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Border Security Applications and Solutions

October 26, 2007

By Lindsay A. Gross

MeshDynamics recently designed a series of fixed-location MD4000 mesh nodes that provide connectivity to additional MD4000 mobile-mesh nodes in security vehicles where border agents may access a variety of applications. The network consists of both fixed and mobile nodes operating at both 5.8 GHz and 2.4 GHz using 802.11a and b. The fixed nodes are located on towers along the border and some are deployed with sectored antennas for long-distance connections. Backhaul node-to-node distances range up to 14.4 miles, although most are in the 3- to 4-mile range.

Some of the wireless mesh sites are so remote that there is no AC power supply, so solar arrays, wind power, and batteries power the equipment. Specialized support in the nodes for long-distance 802.11 connectivity allows links to operate at up to 54 Megabits per second (Mbps), according to company executives.



The DHS created a task group to provide cross-border communications interoperability by connecting communications centers in the United States and Mexico. Photo by Gerald L. Nino

The mobile nodes are mounted in security vehicles and provide connectivity to agents' data terminals. Each mobile-wireless mesh node includes a scanning radio, which allows the connectivity for security applications.

"Over many hops, only third-generation (3G) architectures provide enough bandwidth with low jitter and delay at the distant end of the network," says Francis daCosta, founder and chief technology officer (CTO) of MeshDynamics. "But most 3G solutions depend on fixed-link and channel configurations. The border network's high-speed mobility requirement mandates more channel management and topology intelligence in each mode."

The pilot network was recently expanded since its production deployment in January 2006, and future phases will include wireless connectivity to agents' PCs and PDAs. The solution provides a foundation for the expanding border-security applications, executives say.

Harris

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Pandata Corp
RadioResource Media Group
7108 S. Alton Way, Building H
Centennial, CO 80112
(T) 303-792-2390
(F) 303-792-2391
www.RRMediaGroup.com
www.MCCmag.com
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The Harris Border Security Shelter links information and communications technologies used to detect illegal border crossings or other threats to national security, increasing the flow of information and speeding up response times, according to Harris officials.

The shelter is a rugged, self-contained field command center that combines communications, command and control, and sensor systems under one roof. From these locations, force personnel can monitor border areas using ground radar and unattended sensors or video cameras; communicate to the field and commanders using tactical, microwave, and satellite radio; and send and receive e-mail, images, and other forms of media, officials say.

The shelter provides an IP-data backbone for receiving, synthesizing, and re-distributing various forms of transmissions and can be permanently installed at fixed locations or rapidly deployed to special areas of operation, officials say. Multiple shelters can be deployed and linked to form protective networks.

Selex

The U.S. Army National Guard Joint Task Force Texas (JTFTX) selected the AN/PRC-343 personal role radio (PRR) as the intra-squad radio for communications along the southern U.S. border.

"The National Guardsmen who are securing our borders need a reliable, capable communications that is undetectable to the modern coyote (human trafficker)," says Wesley Gilson, president and general manager of Selex Communications. Now that the PRR has advanced encryption standard (AES) encryption, wireless links to U.S. vehicle intercoms, and compatibility with the Motorola XTS series radios used for longer-range applications, soldiers will be able to "communicate quickly and leave no guardsmen without communications capability," Gilson says.

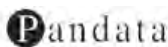


A border patrol agent uses an automated fingerprint recognition system to process an individual who entered the U.S. legally. Photo by James Tourtellotte

The AN/PRC PRR is a digital, encrypted tactical radio that fits in a shirt pocket. Its form is compatible with ACU sleeve pockets and current issue individual body armor (IBA) via the Molle-compatible pouch. It uses advanced low probability of intercept (LPI) and low probability of detection (LPD) waveforms that simultaneously transmit and receive voice and data — and is compatible with all current U.S. Department of Defense (DoD) issue radios, Selex officials say. The unit has a wireless, patented push-to-talk (PTT) button to place on a soldier's weapon and uses two AA alkaline or rechargeable batteries for low logistical impact and cost ownership.

Lindsay A. Gross is managing editor of *MissionCritical Communications* and *RadioResource International*. Contact her at lgross@RRMediaGroup.com. For a full article on the latest developments in border security policy and technology, including the Department of Homeland Security's latest action plan, see the November/December issue of *MissionCritical Communications*.

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