

***Expeditionary
Signal Battalion set
to do more with
fewer personnel***

Network architecture will provide greater flexibility

By Amy Walker

Forwarding observations of the dismounted Soldier up the chain of command in real-time will enable commanders to make quicker, more informed decisions, increasing the effectiveness of U.S. military forces.

"It's now being recognized, especially from an intelligence, surveillance and reconnaissance perspective, that the individual Soldier is really a sensor," said Matt Iannelli, senior systems engineer for the Program Executive Office Command, Control, Communications-Tactical

Technical Management Division. "To not have the Soldier as part of the network reduces the capability of the overall force."

During Operation Iraqi Freedom and Operation Enduring Freedom we have realized a need for communications systems down to the company level. More robust, dismounted, Soldier-based systems enable a Soldier to directly inject ISR observations into the command and control network. Data that Soldiers traditionally observed and reported after the fact will now be integrated into other networked systems in real-time, Iannelli said.

"The network represents the centerpiece of Army modernization," said GEN Peter Chiarelli, U.S. Army vice chief of staff, in a testimony to the House Armed Services Tactical and Land Forces subcommittee earlier this year. "Ultimately, it will connect leaders and Soldiers at all levels, at every echelon of command, in any formation, and across the entire team — with the right information quickly and seamlessly. In doing so, it will make our various formations more lethal, faster and survivable. It will literally redefine how we fight."

Pulling dismounts and vehicles into the fold

Recent conflicts have demonstrated the increasing need for rapid two-way flow of information from the commander down to the Soldier level and the Soldier up to the commander. Soldiers have learned that critical information flow begins at the lowest echelons.

In the future, dismounted Soldiers carrying a Joint Tactical Radio System Rifleman Radio or JTRS man pack for transport will instantly share information across the squad up through battalion echelons, as well as up the chain to higher headquarters when necessary.

Connecting the dismounted Soldier into the network
PEO C3T's Joint Battle



A Tactical Communications Node during the six-week Warfighter Information Network-Tactical Increment 2 Production Qualification Test-Government, which concluded on 5 August 2011 at Aberdeen Proving Ground, Md.

Command-Platform Handheld is a smart phone that can connect to JTRS as well as other tactical radios, said Jay Latham, a contracted systems engineer supporting PEO C3T TMD. JBC-P Handheld is the first developed under an Army effort to devise a smart phone framework and suite of applications for tactical operations.

“The Army and other services have bought a lot of different systems to meet specific operational needs, but the problem with most of those is they were designed to talk to themselves and they didn’t integrate into other systems,” said COL Buddy Carman, Training and Doctrine Command capability manager for Brigade Combat Team Mission Command. “A big step for us is to make sure that the data goes from dismounted leader to platform to command post.”

The JBC-P Handheld government-owned framework, known as Mobile/Handheld Computing Environment, ensures that regardless of who develops them, applications will be secure and interoperable with existing mission command systems. As a result, information will flow seamlessly across all echelons of the force. This highlights the overall direction for network applications programs which is to consolidate capability onto common hardware, a common operating environment, and commonly accessible databases.

As for Army vehicles at lower echelons, the strategy is to roll out a mix of celestial and terrestrial communications. Key leader vehicles will have both line-of-sight and satellite communications for more robust connectivity. Those that operate over larger areas or require relatively low bandwidth will have vehicles with SATCOM only. Those that need the higher bandwidth or



Photo by Ashley Blumenfeld

Paratroopers from the 3rd Brigade Combat Team, 82nd Airborne Division, use Joint Tactical Radio System Handheld, Manpack, Small Form Fit radios and prototype Joint Battle Command-Platform handhelds to communicate during a field exercise at Fort Bragg, N.C., in March.

need to integrate very tightly with dismounted Soldiers will be fielded with LOS terrestrial radios. JTRS radios will be used in vehicular configurations, with Blue Force Tracking 2 serving as the SATCOM component, Latham said.

On-The-Move Network Communications

On-the-move communications is another important facet of the Army’s future network architecture. PEO C3T’s Warfighter Information Network-Tactical Increment 2 will bring mobility to the Army’s tactical network. Similar to a home Internet connection, WIN-T

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provides high-speed, high-capacity voice, data and video communications on the battlefield. By establishing a moving communications grid, Increment 2 eliminates the need to stop in order to communicate, increasing speed of maneuver on the battlefield and allowing commanders to stay connected at all times. WIN-T’s initial production deliveries are currently undergoing a series of pre-fielding tests and evaluations and are expected to reach the first unit in 2012.

“Army senior leadership has recognized that the cornerstone of modernization is the network, and WIN-T Increment 2 delivers that high capacity network on-the-move,” said LTC Robert Collins, product manager for WIN-T Increment 2. “Its fielding will be a significant milestone as we deliver the next-generation network that will transform how the Army operates and conducts its operational missions, both at-the-

(Continued on page 32)

The Future Signal Corps



Photo by Claire Schwerin

Warfighter Information Network-Tactical equipment is pictured on 26 Oct 2011 at White Sands Missile Range, N.M., in preparation for the Army's Network Integration Evaluation 12.1 on 31 Oct. Second from the left is a WIN-T Increment 2 Tactical Communications Node.

