improvements	[Redacted]				[Redacted]				[Redacted]																			
JENM v3.5.x Continuing System Improvements	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
JENM v3.4 Fielding and Sustainment	[Redacted]				[Redacted]				[Redacted]																			
JENM v3.4 Sunset	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
JENM v3.5 Fielding and Sustainment	[Redacted]				[Redacted]				[Redacted]				[Redacted]															
JENM v3.5 Sunset	[Redacted]				[Redacted]				[Redacted]				[Redacted]								[Redacted]							
APB Expiration	[Redacted]				[Redacted]				[Redacted]				[Redacted]								[Redacted]							
Future Joint Software	[Redacted]				[Redacted]				[Redacted]				[Redacted]								[Redacted]							
Future Contracts	[Redacted]				[Redacted]				[Redacted]				[Redacted]								[Redacted]							

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EF5 / <i>Joint Tactical Network (JTN)</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
JENM v3.5 Continuing System Improvements	2	2021	2	2023
JENM v3.5.x Continuing System Improvements	3	2023	4	2026
JENM v3.5 FQT	2	2020	2	2020
Next Generation Planner v1.0	4	2018	4	2019
Next Generation Planner v1.1	3	2019	4	2020
MUOS MOT&E 1	4	2019	4	2019
JENM v3.3.2 Sunset	4	2020	4	2020
JENM v3.4 Fielding and Sustainment	4	2019	1	2023
JENM v3.4 Sunset	1	2023	1	2023
JENM v3.5 Fielding and Sustainment	4	2021	4	2026
JENM v3.5 Sunset	4	2026	4	2026
APB Expiration	4	2026	4	2026
Future Joint Software	1	2027	4	2027
Future Contracts	1	2027	4	2027

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Appropriation/Budget Activity 2040 / 5					R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>				Project (Number/Name) EX6 / <i>Waveforms</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
EX6: <i>Waveforms</i>	-	20.213	18.896	19.455	-	19.455	20.513	22.498	22.463	22.664	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This funding line supports the Army Network Modernization Strategy Line Of Effort (LOE) 1, Unified Network. Efforts are aligned to support the Network-Cross Functional Team's (N-CFT) capability set approach to achieve the network modernization strategy.

Product Manager (PdM) Waveforms provides the transport technologies necessary to support the overall connectivity of the Unified Network. PdM Waveforms' technology assessments, integration, and configuration management enable seamless updates and fluid communication between echelons of the Unified Network.

PdM Waveforms delivers, maintains, and upgrades portable, interoperable, Mobile Ad-hoc Networking (MANET) waveforms, Advanced Networking Waveforms (ANWf), and network enterprise services in support of the N-CFT capability set approach to achieve the network modernization strategy. These waveforms and services are deployed by technical insertion into production of Program of Record (PoR) radios and field upgrades to existing tactical radios.

PdM Waveforms will remain agile to accommodate emerging warfighter needs by addressing the following:

- 1) Waveform (WF) analysis and system engineering activities for DoD as Lead Service Activity for Ground/Line of Sight (LoS) Waveforms (currently TSM), Warrior Robust Enhanced Network (WREN), and Single Channel Ground and Airborne Radio System (SINGARS)) in accordance with (IAW) Deputy Secretary of Defense memo for Enhancing DoD's Joint Tactical Networks and Datalink Modernization, 29 March 2019
- 2) Development and/or integration efforts of Broadcast Waveforms (i.e. SINGARS, WREN, ANWf) and Radio Services (i.e. enterprise Over The Air Management (eOTAM)) in support of Army Network modernization, and agile mission support initiatives
- 3) Viability assessments of ANWf in support of the Integrated Tactical Network (ITN) and future capability sets to ensure waveform performance in advance of formal ITN experimentation and fielding activities

FY 2023 RDT&E dollars will fund next generation Government developed waveforms and Radio Service applications, system and architectural engineering for ANWf radio communications technologies, program management support and logistics in support of N-CFT Capability Set (CS) for the Unified Network LOE, and examine modular and open system architectures to decrease future integration and waveform porting costs.

