CITY OF DALLAS, TX
WIRELESS NETWORK
HELPS TO KEEP **DRIVERS SAFE**

In cities across the U.S., traffic zooms out of control. Even red lights no longer deter some drivers. The cost – in life, in healthcare and in municipal response – is also out of control. But the City of Dallas, deep in the heart of the second-biggest state in the United States, decided to call a halt to the madness. With help from Cambium Networks, the city can now track drivers who ignore red lights, further enforcing traffic safety.

CUSTOMER PROFILE

City of Dallas, TX
- High rate of accidents at major city intersections
- Large city with noisy environment and LOS issues
- Need for efficient monitoring while keeping costs low

Cambium Product
- PTP 58400

Results
- Efficient data delivery in high interference, obstructed areas
- Reliable backbone for flawless backhaul operations
- Improved traffic safety
- Increased revenue for the City
- Deployment met the City's deadline requirements

SITUATION

By leveraging modern technology, the City of Dallas hoped to improve traffic safety, maximize the Dallas Police Department's efficiency and ultimately save lives. In 2006, the City of Dallas began installation of a new photo traffic safety system at select intersections throughout the city. The system is part of an initiative designed to increase public safety and reduce the number of collisions caused by motorists running red lights.

Dallas City officials wanted the project to be completed in a matter of months. The new system would interconnect video surveillance cameras installed at intersections throughout the city that had a history of accidents or red-light violations. In addition, each approach into the intersections would be monitored. Initially, officials decided to install 60 cameras at 40 intersections in order to monitor a total of 60 approaches across the City's entire landscape, which covers 225 square miles.

As part of the "SafeLight, Dallas stops on Red" program, red-light violation information was transmitted from the network of cameras and stored at a processing facility on a daily basis. As a result, a backbone to backhaul all the data traffic was needed. Furthermore, the City mandated that any communication equipment used to support the deployment would have to be installed on existing traffic control poles and towers. Another challenge was that the locations of the intersections were dispersed across the city, and connections needed to be made amidst many obstructions, such as trees and buildings, and over one long-distance link of 10 miles. Traditionally, Digital Subscriber Lines (DSL) would be recommended to interconnect all the cameras, but this technology wasn't available in parts of the city. Furthermore, use of DSL would prohibit the project being completed on time.

SOLUTION

Given the tight deadline, the decision was made to deploy a broadband wireless network instead of DSL, recognizing that fixed wireless provided a more reliable infrastructure, required less time to implement and cost less to purchase and deploy. To handle the data communications element of the new red-light enforcement program, the City of Dallas deployed 140 of Cambium's Point-to-Point (PTP) 58400 Ethernet bridges with integrated antennae.

The first order of business was to establish a communications backbone in order to manage all the traffic from the 60-camera system. To do this effectively, a ring topology was built around the city to handle the backhaul. Happily, the Cambium wireless topology met the city's requirement to minimize the distance to and from each intersection and the nearest communications tower, which ranged from three to seven miles (5 to 11 km).

Since the City of Dallas required that all equipment used for the red-light enforcement program be installed on existing traffic control poles, Cambium wireless bridges were deployed on seven water and three communications towers already in place. Due to the lightweight and small form factor of the radios, there was no need to do a load analysis, so the installation didn't require the assistance of special crews on the water towers. This allowed for the deployment to be completed in three to four hours per tower. Despite the fact that the City asked that special crews handle the installation on the three communications towers, the deployment was done in four to five hours. To accomplish this feat, much of the path engineering and pre-assembly work was done prior to the deployment. As a result, the crews only needed to affix the radio to the existing tower structure and point it in the right direction.

After the backbone was established, the team started to bring each of the intersections online and linked the towers together, some of which were about 10 miles (16 km) apart. In fact, the Cambium bridges on the water towers were linked together to provide redundancy for the wireless network. All of the intersections were dispersed throughout the city, and the signal had to overcome high-rise buildings and tree obstructions that were prevalent across this congested metropolis. As a result, the radios needed to be positioned at least 25 feet (nearly seven meters) above the intersections. Given the height of the radios and the common occurrence of storms in the Dallas region, lightning arrestors were installed to further ensure connectivity even in inclement weather.

WiFi "hot spots" are commonplace throughout the country, and Dallas is no exception. Cambium's PTP units were easily readjusted to navigate around these hot spots (once they were discovered) in order to further mitigate interference.

Each intersection comprises a server, a router, radar detection and a camera network to record data from each approach. To ensure all the data from one intersection could easily be retrieved, a VLAN was created to help monitor each of the paths. After the Cambium bridges transmit the data from all the intersections out to the wireless network, switches are used to route the data to the headend at the Univision building downtown for storage and analysis.

RESULTS

Installation of the Cambium PTP bridges met all of the City's technical requirements below:

- Secure, reliable connectivity in a highly-congested city environment
- High-bandwidth data rates of up to 30 Mbps each way
- Rapidly deployable with minimal disruption to traffic and infrastructure
- Interference mitigation in a mostly non-line-of-sight (NLoS) cityscape
- Reliable backhaul of all data traffic from a network of 60 cameras
- Fit the radios on existing water and communications towers to speed installation and meet a key project requirement
- Get the entire network up and running in five and half months to meet the City's deadline

The City of Dallas was able to leverage wireless technology to accomplish community goals, while keeping costs low. The Cambium PTP system has been able to interconnect all the cameras in the City's red-light violation system as well as overcome areas of high interference and obstruction to deliver the data to the main processing facility downtown. Furthermore, the reliable backbone that was built to handle the backhaul traffic is operating flawlessly. An extra benefit of the program is the additional revenue (in the form of traffic fines from offenders), which has gone toward paying for the program itself. The revenue will also be used for city services and public safety programs, including traffic engineering improvements and traffic enforcement.

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