



#### HMS MANPACK

A paratrooper from 3rd Brigade Combat Team, 82nd Airborne Division communicates using the JTRS Handheld, Manpack, Small Form Fit (HMS) Manpack Radio during a recent field exercise at Fort Bragg, NC. The Manpack's limited user testing, to include Soldier Radio Waveform, was part of the Network Integration Exercise at Fort Bliss, TX, and White Sands Missile Range, NM. (Photo by Ashley Blumenfeld, JPEO JTRS.)

# WAVEFORMS

An integral part of building the Army network

*by LtCol Brian Barton, USMC (Ret.)*

Joint Program Executive Office Joint Tactical Radio System (JPEO JTRS) is playing a key role in the Army's Network Integration Evaluation (NIE) this summer, providing the terrestrial network backbone.



“ THE WAVEFORMS ARE DESIGNED TO FIND THE BEST PATH FOR DELIVERING A PARTICULAR MESSAGE, MAINTAINING A CONTINUALLY UP-TO-DATE UNDERSTANDING OF NETWORK-NODE LOCATIONS SO THEY CAN ALWAYS DETERMINE THE BEST PATH. ”

The JTRS Handheld, Manpack, Small Form Fit (HMS) program’s Manpack element is undergoing its limited user test, to include JTRS Network Enterprise Domain’s (NED’s) Soldier Radio Waveform (SRW) during the exercise. JTRS’ HMS Rifleman Radio, Ground Mobile Radio, and NED waveforms are all vital components of the integrated testing conducted during the NIE.

The testing is designed to demonstrate how various systems, both programs of record and non-programs of record, fit into the Army’s tactical network and connect Soldiers at all levels. The JTRS NED SRW and Wideband Networking Waveform (WNW) provide the backbone of terrestrial connectivity for many of the systems being used during the final two weeks of the integration exercise. While SRW is targeted for the individual Soldier and individual small units, WNW

provides the backbone network connectivity between ground and air vehicles.

#### **DIVERSE MISSIONS AND TERRAIN**

These waveforms are operating under diverse mission scenarios that require mobile ad hoc connectivity over variable desert and mountainous terrain.

“SRW and WNW work very well in providing connectivity for dispersed forces,” said Navy CAPT Jeffrey Hoyle, JTRS NED Program Manager. “Both WNW and SRW are designed to be mobile ad hoc in nature, in that they don’t require a lot of preplanning for nodes to join and leave the network.”

NIE will demonstrate the ability of WNW and SRW to move voice, video, data, and images faster, farther, and more efficiently than legacy waveforms across the battlefield through ad hoc mobile networking.

#### **HMS RIFLEMAN**

A Soldier wears the JTRS HMS Rifleman Radio during a Rifleman Radio event at the Military Operations in Urban Terrain McKenna site, U.S. Army Maneuver Center of Excellence, Fort Benning, GA, Feb. 3. (Photo by Vince Little.)



### WIDEBAND WAVEFORMS

Soldiers carry handheld radios that can demonstrate the ability of wideband waveforms to move voice information farther and more efficiently than legacy waveforms across the battlefield through ad hoc mobile networking. (Photo courtesy of Program Manager JTRS Network Enterprise Domain.)

Both SRW and WNW, which can draw from a larger portion of the available spectrum, to transmit and have the ability to seamlessly route and retransmit information, Hoyle explained.

“The thing that is most important for throughput is the bandwidth that is available in the spectrum. The spectrum is a very finite resource, and the amount of bandwidth that is available will directly correlate to the amount of throughput that the network can support,” Hoyle said.

SRW is designed to efficiently use spectrum in 1.2-megahertz bandwidth allotments, he said.

WNW can also support 1.2-megahertz allotments, but it operates more efficiently and effectively at 3- or 5-megahertz bandwidth allotments (up to 30 megahertz when available) to deliver even higher network capacity, he added.

“The waveforms are designed to find the best path for delivering a particular message, maintaining a continually up-to-date understanding of network-node

locations so they can always determine the best path,” Hoyle said. “The power of the network is enhanced by increasing the number of nodes on the network.”

SRW is targeted for the individual Soldier and individual small units and sensors, such as the Small Unmanned Ground Vehicle.

“SRW is focused on delivering a network capability to those users that have tight size, weight, and power requirements. It packs a lot of networking into a very small package and allows that to be integrated into handheld radios, small hockey-puck-sized radios, and very small sensors, such as unattended ground or air vehicles,” Hoyle said.

WNW is intended primarily to provide the backbone network connectivity between ground and air vehicles, he said.

“It provides a lot of throughput capacity and has a lot of features and algorithms built into it because you have the size, weight, and power infrastructure of the vehicles,” Hoyle said.

### INTEGRATING CAPABILITIES FOR STRONGER NETWORK

JTRS NED also faces a new challenge during the NIE: WNW will be integrating with the satellite communications backbone Warfighter Information Network-Tactical for the first time.

The JPEO JTRS program has been a pioneer since its restructuring and stand up in 2005. Building the Armed Forces’ first software-defined radio forged new ground, addressing the technological questions of how to build and deploy these radios, as well as hardware and software integration and testing. The program is now on the cusp of delivering capabilities that will revolutionize the way the warfighter operates.

*LtCol BRIAN BARTON, USMC (Ret.), provides contractor test and evaluation support for the NED Program within JPEO JTRS through SRA International Inc. He holds a B.A. in sociology from Framingham State College and is a graduate of the Marine Corps Advanced Communications Officer Course and the Marine Corps Command and Staff College.*