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

	FY 2021	FY 2022	FY 2023
Title: Program Management Office Support	2.873	2.375	2.986
Description: Waveform matrix and contractor support, including technical, logistics, and business staff oversight			
FY 2022 Plans:			

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Funding will provide for matrix and contractor support for Waveforms engineering development, testing, and program oversight.</p> <p>FY 2023 Plans: Continue Program Management support for PdM Waveforms, including contractors. Funding will provide for matrix and contractor support for Waveforms engineering development, testing, and program oversight.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase due to inflation</p>				
<p>Title: Waveforms Software Development</p> <p>Description: PdM Waveforms provides software development and waveforms support for tactical radios operational and networking requirements for the following: 1) Single Channel Ground and Airborne Radio System (SINCGARS) - Develop NexGen SINCGARS waveform to combat the adversary's near, mid, and far-term Electronic Attack/Electronic Warfare (EA/EW) capabilities 2) Warrior Robust Enhanced Network (WREN) Waveform will enhance range, scalability, and Electronic Protection (EP) for a unified transport to Army tactical networks. 3) Radio Services (i.e. enterprise Over The Air Management (eOTAM) in support of Army Network modernization, and agile mission support initiatives.</p> <p>FY 2022 Plans: Funding will support the requirement and initial design development of SINCGARS NexGen, WREN problem fixes and hardening the capability in support of the ITN and CS23. Support will include effort to alleviate Cyber Electro-Magnetic Activities (CEMA) threats for SINCGARS and WREN, including Lead Service activities, develop & integrate EW capabilities, and initiate development and release of SATR-DSA 1 for efficient spectrum use</p> <p>FY 2023 Plans: Funding will support the requirement and initial design development of SINCGARS NexGen, WREN problem fixes and hardening the capability in support of the ITN and CS25. Support will include effort to alleviate Cyber Electro-Magnetic Activities (CEMA) threats for SINCGARS and WREN, including Lead Service activities, and Radio Services (i.e. enterprise Over The Air Management (eOTAM)).</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase due to inflation</p>		10.385	9.059	9.445
<p>Title: Waveforms Test and Evaluation</p> <p>Description: PdM Waveforms performs test and evaluation activities to address interoperability, range, scalability, resiliency, Electronic Warfare (EW)/Cyber Electromagnetic Activities (CEMA), and readiness. Advanced Networking Waveforms (ANWf) assessments support inclusion and/or integration of technologies into Army experimentation and Capability Sets (CS's) Viability</p>		5.126	5.019	5.325

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Army		Date: April 2022		
Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>and Readiness Assessments including Technology Readiness Level (TRL) assessment, test and evaluation of EW and cyber capabilities in support of Integrated Tactical Network (ITN), performance and behavior analysis of waveforms against topologies, architectures, operational use cases as defined by Network-Cross Functional Team (N-CFT) and fielding activities</p> <p>FY 2022 Plans: Funding will validate initial design and system engineering activities of the NexGen of Single Channel Ground and Airborne Radio System (SINCGARS), validate and test the enhancements and problem fixes of the Warrior Robust Enhanced Network (WREN) waveforms, validate implementation of enterprise Over The Air Management (eOTAM) 2.1, performance characterization and analysis of waveforms to meet the warfighter's requirements, and validate and test Spectrum Aware Tactical Radio-Dynamic Spectrum Access (SATR-DSA) Release 1</p> <p>FY 2023 Plans: Funding will validate continued design and system engineering activities of the NexGen of Single Channel Ground and Airborne Radio System (SINCGARS), validate and test the enhancements and problem fixes of the Warrior Robust Enhanced Network (WREN) waveforms, validate implementation of fielded enterprise Over The Air Management (eOTAM), and provide performance characterization and analysis of waveforms to meet current and future warfighter's requirements.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Increase due to inflation</p>				
<p>Title: Waveforms Software Support and System Engineering</p> <p>Description: PdM Waveforms software support and systems engineering for waveforms and network manager applications provides the following: 1) Radio Services applications that enable over-the-air (OTA) NSA cryptographic key, radio and network configuration tools and bandwidth efficient OTA protocols supporting the Unified Network Line of Effort (LOE) for CSs 2) eOTAM will enhance radio health services, Common Management Information Base (MIB) integration, integration with Army network management systems and comply with NSA security standards 3) Evaluate the Technology Readiness Level (TRL) of ANWf in support of the ITN, N-CFT and CS' requirements and architectures 4) Oversight and inform policy for SINCGARS, WREN, TSM, eOTAM, and related products for DoD, including Lead Service activities</p> <p>FY 2022 Plans: Funding will support radio services software, product enhancement, and systems engineering & integration (SE&I) as described above in support of PdM Waveforms. Support will include: release of enterprise Over The Air Management (eOTAM) 2.1; Lead Service activities for the integration of existing and emerging waveforms in the DoD; analysis of TSM capabilities for Warrior</p>		1.829	1.752	1.699

