Joint IP modem providing efficient on-demand bandwidth for robust networks

By Stephen Larsen

The requirements of net-centric warfare and operations for robust networks, information sharing and collaboration has led the U.S. military to increasingly transition to using Internet Protocol-based products over both government and commercial satellites.

To date, U.S. military satellite communications systems utilizing IP over SATCOM include, among others, the Army's Warfighter Information Network-Tactical Increment 1and Combat Service Support SATCOM; the Marine Corps' Support Wide Area Network; the Air Force's Global Broadcast Service; and the Navy's Commercial Broadband Satellite Program.

However, these and other similar systems, all utilize different proprietary modems. According to officials at the Defense Information Systems Agency, there are many different modems in the DoD inventory, each requiring its own logistics support. The proliferation of non-standard modems also presents issues regarding interoperability, efficient use of bandwidth and transmission security.

Help is on the way, through the Joint IP Modem, which will soon become the DoD's standard IP modem, based on the widely-adopted Digital Video Broadcasting-Satellite 2nd Generation and Digital Video Broadcast-Return Channel Satellite standards. Managed by the JIPM Program Office of the DISA with the Defense Communications and Army Transmission Systems project office, part of the Army's Program Executive Office Enterprise Information Systems, serving as the acquisition agent, JIPM underwent qualification testing from 7 - 17 Dec. 2010 at the Joint SATCOM Engineering Center at Fort Monmouth, N.J.

JIPM passes qualification testing

According to Johnny Ng, DCATS' JIPM project leader, testers utilizing JIPM successfully passed network traffic via Defense Satellite Communications System and Wideband Global SATCOM military satellites and a Telstar 14 commercial satellite in the X, Ka, and Ku bands. Also, he said, the JIPM Network Control Center, a two-rack hub, successfully broadcasted and received traffic from multiple remote modems (RMs), each of which are housed in a 1U-sized (1.719 inches or 43.7 mm) chassis.

"JIPM works in a hub-spoke configuration, similar to Direct TV," said Ng. "With JIPM, one signal goes up from the hub to the satellite and spreads to many other remote modems (the spokes) around the world."

Ng said JIPM testers demonstrated both unicast (host to host) and multicast (one host to a specific set of hosts) operations utilizing 11.58-meter AN/GSC-39 terminals and 2.4-meter tactical very small aperture terminals to transmit at X-band, the 9-meter Ka Satellite Transmit and Receive Systems (KaSTARS) AN/GSC-70 terminal to transmit at Ka-band and a satellite simulator to transmit at C-band.

Art Reiff, a SATCOM consultant with DCATS, said JIPM uses satellite bandwidth much more efficiently than prior types of modems.
"Prior modems would stream data over a channel, and had a slot on a satellite whether they needed it or not, which is very inefficient," said Reiff. "Now, JIPM only requests use of satellite bandwidth when it needs it and otherwise it gives up the slot for others to use, which is very efficient."

"In addition to much more efficiently utilizing costly satellite resources, JIPM will extend the 'everything-over-internet-protocol' paradigm to users throughout the Global Information Grid," said COL Jeff Mockensturm, project ,anager, DCATS.

Ng said that JIPM is unique among modems in that it employs internal TRANSEC that has been certified to comply with the National Institute of Standards and Technology Federal Information Processing Standard 140-2.
DCATS is acquiring JIPM, said Ng, via an $87 million delivery order awarded in Oct. 2007 on the World Wide Satellite Systems ID/IQ contract from prime contractor Globecomm Systems Inc. of Savage, Md., with ViaSat Inc. of Carlsbad, Calif. serving as the major subcontractor. The

first deliveries, said Ng, will be of JIPM Network Control Centers in early 2011 to various DoD Teleport and Standardized Tactical Entry Point sites.
The first deliveries of remote modems, he said, will be in April 2011 to Hanscom Air Force Base, Mass., followed by deliveries in June 2011 and July 2011to the Navy in Charleston, S.C. and Norfolk, Va..
Ng said that the version of JIPM that just completed qualification testing could only be the first stage of an evolving standard IP infrastructure that will continually grow to serve future warfighter needs.
"The project team is considering future JIPM enhancements such as dynamic routing, improved encapsulation and mesh network architectures and exploring remote modem packaging options to accommodate ground-mobile, shipboard, and airborne platforms," said Ng.

