

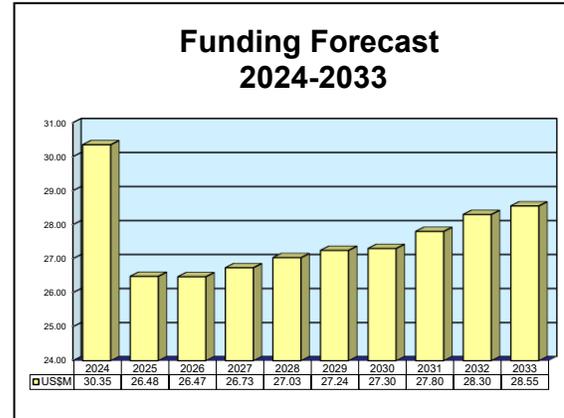
ARCHIVED REPORT

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Joint Tactical Networks

Outlook

- Increasing need for information exchange among services and coalition forces with different networks
- 2024/2025 development should be completed and the JTN ready for Initial Operational Capability
- The program is key to modernization efforts



Orientation

Description. The U.S. Army's Joint Tactical Networks program develops interoperable, secure JTN software that can be applied to a variety of radios.

Status. Ongoing research and development.

Application. Communications.

Sponsor

U.S. Army
Acquisition Executive

Contractors

Prime

Booz Allen & Hamilton Inc	http://www.boozallen.com , 4330 East West Hwy, Bethesda, MD 20814-4408 United States, RDT+E (Joint Tactical Networks)
MITRE Corp	http://mitre.org , 7515 Colshire Dr, McLean, VA 22102 United States, Tel: + 1 (703) 983-6000, RDT+E (Joint Tactical Networks)

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 75 Glen Road, Suite 302, Sandy Hook, CT 06482, USA; rich.pettibone@forecast1.com

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Technical Data

The Joint Tactical Networks program's goal is to provide interoperable, secure JTN software capable of operating in a variety of radios to maintain and sustain an affordable, government-controlled open architecture in support of the mission network requirements of combatant commanders, services, and coalitions.

The JTN program is responsible for the continuous development, delivery, and maintenance of networking waveforms and modified legacy radio waveforms that are compliant with Software Communications Architecture (SCA).

The Joint Tactical Networks program is funded under Program Element #0605031A. The program includes two projects: Project EF5, Joint Tactical Networks and Project EX6, Waveforms.

Project EF5, Joint Tactical Networks includes the following subprojects:

Soldier Radio Waveform (SRW) Development. The SRW (now WREN) will operate on tactical radio sets to provide a networked battlefield communications capability for users engaged in land combat operations and will support voice, data, and video communications on the immediate battlefield. Applications include vehicles, rotary-wing aircraft, dismounted soldiers, munitions, sensors, and unmanned aerial vehicles (UAVs). Functional software applications will use SRW radio-enabled sets over Internet Protocol (IP) capable networks and sub-networks.

The SRW (WREN) will be interoperable with higher throughput, IP-based network waveforms, such as the Wideband Networking Waveform (WNW). As applicable, these IP-based networking waveforms will enable information exchanges through the Global Information Grid (GIG) among soldiers and provide entirely new capabilities for battlefield communications and information sharing. The WREN is currently ported on 21 different radio platforms with nine different vendors.

Wideband Networking Waveform Development. The WNW is a high-data-rate Mobile Ad Hoc NETworking (MANET) waveform that provides the mid-tier tactical Internet backbone and connects tactical forces across the battle sphere. The WNW provides high-throughput, dynamically adaptable connectivity for the exchange of IP-based voice, data, and video traffic.

The WNW will feature two signals-in-space (SiS): the Orthogonal Frequency Division Multiplexing (OFDM) and the Anti-Jam (AJ). The WNW will support network nodes on mobile, airborne, and maritime platforms. The WNW includes networking services, security services, High Assurance IP Equipment (HAIZE) capabilities, red / black switching, and internal routing of WNW signals. The WNW is currently ported on seven radio platforms with five vendors.

Joint Enterprise Network Manager Program Office Support. Under this subproject, the Program Management Office provides support in development of the JENM system (see below).

Joint Enterprise Network Manager Development. JENM software provides a single, consolidated network management tool that allows the warfighter to plan, configure, load, and manage the joint services' tactical radios and their networks in the field. JENM funding supports several types of tactical radios, such as the Manpack and Rifleman, enabling them to utilize MANET and other waveforms, including the following: the Mobile User Objective System (MUOS) waveform, Demand Assigned Multiple Access (DAMA) satellite communications (satcom), integrated waveforms (IW), and the Single Channel Ground and Airborne Radio System (SINCGARS) waveform.