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<p>Robust Enhanced Network (WREN) integration and release to DoD; and NATO and ABCANZ ensuring interoperability between the US and Coalition partners, including Lead Service activities</p> <p>FY 2023 Plans: Funding will support radio services software, product enhancement, and systems engineering & integration (SE&I) as described above in support of PdM Waveforms. Support will include: release of enterprise Over The Air Management (eOTAM); Lead Service activities for the integration of existing and emerging waveforms in the DoD; analysis of TSM capabilities for Warrior Robust Enhanced Network (WREN) integration to Manpack and Leader Radios, and release to DoD, NATO and ABCANZ ensuring interoperability between the US and Coalition partners, including Lead Service activities.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Decrease due to a reduction in commercial waveforms vetting, analysis and characterization efforts.</p>				
<p>Title: Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR)</p> <p>Description: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2022 Plans: Funding transferred in accordance with Title 15 USC ?638</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding transferred in accordance with Title 15 USC ?638</p>		-	0.691	-
Accomplishments/Planned Programs Subtotals		20.213	18.896	19.455
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
<p>PdM Waveforms is responsible for core activities, including; developing and updating legacy waveforms and analyzing Advance Networking Waveforms (ANWf) that operate on multiple radio sets and in all operational environments that support network-centric operational warfare. Waveform developments (upgrading, developing, and maintaining) will generally be procured through full and open contract competitions.</p> <p>While maintaining legacy networking waveforms, PdM Waveforms implemented a strategy which focuses on vetting and analyzing ANWf. The product office continues to establish working relationships with industry partners within the waveform market. The strategy consists of conducting initial analysis of commercial waveforms, documenting vulnerabilities, identifying implementation strategies, and making recommendations to senior leadership on potential Army and other Services' use cases.</p>				

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>
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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			
Program Management Support - Matrix	MIPR	C5ISR Center : APG, MD	4.299	1.051	Jan 2021	0.413	Jan 2022	0.820	Jan 2023	-		0.820	Continuing	Continuing	Continuing
Program Management Support - SETA	C/CPFF	SEV1-Tech : Woodbridge, VA	6.997	1.822	Nov 2020	1.558	Nov 2021	2.166	Nov 2022	-		2.166	Continuing	Continuing	Continuing
SBIR/STTR Transfer	Various	TBD : TBD	-	-		0.691		-		-		-	0.000	0.691	-
Subtotal			11.296	2.873		2.662		2.986		-		2.986	Continuing	Continuing	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			
Software Development - C5ISR Center	MIPR	C5ISR Center : APG, MD	29.241	9.135		7.986	Nov 2021	7.868	Nov 2022	-		7.868	Continuing	Continuing	Continuing
Software Development - Technical/Coding (MA-IDIQ)	C/CPAF	MA - IDIQ : Various Locations	18.382	1.250		1.275	Dec 2021	1.577	Jan 2023	-		1.577	Continuing	Continuing	Continuing
Subtotal			47.623	10.385		9.261		9.445		-		9.445	Continuing	Continuing	N/A

Support (\$ 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			
Systems Engineering - SSC NIWC	MIPR	SSC LANT/PAC : Charleston, SC; San Diego, CA	1.688	0.460		0.511	Dec 2021	0.560	Dec 2022	-		0.560	Continuing	Continuing	Continuing
Software Support - WREN	MIPR	C5ISR Center : APG, MD	4.624	1.369		1.241	Nov 2021	1.139	Nov 2022	-		1.139	Continuing	Continuing	Continuing
Subtotal			6.312	1.829		1.752		1.699		-		1.699	Continuing	Continuing	N/A

