

Analog and Digital Connect



The city of Angleton, Texas, had to answer some hard questions about interoperability and regional, shared networks following Hurricane Ike in 2008. In fact, the Category 2 hurricane led the department to completely revamp its communications network.

When Ike made its final landfall in Galveston, Texas, during the early morning hours of Sept. 13, it was a Category 2 hurricane. Ike impacted the Gulf of Mexico coastline from Louisiana to Corpus Christi, Texas. It caused 112 deaths and an estimated \$24 billion in damage. It was the third-costliest Atlantic hurricane in U.S. history.

Ike knocked out the power and regional communications system for several weeks in the Houston/Galveston area. Angleton, with about 19,000 residents, was one of the cities affected. “The system failed on Saturday,” says Greg Smith, former city administrator for the city of Angleton.

Hurricane Ike forced one Texas agency to rethink its plan for interoperability and disaster communications.

By Tim King

“The system would not allow communications from the emergency operations center to the officers in the streets.” This left the cities and counties in the area scrambling to overcome the crippling effects of no radio communications.

Lessons from Ike

Prior to Hurricane Ike, most of the counties and cities in the Houston/Galveston area had joined to share regional communications resources through an 800 MHz system. Angleton is located about 20 miles from the Gulf of Mexico and 50 miles from Galveston. The city of Angleton used the 800 MHz system as its primary and only source of day-to-day radio communications. Without the regional network, the city would have limited

communications for first responders, local patrols and any other necessary groups.

Following the hurricane, the city of Angleton realized it needed its own radio communications system. City officials decided to upgrade to a new interoperable communications system that they would control. The goal of the system was to provide daily communications and mission-critical communications during disasters. The ideal system would include a new three-channel linked VHF system, a set of dispatch consoles, interoperability with the existing 800 MHz regional system and system portability, allowing the emergency operations center (EOC) and communications network to be moved to another location if necessary. The radio system would



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— Greg Smith, former Angleton city administrator

provide a three-deep radio system: 800 MHz regionally, backup linked three-channel VHF locally, and as a second backup, VHF mobiles for mission-critical and recovery communications.

The search for a new radio system began at various regional trade shows. At the 2009 Texas Homeland Security and Hurricane Conference in San Antonio, Angleton officials met Nalcom Wireless Communications, a mobile communications dealer in Palestine, Texas. Nalcom has integrated a BridgeCom Systems radio over IP (RoIP) system into its UHF Logic Trunked Radio (LTR) system, creating a wide-area network covering most of eastern Texas. Nalcom operates an SMR network on which subscribers purchase airtime or lease server access to network their own tower sites. Nalcom is working with another Texas trunked radio network operator to connect both companies' systems, creating one of the largest interoperable networked systems in the state of Texas.

The New Design

In 2009, Angleton emergency planners deployed a new interoperability system for its 100 police, fire and EMS radio users. First, they licensed three VHF channels for voice communications and deployed conventional analog equipment from Motorola. With this system, Angleton had backup coverage in most areas of the city if the regional 800 MHz system failed. Angleton officials then deployed a portable interoperability gateway system. Unfortunately, the gateway didn't work within the city's virtual private network (VPN). The gateway failed to

perform as expected, and it didn't meet the prescribed requirements of portable interoperability. The rest of the implementation was put on hold as Angleton personnel searched for a different solution.

Nalcom Wireless staff helped redesign the rest of the system. The city needed the interoperability equipment to work within its VPN and to be portable. Nalcom had previous experience working with the Heart of Texas Council of Governments (HOTCOG). In 2008, Nalcom installed a gateway system for HOTCOG to provide interoperable communications among the six member counties.

A TL-NET system from BridgeCom consists of three parts: a controller, gateway and server. The controller is connected to the audio source — an analog VHF repeater for HOTCOG. The gateway is connected to the high-speed Internet connection and manages the audio from the controllers. The server, connected to the Internet, oversees the network and manages call routing.

Nalcom deployed the communications system to the HOTCOG counties using single-channel gateways and a controller at each of the six county sites. Then each site was networked using VoIP through high-speed Internet to a server located at one of the county facilities.

Each HOTCOG county can control the system through BridgeCom's PC client dispatch interoperability software. The software turns any Windows-based PC into a 20-channel dispatch console, allowing a PC to make calls to LTR, conventional and digital

radio users, as well as other PC-based users. In addition, users can monitor up to 20 channels or talk groups. The software at HOTCOG allowed county dispatchers to monitor all channel activity and cross patch talk groups as needed.

Portable EOC

To meet the additional need for system portability, Nalcom designed a portable chassis on which to mount the communications system based on lessons learned from the HOTCOG installation. The Angleton system consisted of a server, eight-channel gateway and eight controllers interfaced to a combination of Motorola mobile radios. The configuration allows portable interoperability among Angleton's three-channel VHF system, regional 800 MHz system and VHF mobiles.

The communications equipment is self-contained in a rolling case for portability inside a new hurricane-proof shelter at the EOC in Angleton. The system's antennas are installed in the attic of the EOC and provide system access from a fixed location. The portable design allows the system to be moved if the EOC is damaged during an emergency. If the system goes portable, there are local antennas at the fire station.

EOC laptops are loaded with BridgeCom's PC client software. This creates multiple virtual dispatch centers from anywhere with Internet connectivity using the EOC VPN through the local cellular network. The software also allows patching of any combination of radios and is expandable to 20 radios. “The RoIP system integrated seamlessly into our existing

Cisco-based network and works flawlessly across our existing VPN configuration,” says Jason Crew, IT specialist for the Angleton Police Department. “Connecting remotely to our radio system in any situation is easy as 1-2-3; connect to the Internet, establish the VPN tunnel and launch the software.”

“With the new system, the city of Angleton has the flexibility and versatility to handle the communications concerns that arise during a natural disaster. In addition, the system provides an excellent redundancy system for all facets of public safety and municipal operations,” Smith says.

City officials are pleased with the new interoperable network, which provides flexibility and redundancy



Photo by John Ervin, Nalcom Wireless Communications

BridgeCom TL-NET system

and opens new possibilities. “With a three-deep radio system, we should always have communications for police, fire and EMS personnel to aid in the recovery efforts,” says Lt. Mike Jones, emergency management

coordinator for Angleton.

Jones says officers have also used the system for special events. In the past, the department didn’t have the flexibility or communications resources to effectively cover large events. With the new system they can easily deploy a dispatcher and the necessary equipment in a mobile command center for more scenarios. ■

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