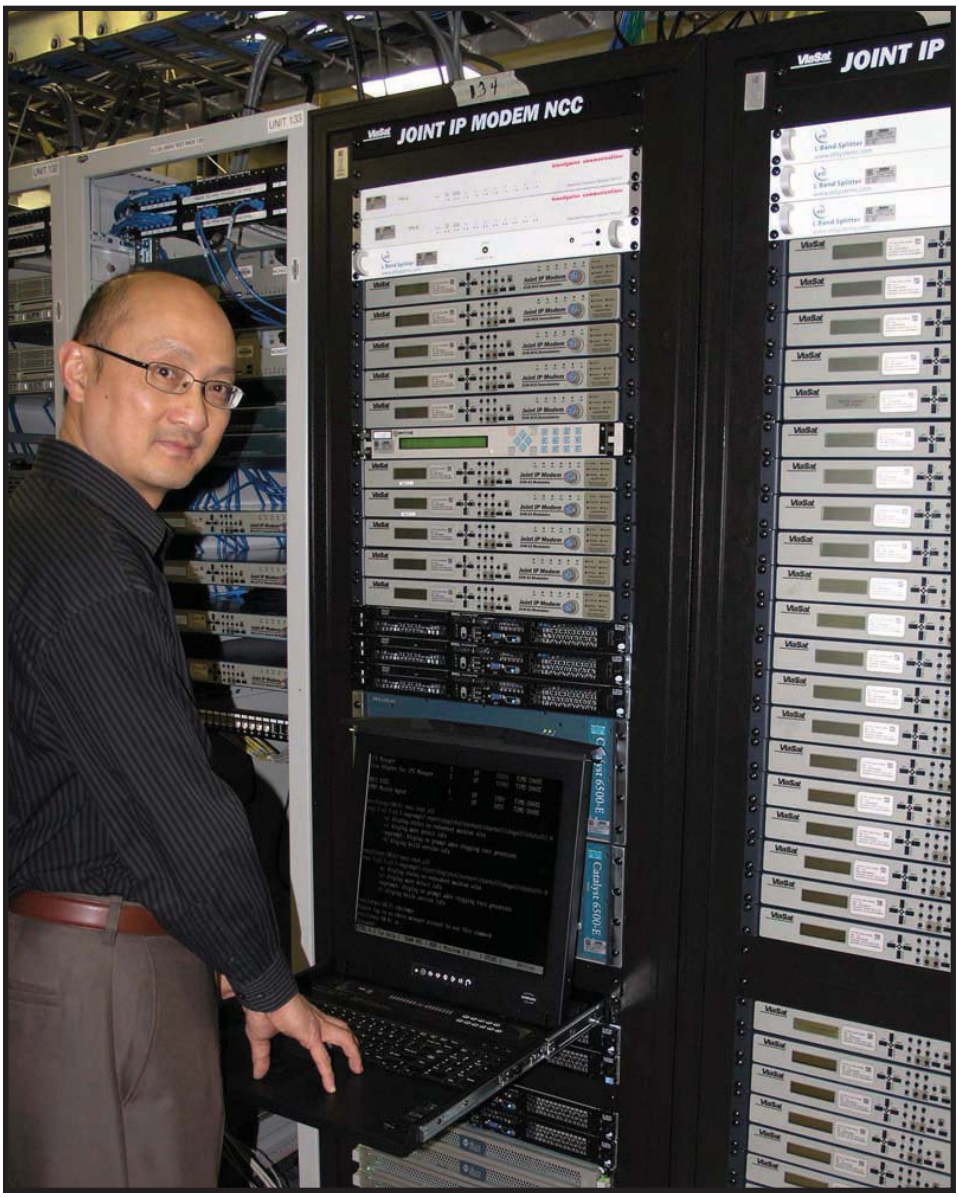

Photo by Stephen Larsen

Johnny Ng, Joint Internet Protocol Modem product leader with the Defense Communications and Army Transmission Systems Project Office, checks out JIPM Network Control Center during recent qualification at the Joint SATCOM Engineering Center at Fort Monmouth, N.J.

Acronym QuickScan

CBSP - Commercial Broadband Satellite Program
CSS - Combat Service Support
DCATS - Defense Communications and Army Transmission Systems
DISA - Defense Information Systems Agency
DVB-S2 - Digital Video Broadcasting-Satellite 2nd Generation
DVB/RCS - Digital Video Broadcast-Return Channel Satellite
EOIP - Everything-over-internet-protocol
FIPS - Federal Information Processing Standard
GBS - Global Broadcast Service
GIG - Global Information Grid
GSI - Globecomm Systems Inc
IP - Internet Protocol
JSEC - Joint SATCOM Engineering Center
JIPM - Joint IP Modem
KaSTARS - Ka Satellite Transmit and Receive Systems
NIST - National Institute of Standards and Technology
SATCOM - Satellite Communications
STEP - Standardized Tactical Entry Point
SWAN - Support Wide Area Network
TRANSEC - transmission security
VSAT - Very small aperture terminal
WIN-T - Warfighter Information Network-Tactical
WWSS - World Wide Satellite Systems