First in the Nation

Pioneering 700 MHz broadband data network puts leading-edge tools in the hands of public safety personnel in the District of Columbia.

Any high-school kid with a cell phone can download video, get information from Web sites and stay in touch via text with a widely scattered network of peers. But a first responder working on the typical public safety radio network can't do any of these things — or at least not well. Although wireless broadband offers great potential for emergency services, agencies have lacked the reliable, dedicated infrastructure required to support bandwidth-hungry, mission-critical applications.

That's all about to change as the District of Columbia goes on line with the proposed launch of the nation's first 700 MHz broadband data network for public safety. The Regional Wireless Broadband Network (RWBN) will give police, firefighters and other district emergency personnel a host of new capabilities — from filing reports and exchanging text messages in the field to feeding video of an incident in progress to a command post. Complementing the voice capabilities of their land mobile radio (LMR) systems, the new network enables a powerful new set of tools for public safety personnel.

Moreover, this pioneering network will demonstrate the public safety capabilities that are possible with high-speed wireless data applications.

"By deploying this network, we'd be able to prove a model — that IP communication for public safety works. It would be reliable, and there's a demand for it," said Vivek Kundra, Chief Technology Officer of the District of Columbia.

The National Capital Region chose Alcatel-Lucent through a competitive process to build the RWBN using 1x Evolution-Data Optimized (1xEV-DO) Revision A equipment. This is the latest version of the same technology used in commercial CDMA wireless networks. It offers the ability to transmit video, data and IP-based voice with peak speeds of nearly 3 Mbps.

Although public safety agencies have long used their private LMR networks to transmit data, transmission on those networks is notoriously slow, with data rates measured in the tens of kilobytes per second. Some departments have used commercial wireless services or municipal Wi-Fi networks for wireless broadband data applications. While those solutions offer greater peak speeds, they force public safety officers to compete with other users for bandwidth, or they demand that users stick close to Wi-Fi hotspots to send and receive data reliably. For communications in an emergency, that's not acceptable.

The Federal Communications Commission (FCC) has allocated spectrum in the 700 MHz band exclusively for public safety broadband data networks. In August 2007, it proposed giving public safety users top priority on a second block of spectrum in that band, with service there to be provided nationwide by a single, commercial provider that will win the spectrum at auction.

First of Many?

The FCC, the wireless industry and the public safety community are still working out the details of this plan. In the meantime, the District of Columbia (District) is in the process of obtaining a Special Temporary Authority (STA) to authorize operational use of the network.

"Instead of downloading a music video, they might download plans for a building that's on fire, upload patient information or download fingerprint data," said Mike Iandolo, president of Alcatel-Lucent's CDMA/EV-DO business division. "File transfers

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would now be measured in seconds instead of minutes." And because the network is optimized for public safety, their data will always go through.

In the National Capital Region, 18 other jurisdictions are considering deploying the same network as the District, purchasing equipment under an amended version of the contract with Alcatel-Lucent.

Implementing the network across the area would provide much-needed interoperability for data, voice and video communications, said Kundra.

By building EV-DO networks, public safety agencies benefit from all the research, development and standards-making activities that have driven the evolution of wireless broadband products and services. They also gain an opportunity to help shape future generations of the technology.

"They can join this global commercial technology ecosystem and no longer be on a technology island," said Iandolo.

Survival of the Fittest

In addition, agencies benefit from the economics of the commercial marketplace, where developers of wireless devices spread their costs over tens of millions of users in the United States alone, and market forces favor the customer.

"We wanted to bring in what I call the Darwinism of the commercial market — where competition is intense and services tend to be a lot better — and apply those lessons to the public safety infrastructure," Kundra said.

With 12 base stations, the new network covers more than 95 percent of the District. Initially the District would deploy 1,500 end-user devices, mostly in the form of wireless cards to be installed in ruggedized notebook computers.

"We're also looking at mobile applications such as PDAs [personal digital assistants] with integrated cards," Kundra said. The District might also use the network to deploy IP-based surveillance cameras, which it could move from one location to another as needed, he said.

Although the District is just getting the RWBN up and running, it already has experienced the benefits of a dedicated 700 MHz network. Since January 2005, the District has operated a pilot broadband system called the Wireless Accelerated Responder Network (WARN), with approximately 250 end-users. If launched, the RWBN would allow the District to decommission the WARN infrastructure, and all users would then move onto the new network, Kundra said.

The pilot network proved the business case for a network like the RWBN, he said. "We found out that giving first responders access to some of these devices allowed them to better communicate amongst themselves."

It also gave users greater flexibility, providing a broad range of Web-based applications that previously weren't available in the field. "No longer do you have to have proprietary technologies that are tied down to a mobile data terminal or a radio," Kundra said. "Now you're able to bring them the power of the Web and the ubiquity of the network. It's an amazing intersection where you're able to provide first responders with the same technologies that consumers have at their fingertips — which, incidentally, have evolved much faster and better, just because of the economics and the market pressures, than vertical technologies in public safety."

Applications that the District expects to implement on the network will allow personnel to exchange e-mails and send reports from the field; collaborate with peers in other jurisdictions using text and IP-based voice communications; transmit live video from an incident to a command post; and more. "There are countless applications," Kundra said. And agencies won't save them just for emergencies. "My goal is to make sure those applications are part of the first responders' day-to-day operations, so that if an incident does happen, we're not introducing new technology on top of all the other issues."

As public safety agencies contemplate the rollout of 700 MHz broadband, the District's network offers a test bed for future applications and an example of how to implement successfully, Kundra said. "Whoever wins the spectrum can look at this as a model."