

Effective response to emergencies such as hurricanes or terrorist attacks depends on public safety agencies being able to communicate. Georgia Tech is helping the state of Georgia build a statewide interoperable communication system.

Photos: Gary Meek



GTRI researchers Les Smeed and Jay Sexton, above, inspect a satellite antenna system used by a mobile communications unit of the Georgia Interoperability Network. The GTRI interoperability network team, below, poses with a mobile unit.



Georgia Interoperability Network:

Georgia Tech Helps Craft a Swift, Sure Emergency Network

By Rick Robinson

Disasters like the 9/11 attacks and Hurricane Katrina have underscored the importance of emergency communications in the United States. The survival of thousands can depend on flexible, robust networks that can quickly connect police and other first responders throughout an affected area.

In cooperation with the Department of Homeland Security (DHS), the Georgia Emergency Management Agency – Homeland Security (GEMA) is developing a statewide system that will connect existing radio communications systems in most Georgia counties and certain state agencies to an Internet protocol (IP)-based network. The resulting Interoperable Communications System will even reach into some neighboring states, and it already includes satellite-capable mobile communications units that can travel to stricken areas.

Engineers from the Georgia Tech Research Institute (GTRI) are participating in the far-reaching venture as part of a team that includes GEMA, the Georgia State Patrol, Motorola, the Georgia Technology Authority, AT&T and SpaceNet. GTRI engineers have been sup-

plying organizational design and testing services to the undertaking – called the Georgia Interoperability Network (GIN) Project – since it began in 2005.

“Not surprisingly, this project has been challenging from both an organizational and a technical standpoint,” says Douglas Cobb, a GTRI principal research engineer. “By the time we finish Phase Four in mid-2009, our GTRI team will have met and worked with nearly all of Georgia’s 159 counties in one way or another.”

The Georgia Interoperability Network is not an upgrade to existing public safety wireless communications. Rather, it’s an add-on that connects existing radio equipment to an adaptable IP backbone statewide.

Cobb, who leads the GTRI technical project team, explains that when the network is complete, Georgia public safety personnel will be able to contact colleagues in other counties almost instantly using their own native radio systems. The network will link the radios of different counties regardless of their technology, which could be VHF, UHF, 800 megahertz, iDEN or others.

While communication between neighboring locales is usu-

ally the most vital, Cobb explains, a major emergency could require extensive conferencing among field and headquarters personnel in various counties. The interoperability system can easily connect any number of officers and managers in wide-ranging departments with first responders in the field.

“During emergencies, many kinds of situations can come up, including some that no one even anticipated,” Cobb says. “Those are among the things for which the interoperability project is designed.”

There are many examples of emergency communication needs, he says. One that’s occurred in recent years involves hurricane evacuations. Police and fire/rescue personnel along an interstate evacuation route must be able to talk to their counterparts up and down the crowded corridor to check conditions, set up detours or call in aid.

In the past, mobile units like police vehicles could communicate when they moved out of their own system’s radio coverage. But the process was cumbersome, involving the need to switch to special “mutual aid” channels. Often, first responders aiding another county

had to borrow some of the host county's radio equipment to enable communication.

By contrast, the new interoperability system can connect any elements in the system quickly, thanks to the reliability and flexibility of Internet technology. Using Microsoft Windows-based custom software, county and municipal dispatchers will employ a familiar drag-and-drop interface to seamlessly connect wired and/or wireless users to conference calls whenever needed.

The Georgia network is also expected to extend in varying degrees into neighboring states, including Alabama, Florida, South Carolina and Tennessee.

The Georgia Interoperability Network uses a radio gateway unit to connect a county's radios to the statewide IP backbone. In some cases, engineers must design a custom interface to connect an existing radio setup to the backbone successfully.

On behalf of GEMA, GTRI is serving as the technical systems integrator and project manager for the Georgia Interoperability Network. The job includes major responsibilities in site, network and satellite design; simulation and testing; facilitating meetings and information

exchange, and extensive trouble-shooting.

GTRI's experience in designing communications for the U.S. Department of Defense, GEMA and others is allowing its engineers to develop individual county-specific interoperability solutions. One pervasive issue involves the fact that Georgia counties use a variety of mobile systems and radio frequencies.

In one instance, GTRI engineers assisted Motorola in its design of a custom two-wire / four-wire hybrid setup to bring certain local mobile-radio systems into the network. In another case, GTRI used its satellite-design expertise to develop requirements specifications, assist in satellite-vendor selection and test the GIN system's mobile communications units.

When complete, the network should be a model of speed and transparency, Cobb says. Robust connectivity hardware and software and the use of Internet technology will give the state an excellent communications network.

"The first time I ever saw this system, someone was talking on a radio in Atlanta to a radio in Tel Aviv, Israel," he recalls. "Distance just doesn't make any difference with this technology." **rh**

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- Douglas Cobb, a GTRI principal research engineer

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John Cobb, left, tests the low-band radio system in a Georgia mobile communications unit, while Doug Cohen adjusts the unit's satellite system.

