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## First of Its Kind



Friday, October 18, 2013  
Carl Oldberg

Lt. Shawn Fischer and Sgt. Chris Rymer of the Baytown (Texas) Police Department busily prepared two department vehicles to demonstrate the city's new public safety 4G LTE communications system at the most recent Houston Ship Channel Security District annual meeting.

The Baytown vehicles are part of the Harris County, Texas, 4G LTE public safety countywide communications network, the first system of its type in the U.S. Baytown is the first city in the county to actually deploy the system on the street. Designed, manufactured and deployed by Motorola Solutions, the countywide system eventually will tie together county law enforcement, fire department, EMS providers and school districts into a sophisticated interoperable wireless broadband communications network.

Those attending the conference were anxious to see the system in action. The Baytown installation marks the first step in the deployment of the countywide system that will heighten security along the county's economically critical 52-mile Houston Ship Channel. The Security District also has helped fund the system deployment.

Public safety officials nationwide have been closely monitoring the system roll-out. Most

believe it will be a model for their own jurisdictions and the developing national public safety wireless broadband network called FirstNet.

For Fischer and Rymer, the event was a chance to demonstrate what the system really can do.

"Three factors make this system a big deal—speed, streaming video, and the way it has transformed my vehicle into a mobile office," Rymer says.

How fast? "A mug shot that used to take 10–12 minutes to download with our former data system is now on my screen in 3–5 seconds," Rymer says. "Speed increases safety for everyone—first responders and residents."

Streaming video clearly is an equally dramatic system feature, he adds. Thanks to broadband technology, first responders can view video from an emergency scene as they race there, watch archived video of the incident scene, and relay video back from the scene in real time for anyone involved to view. Bottom line: The 4G LTE technology puts relevant information within arm's reach.

"Web-based capabilities mean a police officer can file charges through JIMS (Justice Information Management System) right from the car," Rymer says. "We can access driver's license servers from the Texas Department of Public Safety in Austin and retrieve drivers' photographs. We no longer are limited to applications specifically designed for mobile data terminals."

The system delivers all this information with the reliability first responders require. The system's network is hardened for 24/7, "always on" use. System redundancy ensures that it will function as required even in disaster situations.

With all of this capability, some might think that learning to use it well could be overwhelming. Rymer: "The system provides all of these capabilities in a user-friendly manner. No need for an IT degree to understand and use it."

## **State, County Drive System Vision**

Harris County and the Texas Department of Public Safety have been evaluating 4G LTE technology for some time. That work resulted in a common vision that has fueled the Harris County implementation.

"What we are driving toward is an environment where highly relevant information will be quickly sorted and presented to first responders in a rapidly absorbable format, and allowing for instant collaboration with other responders," says Todd Early, Deputy Assistant Director for DPS Law Enforcement Support Division. "Harris County is at the forefront and will help identify issues and set the direction and processes that work."

Harris County Sheriff Adrian Garcia first began evaluating the technology when he served in the Houston City Council as chair of its public safety and homeland security committee. He was elected sheriff in November 2008 and formally assumed the office in January

2009.

"Harris County faces all the factors that make a sophisticated, interoperable and reliable public safety communications system vital—a large resident population (third largest in the U.S.), severe weather (think Hurricanes Katrina, Rita and Ike) and the constant threat of terrorist attacks at the huge petrochemical facilities in the county," the sheriff says.

"These realities required that we be visionary, bold and collaborative in finding solutions that would enable first responders to sleep a little sounder," the Sheriff adds. "This system is proving to be an incredible added benefit for first responders. It may be the difference between solving crimes and saving lives or not," Garcia says.

For Harris County Chief Information Officer Bruce High and his team, the challenge was to translate the system vision to reality. The goal was to use the 4G LTE technology to develop a system that incorporated voice, video and data to deliver a new level of situational awareness.

"One of the challenges we always have had is getting data in the hands of the people who need it," High says. "Public Safety 4G LTE has given us the capability to set priorities during an emergency and make sure those first responders out in the field facing an issue have everything they need to make decisions in a timely manner."

Although the county system is still taking shape, the information that it can capture and relay already has proved impressive.

"We can stream videos that we never thought of," High says. "We have the capability to watch incidents in progress and even see the perpetrators leaving the scene. We can perform live line-ups at the scene. We can relay vital information on sites including what may be stored there or who may live or work there."

The public safety network also gives the county the system capacity to easily add new features in the future, according to Robert Cavazos, Harris County Director of Broadband Services. County officials already are identifying prospective capabilities.

"Telemedicine is one of those areas," says Cavazos. "The medical support this would make possible at any scene obviously would be invaluable."

Cavazos says the system ties the county's substantial existing Land Mobile Radio (LMR) Project 25 network into the LTE system. The standards-based, interoperable Motorola Astro 25 LMR network currently includes some 80,000 radios.

"A push-to-talk (PTT) gateway between the two has been operational for more than a year and allows first responders on either system to talk with each other," he says.

With this new level of capacity and interoperability, Cavazos says the county can better focus its public safety resources no matter what the emergency may be.

This capability will be a vital link for County Judge Ed Emmett, the county's top elected official. In this role, he heads the county's Office of Homeland Security and is director of

emergency management. "This system will serve as Judge Emmett's 'eyes and ears,' in the county," High says.

