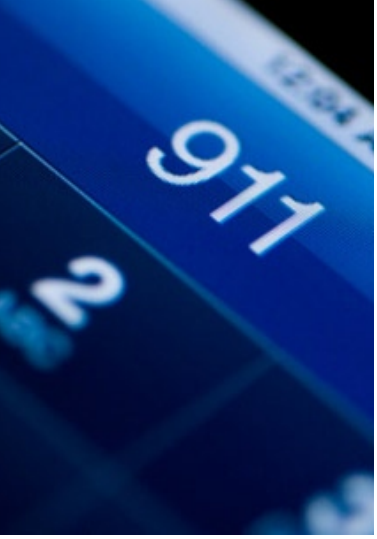

A Fully Redundant, Interoperable Next-Generation 9-1-1 Network for Greater Harris County, Texas

THE SITUATION

Home to approximately five million residents, the Houston region is one of the nation's largest metropolitan areas and one that has been susceptible to natural disasters. The Greater Harris County 9-1-1 Emergency (GHC 9-1-1), a regional government body, has been a leader in the advancement of emergency communications. Additional Greater Harris County 9-1-1 statistics:

- Provides 9-1-1 services across Harris and Ft. Bend Counties
- Covers 1,700 square-miles
- Covers 49 cities and two counties, which includes Houston
- Served by nearly 50 public safety answering points (PSAPs)

A main objective for GHC 9-1-1 was to integrate all PSAPs into one next-generation 9-1-1 system with one IP (Internet Protocol) backbone. At the same time, Harris County and the City of Houston were planning to replace and upgrade their radio systems for broader coverage. They also wanted to convert legacy systems to digital for enhanced interoperability.

Leaders in the region realized that **emergency services could gain huge benefits from sharing infrastructure and sites for radio towers and other equipment**. Other benefits included:

- Leveraging economies of scale by converging systems onto one digital, multipurpose backbone
- The ability to share push maps and other data to 9-1-1 call centers
- The ability to rapidly transfer calls across multiple jurisdictional boundaries
- Reduced costs resulting from the elimination of duplicated equipment

THE CHALLENGES

1. GHC 9-1-1 had already adopted IP-networks within each of its PSAPs, but a much more robust digital network was required to tie all of them together.
2. They also desired a fully redundant backup system that could take over any or all functions if a disaster struck the primary network.
3. With two complete, interconnected systems, they needed to be able to eliminate a single point of failure.

This phased challenge would require a thorough vetting of equipment vendors and a strong relationship between the GHC 9-1-1 and its project management firm and project managers would need to evaluate current tower sites and microwave equipment to determine how to integrate existing technology into the new public safety IP-network.

Project Overview

GREATER HARRIS COUNTY 9-1-1 BY THE NUMBERS

- One of the largest 9-1-1 networks in the nation
- 1700 square miles area
- 48 cities and two counties
- 50 PSAPs

FE/Kimball PROJECT MANAGEMENT SERVICES

- IP network strategy
- Procurement assistance
- System design and implementation
- Microwave network design

COMPLETION

Mid-Summer 2010

An Expansion of Federal Engineering
L.R. Kimball℠
Combining Decades of LMR & PSAP Experience

THE SOLUTION

The GHC 9-1-1 worked successfully with FE/Kimball on a previous project to transition to a self-managed automatic location identification (ALI) database—a type of integration of that size had never been attempted before. Therefore, given the familiarity with their 9-1-1 system and their ability to quickly pull together a high-level strategy, GHC 9-1-1 selected FE/Kimball to manage the project.

An Impartial Advocate for GHC 9-1-1

FE/Kimball immediately developed a high-level strategy study that recommended facilities and equipment that should be incorporated into the IP-network. "Harris County had radio towers for emergency communication and a network, so did the City of Houston," said FE/Kimball Project Manager RoxAnn Brown. "We determined that by increasing the bandwidth on the new network, we could also support these radio towers."

FE/Kimball completed the following tasks:

- Wrote an RFP that met the procurement rules of the county; distributed the RFP
- Gathered and evaluated all proposals
- Made decisions balancing price, experience and schedule.
- Worked through contract negotiations with the chosen vendor, gaining clarification of specifications and serving as a buffer for GHC 9-1-1 in the talks.

After the contract was signed, FE/Kimball began implementation and project management to deploy the new system, which included the following tasks:

- Designing a conceptual layout based on bandwidth and locations
- Delivering system requirements relating to sites, towers and bandwidth to the vendor

The Importance of Redundancy

Because of the potential weather issues in the region, redundancy was immensely important to the success of the system, so FE/Kimball set about designing a microwave backup network. "To put up a fully redundant, active, load-bearing microwave system was an unprecedented endeavor," Brown says. "They were seeking to put themselves in position to provide 9-1-1 services in almost any situation. Their goal was to never, ever be down."

FE/Kimball assembled GHC 9-1-1 network data on existing tower locations and developed a path for back end network growth. Working with IT staff, FE/Kimball ensured the network met available National Emergency Number Association (NENA) and industry standards for Next-Generation 9-1-1 (NG9-1-1). Once again, FE/Kimball worked with GHC 9-1-1 to develop and write a RFP for the microwave network, helped with the evaluation and negotiated the contract.

FE/Kimball's role also included:

- Examining available tower sites and comparing them to coverage needs for GHC 9-1-1
- Choosing the sites and layout for the system
- Developing the scope of work for the microwave vendor
- Conducting a pre-bid conference
- Managing the selected vendor

THE RESULTS

A Complete Backup System, Cost Savings and Greater Coverage

"Now with two projects, we are working on building the full IP-backbone from end-to-end," Brown reports. "It will offer an MPLS network across the entire area with a 3G wireless backup and T1s in certain areas. The microwave network will serve as a complete backup fall-over system."

FE/Kimball is repurposing equipment previously used to create additional cost savings. Houston and Harris County are providing their existing tower sites, while GHC 9-1-1 provides microwave dishes and equipment boxes. Now only one microwave dish is required on each tower instead of three separate, duplicate microwave dishes. The towers will be linked and calls will be distributed to the right first responder department within the network.

The network furnishes greater coverage because enough towers collectively are available to enable a much larger footprint than before. The entire area is covered without GHC having to build any additional towers. "We eliminated duplication of tower sites and hardware because we didn't need all the separate microwave dishes with an integrated network," Brown says. "A single microwave dish can take radio, data and phone traffic over the system, since we've converged digital radio and digital telephony across the IP network."

Additionally, with two completely redundant systems, GHC 9-1-1 can balance the load between the IP backbone and the microwave network.

Greater Harris County 9-1-1 Emergency is well on its way to a seamless, county-wide communications system that creatively advances the legacy network with upgraded technology to produce a platform for interoperability among all public safety departments within its coverage area.