Using its over-the-air-management (OTAM) functionality, JENM provides the commander with the ability to quickly reconfigure critical networks. JENM enhances the ability of S6s (primary staff officers) to conduct course of action (COA) analysis and the "military decision-making process," providing commanders critical information regarding their ability to communicate.

Project EX6, Waveforms includes the following subprojects:

Wideband Networking Waveform (WNW) Development. The WNW provides the Army's mid-tier tactical Internet backbone (transit network) and connects tactical forces during Unified Land Operations, particularly in a denied, degraded, disrupted, space operational environment (D3SOE).

As indicated above, the WNW has two SiS: the OFDM and the AJ, each with multiple bandwidths. See above for further details

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Warrior Robust Enhanced Network (WREN). The WREN (formerly SRW) will operate on tactical radio sets to provide a networked battlefield communications capability for users engaged in land combat operations and will support voice, data, and video communications on the immediate battlefield. These forces, as mentioned

above, include vehicles, rotary-wing aircraft, dismounted soldiers, and UAVs.

Functional software applications will use WREN radio-enabled sets over IP-capable networks and sub-networks, as discussed above.



Joint Tactical Networks will broaden the exchange of information over different cyber domains.

Source: U.S. Army

Program Review

The Joint Tactical Networks program is funded under PE#0605031A. The program includes two projects: Project EF5, Joint Tactical Networks and Project EX6, Waveforms.

Project EF5, Joint Tactical Networks Subprojects

Joint Enterprise Network Manager Program Office Support. Under this effort, development of the JENM system as well as dynamic network connectivity began in FY17. By the end of FY18, efforts were underway to support JENM design, engineering, and integration and the testing of mid- and lower-tier planning and management applications for the Software Defined Radio (SDR) network. Other work focused on extending OTAM capabilities to the "mounted environment" through the U.S. Army's participation in development of dynamic network connectivity.

Joint Enterprise Network Manager Development. Among recent activity, in FY15, JENM v3.2 was released in support of MUOS testing. In the first quarter of FY16, the JENM functional qualification tested (FQT) v3.3 was released to support MUOS testing, a mid-tier networking evaluation, a JENM operational test, and Network Integration Evaluation (NIE) 16.2.

Development of dynamic network connectivity as part of the STARNET objective was begun in FY17. In addition, software products for the Capability Set Fielding Team were developed that provided systems engineering for the U.S. Navy's Digital Modular Radio for the MUOS to include the ARC-210 and PRC-117G radios.

From FY18-FY20, funding continued to support JENM design, engineering, integration and testing of mid- and lower-tier planning and management applications for the SDR network.

Support work continues to align with the vision of Unified Network Operations (UNO) to further integrate lower- and mid-tier network management with management of the Tactical Network. JENM is also working to extend OTAM capabilities to the mounted/tablet-based environment by participating in the development of dynamic network connectivity.

JENM is also working to defer U.S. Army program requirements. To date, the JENM Program Office has assisted with completion of the "JENM v3.4 Transitioning to Sustainment" effort in addition to development of JENM v3.5, which simplified the MUOS and upgraded JENM "public key infrastructure."

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In FY21, prototyping efforts began on the radio planner that will support the TrellisWare Scalable MANET (TSM) and WREN waveforms.

In March 2021, TrellisWare Technologies announced the first shipments of the company's new TW-135 TSM Shadow High Power Radio, which utilizes the MANET waveform. TrellisWare's TW-135 TSM Shadow HPR provides up to 20 watts of amplified transmit power across UHF, L-band, and S-band frequencies, extending range for vehicular, airborne, or manpack network configurations.

The first integration of TSM software into a communication solution was successfully completed by Spectranetix Inc in April 2021. Spectranetix's ComScan was the first TSM project to successfully complete Phase 2 testing under the U.S. Army Capability Set 23 effort. The prototype ComScan multimission system is the first solution aligned with the U.S. Army's C5ISR Modular Open Suite of Standards (CMOSS) and the Open Group's Sensor Open Systems Architecture (SOSA) technical standard. The solution is still a prototype, and ComScan is likely the first of many platforms that will use TSM waveforms. (The Open Group a global consortium dedicated to documenting, tracking and integrating current and emerging technology standards and requirements.)

