

Better Waveforms, Better Value

Joint Tactical Networking Center incorporates better buying power by promoting competition with software-defined waveforms

by MAJ William Brickner

In mid-November 2012, the training areas of Fort Huachuca, AZ, bustled with DOD, Army and Navy acquisition professionals participating in the third Joint Tactical Networking Center (JTNC) Wideband Networking Waveform Performance and Interoperability Quick-Look, or WIQ 3. An Interoperability Quick-Look is a cost-effective risk reduction event providing non-developmental item (NDI) vendors a unique opportunity to port and host Joint Tactical Radio System (JTRS) waveforms on their platforms and undergo evaluation for JTNC waveform compliance, in advance of upcoming field exercises.

These tests were part of the final two phases of a three-phased approach to testing radios using the Wideband Networking Waveform (WNW) application from the government's JTRS Information Repository. (See Figure 1.) Incorporating a number of focus areas in the DOD Better Buying Power 2.0 initiative, WIQ 3 enabled waveform developers to leverage existing assessment activities, reducing nonproductive processes to help control costs throughout the waveform's life cycle and promoting effective competition among multiple software-defined radio vendors to drive down procurement costs.

Designed to enable more cost-effective capability growth by applying the concept of competition to an acquisition strategy, JTNC's business model—the reuse of government-owned software by multiple vendors—represents a paradigm shift for defense communications. It moves away from sole-source, stovepiped, proprietary systems to a highly competitive, interoperable networking environment. As LTC Mathew Guerrieri, the product manager for joint tactical network waveforms, noted, “The WNW Quick-Look and demonstration during Network Integration Evaluation (NIE) 13.1 reinforced the value that our evolving business model delivers to the warfighter and taxpayer by promoting effective competition with four industry partner radio platforms operating in the same network.”

“With government purpose rights software running on program-of-record and commercial software-defined radios throughout the battlespace, we all benefit from improved productivity and innovation in industry and government, ultimately leading to affordable programs,” Guerrieri added. WIQ 3 “assisted the development team by identifying areas for improving the software and by updating the JTNC stakeholder community on this capability's status and ability to provide timely value.”

FIGURE 1



BN – Battalion
CO – Company

JENM - Joint Tactical
Radio System Enterprise
Network Manager

OTA – Over the air
SRW - Soldier Radio
Waveform

TCP – Transmission
Control Protocol

WNW - Wideband
Networking Waveform

JTNC is taking a three-phased approach to testing radios using the WNW application from the government's JTRS Information Repository. The tests focus on a fully integrated and seamless tactical mobile communications system using SRW as the lower tier, WNW as the middle tier and Warfighter Information Network – Tactical (WIN-T) Net Centric Waveform as the upper tier. (SOURCE: JTNC)



GETTING THE BIG PICTURE

Michael Davenport, JRIL systems engineer, tracks communications during NIE 13.1 last fall at White Sands Missile Range, NM. The network transmitted voice, data and live video feeds, including text messaging from Soldiers on the ground at Fort Huachuca, AZ. (Photo courtesy of JTNC)

PROMOTING INCENTIVE, PRODUCTIVITY AND INNOVATION

The first phase of testing, conducted in September 2012 at the Space and Naval Warfare Systems Center Atlantic facilities in Charleston, SC, was a laboratory-based simulation to evaluate performance and interoperability. The second phase was

conducted at the U.S. Army Electronic Proving Ground (EPG), Fort Huachuca, AZ, with vendors providing radios for integration into a variety of vehicles and field evaluations of the WNW mid-tier networking capabilities. Phase 3 culminated with a two-day, over-the-air demonstration connecting communication nodes via a satellite link from EPG

to White Sands Missile Range, NM. That test coincided with the NIE 13.1 Distinguished Visitors Day demonstrations and marked the completion of the assessment of WNW's capability as a deployable mid-tier network.