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>
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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			
Test and Evaluation - C5ISR Center	MIPR	C5ISR Center : APG, MD	9.038	5.126		4.711	Feb 2022	5.026	Feb 2023	-		5.026	Continuing	Continuing	Continuing
Test and Evaluation - NATO	MIPR	RAND : Arlington, VA	0.490	-		0.510	Jun 2022	0.299	Jun 2023	-		0.299	Continuing	Continuing	Continuing
Subtotal			9.528	5.126		5.221		5.325		-		5.325	Continuing	Continuing	N/A
Project Cost Totals			74.759	20.213		18.896		19.455		-		19.455	Continuing	Continuing	N/A

Remarks
 FY 2021 and out reflect a reduction in reimbursable manpower as a result of a realignment of matrixed business management support from Army Material Command, to direct funded Operations and Maintenance.

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>
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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
SINGGARS 3.1.1 Waveform					▲ 2 SINC 3.1.1 Release																							
SINGGARS NexGen Waveform Development									SINC NexGen Development																			
SINGGARS NexGen Waveform Problem Report (PR) Fixes																	SINC NexGen PR fixes											
SINGGARS NexGen Waveform																					▲ 8 SINC NexGen Release							
SINGGARS NexGen Waveform FQT																									▲ 10 SINC FQT			
Warrior Robust Enhanced Network (WREN) PR Fixes									WREN Hardening . Minor Enhancements, PR Fixes																			
Warrior Robust Enhanced Network (WREN) A													▲ 4 WREN Release A															
Warrior Robust Enhanced Network (WREN) B Development													WREN Release B Development															
Warrior Robust Enhanced Network (WREN) B PR Fixes.																					WREN Hardening . Enhancements, PR Fixes.							
Enterprise Over The Air Management (eOTAM) 2.0					▲ 1 eOTAM 2.0 Release																							
Enterprise Over The Air Management (eOTAM) 2.1					▲ 3 eOTAM 2.1 Release																							
Enterprise Over The Air Management (eOTAM) 2.1.1									▲ 5 eOTAM 2.1.1 Release																			
Enterprise Over The Air Management (eOTAM) 2.2													▲ 6 eOTAM 2.2 Release															

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>
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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																												
Enterprise Over The Air Management (eOTAM) 2.2.1																					7 eOTAM 2.2.1 Release																																			
Enterprise Over The Air Management (eOTAM) 2.3																					9 eOTAM 2.3 Release																																			
Enterprise Over The Air Management (eOTAM) 2.3.1																					11 eOTAM 2.3																																			
Advanced Networking Waveforms (ANWF) Analysis																																																								
MAIDIQ - Contract Award																																																								

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

Appropriation/Budget Activity 2040 / 5	R-1 Program Element (Number/Name) PE 0605031A / <i>Joint Tactical Network (JTN)</i>	Project (Number/Name) EX6 / <i>Waveforms</i>
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
SINCGARS 3.1.1 Waveform	1	2022	1	2022
SINCGARS NexGen Waveform Development	4	2021	3	2028
SINCGARS NexGen Waveform Problem Report (PR) Fixes	4	2024	3	2025
SINCGARS NexGen Waveform	4	2025	4	2025
SINCGARS NexGen Waveform FQT	1	2027	1	2027
Warrior Robust Enhanced Network (WREN) C5ISR Transition	4	2020	4	2020
Warrior Robust Enhanced Network (WREN) PR Fixes	1	2021	4	2022
Warrior Robust Enhanced Network (WREN) A	1	2023	1	2023
Warrior Robust Enhanced Network (WREN) B Development	1	2023	2	2025
Warrior Robust Enhanced Network (WREN) B PR Fixes.	3	2025	4	2027
Enterprise Over The Air Management (eOTAM) 2.0	1	2021	1	2021
Enterprise Over The Air Management (eOTAM) 2.1	4	2022	4	2022
Enterprise Over The Air Management (eOTAM) 2.1.1	4	2023	4	2023
Enterprise Over The Air Management (eOTAM) 2.2	4	2024	4	2024
Enterprise Over The Air Management (eOTAM) 2.2.1	4	2025	4	2025
Enterprise Over The Air Management (eOTAM) 2.3	4	2026	4	2026
Enterprise Over The Air Management (eOTAM) 2.3.1	4	2027	4	2027
Advanced Networking Waveforms (ANWf) Analysis	1	2021	4	2026
MA/IDIQ - Contract Award	4	2018	4	2028