Project EX6, Waveforms Subprojects

Wideband Networking Waveform (WNW) Development. During FY17, this effort worked on integrating HAIPE 4.2 interoperable core and designated extensions in collaboration with JENM and Warfighter Information Network-Tactical (WIN-T) high-efficiency routing deployments. It also developed an expanded testbed for validation of the performance and interoperability of waveform applications and radio platform services. The latter effort is helping to achieve Mid-tier Networking Vehicular Radio (MNVR) and Small Airborne Networking Radio (SANR) milestones. This work continued through FY20 with the development of WNW 5.0 capability and "unit lead testing" of interim engineering releases.

Warrior Robust Enhanced Network (WREN). Efforts to develop and enhance the WREN for improved

performance and to develop WREN/SRW Version 2.0 continued through FY20.

FY21 work was focused on evaluating options for an eventual replacement of the U.S. Army's SINCGARS and future WREN integration.

FY22 funding was used to design, engineer, integrate, and test planning and management capabilities for the Tactical Radio network in support of the TSM and WREN waveforms. In addition, further efforts to develop the radio planner also supported improvements to the MUOS waveform and rapid provisioning of MUOS end-user terminals, as well as high-frequency waveform planning in support of HF modernization.

Product Management (PdM) Waveforms. Efforts to develop new Product Management waveforms were launched in FY22. PdM waveforms provide the transport technologies necessary to support the overall connectivity of the Unified Network. (According to the U.S. Army, "The Unified Network will enable Army formations, as part of the Joint Force, to operate in highly contested and congested operational environments with the speed and global range to achieve decision dominance and maintain overmatch.") PdM waveforms deliver, maintain, and upgrade portable, interoperable MANET waveforms, Advanced Networking Waveforms, and network enterprise services in support of the "Network Cross-Functional Team (N-CFT) capability set approach" to achieve the network modernization strategy.

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Funding

	U.S. FUNDING							
	FY22 AMT	FY23 AMT	FY24 AMT	FY25 AMT	FY26 AMT	FY27 AMT	FY28 AMT	FY29 AMT
RDT&E (U.S. Army)								
PE#0605031A								
Joint Tactical Network	27.85	30.15	30.33	26.28	26.27	26.53	26.83	N/A

All \$ are in millions.

N/A = Not Available

Source: U.S. Army FY24 RDT&E budget document

Contracts/Orders & Options

No contracts valued over \$5 million have been identified for this project.

Worldwide Distribution/Inventories

This is a U.S. Army program.

Forecast Rationale

The growing use of joint operations (air, land, and sea) requires the ability to communicate and exchange information across various branches of the armed forces and a host of network domain servers. The U.S. Army-led Joint Tactical Networks program develops interoperable, secure Joint Tactical Networking software that can be applied to a variety of radios. It can be considered an outgrowth of the canceled Joint Tactical Radio System (JTRS) program so as not to waste the progress made within that program. Although the JTRS never came to fruition, something positive did result from the JTRS program: software communications waveforms.

The need to communicate among not just the various U.S. military services but also multinational coalition forces – and in a simple, coherent, and cost-effective manner – is driving the demand for this communications technology. Funding will remain stable through 2024 as development shifts into operational capability.

COVID-19 was expected to have only a minimal impact on this program, with perhaps a three-month delay at the most. Many R&D programs typically experience

program delays and setbacks due to one technical issue or another, so delays are built into the schedule.

Recent years have seen a focus on the development of new technologies – of note, Project Manager (PdM) waveforms. PdM waveforms will accommodate emerging warfighter needs by addressing three areas, as follows:

Waveform analysis and system engineering activities for DoD services, with the Waveforms project as the "Lead Service Activity" for ground/line-of-sight waveforms.

The development and/or integration of broadcast waveforms and radio services in support of Army network modernization, and agile mission support initiatives.

Viability assessments of Advanced Networking Waveforms in support of the Integrated Tactical Network and future capability sets to ensure waveform performance in advance of formal ITN experimentation and fielding activities.

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Ten-Year Outlook

ESTIMATED CALENDAR YEAR RDT&E FUNDING (in millions US\$)												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total
MFR Varies												
Joint Tactical Networks <> United States <> Department of Defense												
	339.57	30.35	26.48	26.47	26.73	27.03	27.24	27.30	27.80	28.30	28.55	276.25
Total	339.57	30.35	26.48	26.47	26.73	27.03	27.24	27.30	27.80	28.30	28.55	276.25