The information available to Judge Emmett will help him make countywide time-sensitive decisions ranging from resident evacuations to responses to plant explosions to weather to terrorist attacks, says Doug Adkinson, criminal justice advisor to the judge.

## Installation, Deployment Begins

Harris County began the design of its countywide system in 2010. Actual hardware installation began in 2011. The system is licensed by the Federal Communications Systems (FCC) to the Texas Department of Public Safety.

Funded through grants from the U.S. Department of Homeland Security coupled with matching funds from the Houston Ship Channel Security District, the county has invested approximately \$11 million in this system to date.

"When looking for an LTE broadband solution, we took the same approach as we did when looking for a public safety land mobile radio solution," says Cavazos. "We wanted a standards-based, reliable solution designed for the special mission-critical needs of public safety. The fact that the LTE solution integrates with our existing P25 LMR network was an important consideration."

The county contracted with Motorola to supply equipment for the system core and its first 13 system sites. The system core is the hub of the system with servers and system gateways.

In addition to the core site hardware and software, Motorola also has provided:

- Real-time video intelligence software to capture and relay live video to and from stations, vehicles and hand-held devices.
- VML 700 vehicle modems, mobile workstations and in-car digital video systems that will enable personnel to record audio and video evidence at an emergency scene. Future hardware plans call for the addition of LEX700 mission critical hand-held radios.
- Broadband push-to-talk software and servers to provide increased PTT capabilities between the LTE and P25 Digital LMR networks.

The company's experience with 4G LTE technology, particularly system cores, and its 4G LTE product portfolio, proved a good fit with the county's system goals. "Our specific experience in spectrum prioritization and streaming video enabled us to not only provide a system that has performed as the county required, but also meet the county's design, testing and deployment timetable," says Eddie Fuerst, Motorola vice president, North American Government Markets.

## Baytown Starts Deployment

Harris County and Baytown agreed in October 2010 that the city would be the first to test and deploy the system. Baytown has been a client of the county's P25 digital trunked radio system for years.

For the county, Baytown provided an ideal location to begin. It sits right on the Houston Ship Channel. In fact, the largest petrochemical facility in the United States surrounds Baytown City Hall.

For Baytown, the timing of the test and deployment was especially attractive. The city's outdated data system no longer could meet the city's growing needs. Given the importance of data generally, the interoperability requirements of the national public safety wireless broadband network, state mandates for a dedicated public safety network and regional initiatives—all of which required a massive data pipe, Baytown viewed the Harris County 4G LTE system as a compelling opportunity.

"We were excited to participate in the development and testing of the system here," says Dennis Wells, assistant director of IT for the city. "We had the chance to be directly involved in network design, hardware testing, functional testing, system demonstrations, interaction with software engineers and live testing."

For Wells, the system proved its value quickly.

"With this system, we can provide our first responders in the field easy access to resources that were never available before," Wells says. "Data access is much better. Video is really critical. The system has the redundancy required in public safety. And, the system reduces the time required of officers at the station."

Wells also was impressed with the system range.

"The coverage is good—about 30 percent more than I anticipated," Wells says. "As we and the county continue to build-out the system, this may mean that fewer radiating towers will be required to meet agency needs."

Wells says he expects the city to have six antenna sites operational by mid-year.

Ten 4G LTE system equipped vehicles are currently in use in the city—eight in the police department, and one each with the fire department and EMS. Plans call for a total of 78 police department, 15 fire department and 8 EMS vehicles eventually to have the system installed, enabling Baytown to cover its entire jurisdiction.

## Moving Forward

Cavazos predicts that the county system will have 12 antenna sites operating by late summer. Then, the county plan calls for the system to expand to the northwest of Baytown. Sixteen additional antenna sites are projected to be in place by year-end.

This growth will be possible thanks to the support of the FCC and other agencies involved

with the implementation of the national public safety broadband plan. This includes a potential spectrum lease for the system's roll-out that would replace the 180-day Special Technical Authority licenses that the State of Texas and the county have operated under to date.

"The FCC has made it possible for us to do what we needed to do," says High.

The opportunity for a permanent spectrum lease surfaced after FirstNet officials saw the system perform first-hand in January this year.

"Based on our site visits and other discussions with the project's leaders and vendors, we've determined that the Texas project could provide substantial benefits for FirstNet's national deployment efforts and generate valuable lessons learned on the changes we face," said Sam Ginn, Chairman of the FirstNet Board, following the FirstNet Board meeting in April.

The county master plan calls for a total of 80–90 tower sites to provide complete vehicular coverage. Cavazos predicts the county will require an additional 30 sites to deliver hand-held coverage countywide. Eventually, the system is expected to support more than 1,700 4G LTE hand-held devices.

County progress so far reflects the determination of Harris County officials and feedback from the county's first responders to deploy a 4G LTE system that worked for everyone.

"We always have been committed to providing our first responders the best tools available to perform their jobs effectively and safely," High says. "Now, our work with 4G LTE technology will benefit first responders everywhere."

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**Carl Oldberg** is a public safety writer. For more information on this installation, please contact Harris County Director of Broadband Services Robert Cavazos at [Robert.Cavazos@itc.hctx.net](mailto:Robert.Cavazos@itc.hctx.net).

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