

# Corpus Christi Pioneers metro-wide Wi-Fi mesh network for AMR



## Customer highlights

### Challenges

- Human meter readers had a high rate of injuries and workers compensation claims
- Install network that would meet needs of AMR plus other city departments

### Solution

- 147 sq mile (380 km<sup>2</sup>) Tropos mesh network
- Citywide water and gas AMR system

### Systems and Services

- Public Technologies, Inc. (PTI)
  - Consulting
- Northrop Grumman
  - System integration
- ABB Tropos Wireless Communication Systems
  - Mesh routers
  - Wireless network management

Corpus Christi, Texas, rated one of the nation's top ten digital savvy cities in a Center for Digital Government poll, extends their applications into the field to increase municipal government efficiency, boost city workforce effectiveness and better serve its citizens.

The city leverages one of the nation's first citywide Wi-Fi mesh networks powered by Tropos wireless mesh routers. The citywide Wi-Fi mesh links water and gas utilities, public safety officers, public works department employees and building inspectors to vital online information while they are in the field.

### History

Discovered by Spanish explorers on the Feast of Corpus Christi in 1519, Corpus Christi is the largest city on the Texas coast and the nation's sixth largest port. More than 247,000 people live within its boundaries, which curve around Corpus Christi Bay.

With a national reputation as a public services leader – the city was honored as one of ten All-America cities in 2003 – Corpus Christi employs technology aggressively to enhance the productivity and efficiency of its municipal services. A fiber optic network backbone, installed as part of a centrally managed traffic control system, covers two-thirds of the city. Municipal workers access and share data via an enterprise-wide information system. Citizens and visitors sign onto the city's Internet site,

[www.cctexas.com](http://www.cctexas.com), to pay their utility bills and traffic tickets, apply for jobs, view real-time City Council meetings and airline flight status data, check events calendars, and pinpoint lot-by-lot zoning or right-of-way easements via an interactive Geographic Information System map.

## Challenges

In 2002, Corpus Christi decided to automate meter reading for municipal gas and water services that supply a 147-square-mile area.

Meter readers often have difficulty accessing a property because of fences or dogs," explained Leonard Scott, MIS unit manager and program manager for the Wi-Fi project. "We average several complaints per day, every day, from customers who believe their utility statements are incorrect. If someone wants to buy a house, there is no easy way to check gas and water usage history."

With automated data collection, gas and water customers can check meter data online and view a property's gas and water consumption history. Instead of monthly meter readings, meters could be read daily, or even more frequently in the case of commercial customers and other large users. Close monitoring of consumption would allow the city to match daily gas usage with gas price fluctuations and better control water flow to reduce system breaks.

Corpus Christi teamed with Public Technology Inc. (PTI), a national technology research and development membership organization, to work out specifications for the automated meter reading system. The team weighed the pros and cons of two possible implementations:

- Employ the city's already-existing fixed fiber optic network as part of an automatic meter reading (AMR) system
- Equip meter readers with RFID-based mobile equipment and have them drive by properties and capture meter data from a distance.

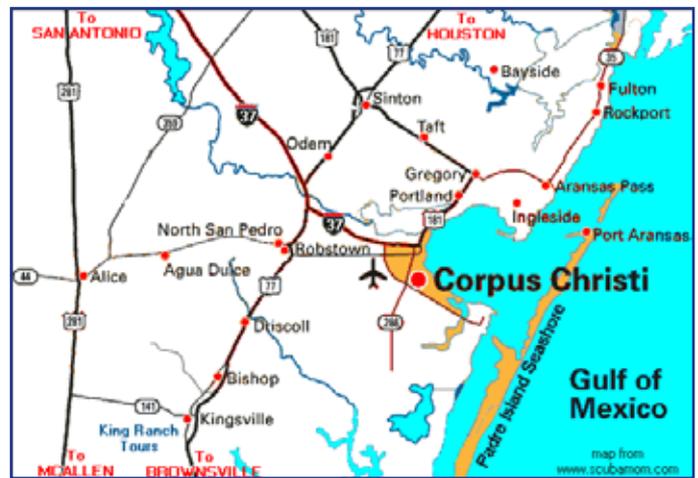
The mobile solution was slightly less expensive, but it was clear that the fixed network plan would provide the customer service benefits that Corpus Christi wanted to implement.

## Solution

Corpus Christi selected Northrop Grumman to build a citywide Wi-Fi network based on [mesh technology](#) from Tropos Networks that would relay gas and water meter data from AMR concentrators located in the field to the city's Utilities Business office system. Tropos mesh routers combine the high bandwidth of the 802.11 Wi-Fi standard with mesh routing capabilities that enable economical Wi-Fi connectivity over large areas. Mounted on a traffic signal pole, they provide wide-area coverage much greater than off-the-shelf access points designed for indoor use. "Most of the proposals we got back were too expensive and/or did not meet our needs," Scott said, "but the one from Tropos met all of our requirements."

## Results

The city found that the mesh network met their needs for transporting AMR readings for their water and gas customers. The city utility was able to provide a higher level of customer service and support for citizens, accurate billing, and a safer work environment. Overall, the city spent around \$20 million for their AMR and Wi-Fi



network which provides a \$30 million savings over the estimated \$50 million that they would have spent over the next 20 years without an AMR system. In addition, the immediate access afforded by the Wi-Fi AMR network allows them to generate final meter readouts from the office, proactively notify customers with usage spikes, and helping to improve water conservation by identifying potential system losses. After rolling out the network, the city discovered that the AMR application uses only a portion of the Wi-Fi mesh network's bandwidth. City departments immediately saw the potential for a host of other services.

## Next steps

Within a year of deployment, Corpus Christi was using the Wi-Fi network for a range of applications in addition to AMR including enabling remote access for code enforcement, health inspection, animal control, public works, utilities, and public safety personnel. Building inspections became more efficient helping cut overall construction time by 25% throughout the city, public safety and utility vehicles were tracked using the network to identify the closest vehicle to respond to incidents at a fraction of the cost of previous systems, and first responders and ER doctors had quick access to HIPAA releases for victims to enable quicker treatment beyond simple triage in the field.

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