

Saving Lives with Video EMS and Eliminating High Cost of Leased Lines in Tucson, AZ

Customer Highlights Challenges

- Hospital ER staff had limited information about trauma patients enroute to the hospital, making it difficult to efficiently prepare for incoming patients
- High recurring cost for leased lines used for traffic signal management

Solution

- Patient telemetry data and a real-time video feed provide in-depth, information to the hospital in trauma situations before patient arrives
- Centralized management of traffic signals over high-speed links
- Video cameras at street intersections used for traffic management and by public safety workers

Results

- Better preparedness at the hospital before patient arrives can help save lives
- Eliminated \$200,000/year in traffic signal management telecommunications costs
- Public safety workers can respond faster and more effectively to emergency and traffic congestion situations given their real-time access to street intersections video streams

Systems and Services

- Tropos Networks MetroMesh 5210 and 4210 routers
- SmartWAVE Technologies: System integration
- General Devices: e-BRIDGE mobile telemedicine application in EMS vehicles and at hospital

broadband infrastructure to support traffic signal management and to help police and fire departments operate more efficiently and effectively. The city was paying \$200,000 per year to lease phone lines to monitor and transmit traffic information. Not only were the leased lines expensive, but their slow speed also prevented the use of video transmission for traffic management.

In a sprawling metropolitan city such as Tucson, municipal services must operate across a very large geographic area. The City of Tucson is bridging this distance by using a Wi-Fi mesh network to bring efficiencies to two important municipal services. The city has deployed the nation's first video-based Emergency Medical Services (EMS) telemedicine system, ER-Link, to help save the lives of trauma patients. The same Tropos-based network infrastructure is being used for traffic signal management, saving the city \$200,000 in telecommunications costs per year.

THE CHALLENGE

A few minutes can mean life or death for trauma patients, so having advanced knowledge about a patient's condition before arrival at the hospital can give doctors the edge they need to save a life. Yet the very nature of trauma situations means that paramedics are often focused completely on patient needs and have little time to relay key information to the hospital such as patient vitals or specific visual observations about the patient's condition,

Doctors at Tucson's University Medical Center wanted an advance assessment of incoming trauma patients so they could be better prepared for their arrival. Doctor Terence Valenzuela, Emergency Physician, University Medical Center, and Medical Director of the Tucson Fire Department, explained the need.

"At our trauma center, there are three levels of injury severity - red, white and green - each requiring a different physician team to be present when an injured person arrives," said Doctor Valenzuela. "We don't want to call the entire Trauma Service if it's not medically necessary."

An interesting side benefit is that ER-Link is also being used to help prevent "frequent flyers", people that request frequent transportation to the emergency room whether they need immediate medical attention or not. If a paramedic on the scene does not believe the patient needs a hospital visit, ER-Link can be used to have the patient speak directly to a doctor who can evaluate their request and authorize or deny ambulance transportation. If treatment is deemed unnecessary, the ambulance is put back in service, thus adding capacity to the city's ambulance services to save costs and improve response time.

Looking beyond emergency services, the city had also identified a need for a wireless



"We used to rely on phone lines to monitor and transmit traffic information. By owning the network infrastructure, Tucson is now saving approximately \$200,000 per year in telecommunication fees and also taking advantage of video transmission which was not possible using phone lines."

Francisco Leyva
Project Manager
Tucson Transportation Department

RESULTS

All 17 of the City of Tucson ambulances have been equipped with the city's new ER-Link system to enable critical patient information to be relayed to the hospital in real-time. ER-Link (based on General Device's e-BRIDGE mobile telemedicine application) utilizes a 12-lead patient telemetry system and a live video connection in the ambulances to deliver patient diagnostics and enable visual analysis by nurses and doctors at University Medical Center.

"With ER-Link, doctors at the Medical Center can get patient information as soon as they're en route and assist medics, if necessary, on how to treat them. Minutes count, so any tool that sends better information, faster, to the hospital and permits evaluation of a patient's condition is an enormous asset," said Tucson assistant fire chief Dave Ridings. "With ER-link in our department's ambulances, our medics can use the camera to zoom in on an injury, for example, so a doctor can view it. They can also transmit vital signs, and an exterior camera can even give trauma surgeons real-time images of an accident scene."

The Tropos network is also being used to improve traffic management and cut telecommunications costs for the Tucson Transportation Department. Furthermore, video cameras at major intersections on city streets are being converted to IP so video of the intersection can be viewed over the wireless network, enabling police and fire department staff to better respond to traffic, crime or emergency incidents.

TROPOS SOLUTION

The 228 square-mile wireless mesh network was deployed by mounting Tropos MetroMesh 5210 routers on city assets such as utility poles. Tropos 4210 mobile MetroMesh routers were then used inside city ambulance vehicles to provide reliable roaming access throughout the city. Tropos 4210 mobile MetroMesh routers have also been installed in police vehicles using a separate Virtual Local Area Network (VLAN) to isolate the police network. SmartWAVE Technologies, a leading wireless systems integrator, deployed the network and applications for the city.

LOOKING FORWARD

The city plans to leverage its wireless infrastructure investment adding applications such as:

- Automated Meter Reading - Centralized monitoring of water meters will help reduce costs, enable greater accuracy, quickly detect leaks and provide the ability to take readings anytime.
- Filing reports from the field - Several city departments are evaluating installing mobile Tropos routers within city vehicles to improve efficiency of field workers by enabling them to submit field reports remotely.
- Tracking firefighter location - The location of firefighters while they are in a building can be tracked with GPS through the Tropos network to help improve firefighter safety.
- Intelligent Transportation System - Network connectivity to electronic roadway signs will enable display of real-time messages about detours, optional routes and road closures to help reduce traffic congestion.
- Voice over IP (VoIP) phones - The city has tested and is planning to implement a VoIP phone solution to save on telecommunication costs for officers and fire department staff in the field.
- Wireless access on buses - Free service to promote public transportation.

