Mission Critical Regional Radio System

"No single entity can address a major catastrophe by itself. We all have to rely on each other for resources and expertise. The key ingredient in that reliance is the ability to communicate with each other."

— Steven Jennings, Chief Information Officer of Harris County and Executive Director of the Information Technology Center

Situation: Growing with the needs of the community

Harris County is the largest county in Texas with 1788 square miles, and the third largest in the U.S. "We are one of the few areas that has all of the predictors for terrorist attacks," explains Judge Robert Eckels, who as County Judge serves as the senior elected official of Harris County. These include international shipping, petrochemical and nuclear power facilities, and the nation's fourth largest city, Houston… not to mention the recurring natural threat of severe weather along the Gulf Coast.

In 1989, the county was served by a patchwork of more than 15 different independent radio networks – with more networks in neighboring counties. Leaders realized that interdependence would result in a better situation for all and they agreed on a unified communications plan.

Solution: An expandable network

In 1989, Harris County built a single-site 800 MHz network to consolidate and centralize those 15 systems. It took just nine months to set up the first six-channel system.

"From that point we expanded to a 25 channel system and we found that the resources were so abundant we could offer these services to other agencies in the region," says Larry Orr. Today the network has grown to support a shared infrastructure with 133 channels and 17 tower sites.

Result: Communications everyone can depend on.

The network supports a wide array of functions from police, fire, and EMS to public service, roads and bridges, schools, and animal control. "In theory," says Judge Eckels, "we can talk to Houston's garbage trucks. It is a system that can be adapted to conform to the needs of the partners we work with every day."

Steven Jennings says the results are worth the investment. "When you get down the road and see it being used by the public safety officers and first responders, all of a sudden the late nights make sense. All it has to do is help in just one circumstance and you've paid for the system. Words can't describe the satisfaction you get when things work well."

System
- 800 MHz single-site

Coverage Area
- Harris County with intent to expand and serve 13 counties in the Houston/Galveston area

Users
- Over 20,000 from more than 400 departments
- 2,000 mobile data terminals

True Interoperability

"No single entity can address a major catastrophe and handle it all by itself," Jennings says. "The reality is that we all have to rely on each other for resources and expertise. We believe that a cohesive group of trained individuals, regardless of being from disbursed agencies, can better address problems. A regional communications system is the thread that ties all of them together."

Interoperability is not just for large-scale incidents. "It goes beyond the big disasters into the day-to-day operations of the police departments," says Judge Eckels. "We have over 90 different police agencies operating in very close proximity." The new network allows dispatchers to send the closest officer to the scene, no matter what agency he or she works for. "When somebody's in their house with a guy coming through the front door, they really don't care whose red lights are on top of that car. They just want a policeman."

Interoperability is the key reason why agencies join the network, but they gain other benefits as well. Because Harris County took the lead in funding infrastructure, the incremental costs of adding new partners are minimal. New agencies pay a monthly service fee. In return, they get spectrum access, tower capacity, and technical assistance, plus the ability to comply with grants that require interoperability. Agencies continue to control their own communications and don't have to change their standard operating procedures – but now, by pooling resources, they have access to over 130 frequencies at an affordable cost.

"A small town department with 20 or 30 policemen and a much lower budget can have all the resources available to the Harris County Sheriff's Department," says Judge Eckels. "Together we can do just about anything."

The only system left operating

Tropical Storm Allison struck in 2001, bringing floods that left 22 people dead, forced thousands out of their homes, and caused $5 billion in damages. "Almost every communication system in the region failed, including the commercial cell phones," says Orr. "The only system left operating was the regional SmartZone® system, which provided all of the emergency service communications for the duration of that storm."

The network supported a massive joint response. Judge Eckels says, "We had dozens of agencies coming together to respond to 90,000 homes that were flooded in the largest urban flood in the history of the country. We brought together tremendous resources and the system really proved itself." Seamless interoperability allowed these multiple agencies to coordinate their communications before, during and after the storm.

"The ability to leverage off of the existing system allowed a lot of smaller agencies who needed to communicate with Harris County the opportunity to get on the larger system, which they couldn't afford normally."

Larry Orr, Managing Director of the Harris County Regional Radio Division

Critical Networks

"We, as a mission critical organization, must have a system that is available 24 hours a day, seven days a week," says Jennings. "We have lives on the line and so consequently we can't be off line." Therefore, the network was designed for high levels of control, security, and redundancy.