(Continued from page 31)

halt and now on-the-move, all the way down to the company level. It's a major step."

Traditionally, the WIN-T network has been at the battalion level and above, but the Soldier Network Extension of Increment 2 will now extend that network down to the company level. In the past, terrain features often fractured the radio component of the network, but the SNE has the capability of healing the network using SATCOM as an alternative. With the SNE extended down to the lower echelon radio nets, such as the Wideband Networked Waveform, Soldier Radio Waveform, Enhanced Position Location Reporting System and Single Channel Ground and Airborne Radio System, radios can now "touch" the WIN-T network

backbone, increasing the scope of the Army's entire communications network.

Aerial Tier thickens Army's network

An aerial tier will thicken the Army's network, providing increased capability to almost everyone within its footprint. If units lose LOS access in today's architecture, they revert to SATCOM, which can come with high bandwidth/operator cost as well as more limited capability. But with the addition of the aerial tier, geographically separated units, previously interconnected only via SATCOM, are able to be more tightly integrated through a higher capacity, lower latency, noncommercial tier, which does not present the recurring costs of satellite bandwidth to the Army, Iannelli said.

An aerial tier helps with connectivity when forces are dispersed over relatively large areas of operation, or when operating in complex terrain. An aerial tier uses tethered aerostats or unmanned aerial systems to elevate radios/antennas thousands of feet above ground, thus greatly extending the range of terrestrial radios. "The radios/antennas share space on aerostats and UASs that are already in place for ISR purposes," Latham said. "The use of an aerial tier also helps to reduce the demand on heavily oversubscribed satellite systems."

Company Command Post

Traditionally, the company has had minimal fielding of communications and network equipment, and what has been fielded has not been standardized. The CoCP initiative standardizes

the core communications capability available at the company echelon, enabling other programs to build upon it. The CoCP provides company commanders effective situational awareness, allowing them to better plan and execute operations, understand the current situation and effectively visualize, describe and direct subordinates.

Company intelligence and surveillance teams will be among those taking advantage of the CoCP and building upon its existing architecture, Iannelli said. Cooperative tactical infrastructure collapse

During the last 10 years the Army has exponentially increased capability, but it has also introduced a great deal of complexity. Although the future focus will remain on increasing capability, it will be accomplished with a reduced complexity and equipment footprint to allow the Soldier to focus on the mission and not the network, Iannelli said.

As a paradigm, the conflicts in Iraq and Afghanistan have forced the Army to stop thinking of C3T and ISR as separate entities and as a result the acquisition community is changing. Currently there is a cooperative effort between PEO C3T and PEO Intelligence, Electronic Warfare and Sensors to collapse servers where appropriate. Consolidating tactical server infrastructure and unifying tactical solutions will enable the PEOs not only to collapse their own servers within their own locations but to use each other's virtual server environment when needed.

"At this point C3T and ISR are very much tied at the hip in terms of the network and the systems architecture," Iannelli said. Flexibility and nimbleness

In line with the Army's modernization strategy, the

brigade level has become more modular, with a more flexible organizational structure allowing them to be task-reorganized seamlessly across the force.

However, counterinsurgency operations in OIF and OEF have highlighted gaps in current force capabilities, specifically at lower echelons. In today's counterinsurgency conflicts, companies and in some instances even platoons are being task-reorganized to other units, but the communication architectures for the current force are not designed around those concepts of operations, Iannelli said.

"It's been identified by Army leadership that the forces need to be able to affect change imminently and immediately to suit mission," Iannelli said.

One of the underlying elements of the future architecture is flexibility for the commander. Today, the initialization of systems is very rigid and there is a strict process

in standing up a network. It is also difficult to make changes once the network is stood up. To move a company from one brigade to another requires a great deal of reconfiguration to accommodate its new network. However, in the future many of these rigid processes vanish by nature of the architecture, Iannelli said.

"It doesn't serve a frenetic operational environment where you may need to change your entire network architecture to suit mission," he said. "Instead of the brigade as a puzzle piece today being moved through a division or corps architecture, you will soon be able to see a battalion or company element puzzle piece being moved just as nimbly through the greater Army."

Amy Walker is a staff writer for Symbolic Systems, Inc. supporting the Army's Program Executive Office Command, Control and Communications-Tactical.

ACRONYM QuickScan

COIST - Company Intelligence and Surveillance Teams
CoCP - Company Command Post
EPLRS - Enhanced Position Location Reporting System
ISR - Intelligence, Surveillance, Reconnaissance
JBC-P - Joint Battle Command-Platform
JTRS - Joint Tactical Radio System
LOS - Line-Of-Sight
OEF - Operation Enduring Freedom
OIF - Operation Iraqi Freedom
OTM - On-The-Move
PdM - Product Manager
PEO C3T - Program Executive Office Command, Control, Communications-Tactical
SATCOM - Satellite Communications
SINCGARS - Single Channel Ground and Airborne Radio System
SNE - Soldier Network Extension
SRW - Soldier Radio Waveform
TMD - Technical Management Division
UAS - Unmanned Aerial Systems
WIN-T - Warfighter Information Network-Tactical
WNW - Wideband Networked Waveform