This particular WIQ was planned, coordinated and executed by the Joint

Reference Implementation Laboratory (JRIL) test team in support of JTNC’s project manager for joint tactical networks (PM JTN).

ENABLING COMPETITION

Participation in the WIQ 3 provided several benefits for software-defined radio vendors. They had the opportunity to baseline the WNW hosted on their platforms and to provide a cost-effective risk reduction exercise linked to subsequent field events. The WIQ 3 also provided them with the chance to evaluate waveform application compliance and performance hosted on a radio platform in accordance with the WNW configuration package defined by the JRIL.

WIQ 3 also provided NDI industry vendors an opportunity in a field environment to participate in a simulated, battalion-size network architecture, demonstrating to DOD leadership and service acquisition planners the advantages WNW offers as a mid-tier networking waveform application in a stressed environment. The simulated network architecture was representative of the Army’s objective network architecture, while units at NIE 13.1 focused on the currently fielded bridge network architecture known as Capability Set 13/14.

WIQ 3 successfully demonstrated that WNW is capable of transmitting, distributing and receiving live video, data and voice over Internet Protocol packets from a tactical application while providing network “healing” (autonomous re-forming) relief from a fragmented Soldier Radio Waveform (SRW) company sub-network. WNW further demonstrated rerouting capabilities when an upper-tier access point was removed, forcing information from the battalion and company networks to direct to another upper-tier access point through the WNW network.

The use of multiple platforms in a single WNW network further demonstrates the JTNC business model.

REDUCING NONPRODUCTIVE PROCESSES

WIQ 3 also provided an excellent opportunity to demonstrate the mid-tier networking capabilities of WNW in a realistic environment, using architectures that meet current and future operational needs of Joint forces. During the WNW demonstration, distinguished visitors at a simulated battalion tactical operations center at White Sands were able to talk to and see nodes moving around the “battlespace” at EPG. In one scenario, the visitors viewed a live video feed from

the fictional “Alpha Company” commander’s vehicle while simultaneously receiving real-time situation reports from an engagement with suspected insurgents. Future test events will continue to serve as a forum to demonstrate new capabilities and assess the viability of WNW to meet the emerging needs of the warfighter.

“The continued use of the SRW and WNW Performance and Interoperability Quick-Look events based on the JTNC business model generates waveform software reuse to increase competition and interoperability while reducing total cost of ownership for defense communication networks,” said Brett Bendt, WNW RIL’s principal test engineer for WIQ 3.



COMMUNITY OF EFFORT

Dr. Richard North, JRIL director, describes how to achieve the battalion objective architecture, using a battalion WNW backbone, to a stakeholder during NIE 13.1 at White Sands Missile Range. (Photo courtesy of JTNC)



OPERATIONAL REALISM

A vehicle-mounted radio runs WNW as a mid-tier backbone network during a recent field test at EPG to demonstrate its utility in highly mobile environments with significant terrain impediments. (Photo by Barkley Galloway)

“In short, through events like these, the government can assess vendors’ progress in porting JTNC waveforms, while also learning how to make the waveforms more dependable and portable,” he said.

During WIQ 3, the team examined the ways in which NDI vendors were able to handle more advanced WNW functionalities in a multi-platform, networked field environment. Bendt added, “WIQ 3 provided the PM JTN with extremely valuable risk and cost reduction data through integrated testing. The event also demonstrated that WNW is a viable option for the Army’s mid-tier backbone network.”

CONCLUSION

Despite what the name suggests, WIQ 3 is not just a quick look but rather the first step in reviewing the performance, agility, security, cost and interoperability of software-defined radios operating JTN waveform products for eventual deployment with warfighters. JTNC will continue to execute interoperability quick-looks on all government-owned waveforms; the scope of testing will evolve to meet the changing requirements of the operational community.

(Author’s Note: The Department of the Navy selected Bendt to receive its 2012 Test and Evaluation Small Program Outstanding Tester Award for his efforts during the WIQ 3.)

For more information, go to www.jtnc.mil.

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