Tower coverage areas overlap, providing a level of redundancy with service operation. Each radio has a system ID, so if a radio is lost or stolen, it can be taken off line. "There are lots of reasons for having our own system," Jennings says, "but I think the most salient point is the ability to maintain a service level without a profit motive."

Larry Orr agrees, "The region owns its network because it's absolutely necessary. In the past when we've had critical storms, and other types of events, it was the only system that would work. So we have chosen to expand and improve the system so that it becomes the regional standard. The main issues for us are control and security as well as the capacity to evolve the system into one that meets the specific needs of the partners." As owners of the network, agencies are free to make changes and upgrades as necessary in support of their public safety missions.

The ability to help when NASA and the nation called

"When the Columbia incident went down, it was early on a Saturday morning," Jennings remembers. The 2003 space shuttle tragedy left a debris field centered around Sabine County, 150 miles from Houston. "NASA called us up, because the capability of communications in Sabine was very limited. They asked us to see if we could expand our system. We ended up taking a Communications on Wheels van with a five-channel system and migrating it up to Sabine County." Federal, state, and local agencies shared the system to coordinate recovery efforts. Then, for two weeks the Navy continued using it to support divers searching nearby lakes.

"We could not have provided that service had we not owned our own system, our own frequencies," says Jennings. "They relied on our system, and that made our people, our county, and our radio staff very proud."

Mission Critical Data

"Mobile data is one of the most important aspects of our system," says Orr. "It allows officers to be safer and also to perform their jobs more efficiently, without having to interrupt the dispatcher for routine checks." Computer-aided dispatch (CAD) is helping to reduce emergency response times. An automatic vehicle location (AVL) system maps the current locations of approximately 400 vehicles so dispatchers – and officers in the field – can see at a glance where units are located and how close they are to the scene.

Pre-emptive data – knowing what to expect before walking into a situation – can save lives. "The world's more complicated today," says Judge Eckels. "When a fire truck rolls up on a scene, they need to know what they're approaching, whether it's a hazardous chemical or a fugitive at that address. More and more, we see that need both for the public safety agencies and for public works."

Wireless terminals allow quick access to motor vehicle records, the Texas Crime Information Computer (TCIC), the National Crime Information Computer (NCIC), and other data sources. The system remembers vehicle license checks made in the last 30 days by any of the participating agencies, so officers will know if a car has been stopped previously. When an officer pulls over a vehicle, the system gives an audible warning if it finds an outstanding warrant on that license. "In that instant," says Jennings, "it puts the officer on a different plane. To ensure that the public safety officer is safe, having first-hand access to information at a first-responder level is critical to any communications system."

Rapid deployment anywhere, any time

Because no one can predict where the next incident will take place, two Communications on Wheels (COW) vans allow rapid deployment to areas that are outside the network coverage area, or wherever extra channels are needed in an emergency. "The mobile capability and the flexibility are irreplaceable, especially with the new threats and disasters that we're going to be facing," says Jennings. "If you're considering purchasing a COW, I would support you wholeheartedly. For the investment and the return and the functionality, the cost benefit is very, very positive. These systems allow you to address special needs without impacting the overall structure of your existing system."

"Since the inception of our regional system, Motorola from an organizational and a technology perspective has been a partner. I don't think we could have achieved the levels of service and/or functionality that we've achieved without the technical expertise of Motorola and the products they've supplied that we've integrated into our system. We've been very pleased with the support and the growth and the technical capabilities that the system has provided us."

— *Steven Jennings , Chief Information Officer of Harris County and Executive Director of the Information Technology Center*

Over 65 years of understanding the needs of public safety

In today's world you need a partner who understands what mission critical is all about: the lives and well-being of your employees and the citizens they protect. That's why Motorola is a leading provider of interoperable communications systems for public safety and first responders. Our experience in the public sector, along with our skills, people, partnerships and alliances, allow us to build innovative, fully integrated technologies that help organizations like yours share vital information with ease and confidence. We've been doing it for 65 years, and we'll be standing by our customers for years to come. We are committed to bringing all of our knowledge and technical expertise together so you can focus on what you do best… to serve and protect the public.

MOTOROLA

RC-99-2039