### Rugged Network Components

# City of Peoria, Arizona
## Hybrid Communications Network

### Objective

Extend the communication network from traffic signal controllers, cameras and variable message signs back to the City of Peoria's Traffic Management Center (TMC).

### Solution

The RS900G and RSG2200 switches were combined with existing fiber and 5.8 GHz radios to provide Gigabit connectivity and flexible management from field devices, while also allowing plenty of room for future growth.

### City of Peoria

Located in the Arizona valley just northwest of Phoenix, Peoria is home to over 150,000 residents and stretches across 176 square miles of the beautiful Sonoran desert. This one-time farming community now features award-winning facilities including the Peoria Center for Performing Arts, Rio Vista Community Park and the Peoria Sports Complex, which is home to the San Diego Padres and Seattle Mariners annual spring training. During the most recent economic boom, Peoria was one of the nation's fastest growing cities and ranked by Money magazine as one of the '100 Best Places to Live' in 2008.

The Traffic Engineering Division is responsible for establishing standards, reviewing impact studies, coordinating traffic counts, conducting traffic investigations and representing the city on various transportation committees such as MAG, AZTech, Valley Traffic Engineers Committee etc.

Most importantly, they oversee the construction of traffic signals and keep the city moving by ensuring smooth operation along all their major arterial roadways.

### The Challenge

In 2005, the City of Peoria had a vision of providing efficient congestion management to their residents. They had over 100 signalized intersections equipped with TS-2 cabinets and Econolite controllers that used time based coordination. Congestion relief was mitigated by performing regular count studies and deriving optimized timing plans that had to be manually loaded into each controller.

"Since there was no way of communicating to the traffic controllers from the TMC, frequent trips out to the field were required to collect traffic count data and perform controller updates, which occupied large amounts of our time," explained Assistant City Traffic Engineer, Ron Amaya.

With the rapid growth of the valley's population it became increasingly difficult to manage congestion so the City's traffic engineers set out to extend their communication network.

Since there was no real infrastructure in place, their plans included a high-speed fiber backbone, CCTV cameras, dynamic message signs and connectivity to every intersection either directly through fiber or by indirectly using a wireless hop until fiber could be run. All of these devices would then be connected back to their newly built TMC where operators would constantly monitor, make necessary changes and update message signs with useful information for motorists.

## Answers for industry.

## City of Peoria Traffic Management Vision Statement

**"Provide efficient congestion management through Intelligent Transportation Systems."**

As with most ITS deployments, their success is largely based on the reliability and robustness of the underlying communication infrastructure. Peoria wanted a system that would provide ample bandwidth for today but not be outgrown by tomorrow. It needed to be able to withstand the extreme temperatures inside the cabinets without interruption of service and segregate a variety of data feeds from field devices. The RUGGEDCOM switch line was chosen for their ability to meet or exceed these requirements. They provided Gigabit connectivity throughout the entire network using fiber optic Ethernet and exceeded NEMA TS-2 specifications through the use of maintenance free, passive cooling making them ideal for use in traffic cabinets. The embedded RUGGEDCOM Operating System (ROS) provided advanced networking features to allow fast and reliable transmission of video and data over IP throughout the entire network back to the TMC.

The rollout was done in three separate phases using a combination of new and existing conduit to bring fiber to the majority of signalized intersections. The backbone is 25 miles so in order to create network separation and redundancy, RSG2200 switches were installed at fiber cross points and in the TMC. The RS900G switches were installed in each signal cabinet providing dual fiber optic Gigabit Ethernet ports and eight Fast Ethernet copper ports for connecting local devices such as the traffic controller, video camera or VMS. Locations without fiber received a 54Mbps, 5.8 GHz radio to create a wireless hop back to the backbone. This hybrid approach ensured complete network coverage right from the onset.

With the communication network up and running, the City of Peoria was able to provide efficient congestion management without the need to visit the field. At the TMC they were now receiving streaming MPEG-2 video from over 25 CCTV cameras that were projected onto an impressive video wall illustrating current traffic conditions. Data collection and changes to the timing plan no longer required timely site visits and could be done remotely.

"The completed communication network provided us with real-time connectivity to all our field devices allowing valuable resources to be used elsewhere," says Amaya.

"We could now administer timing plan changes and update VMS signs with relevant information on the fly from one central location."

City of Peoria now has one of the Nation's most state of the art ITS systems with RUGGEDCOM products providing reliable, virtually maintenance-free communications while leaving plenty of room to expand

## RUGGEDCOM Products Used

- 106 x RS900G switch
- 5 x RSG2200 switch

## Key Features

- Gigabit Connectivity
- Exceeds NEMA TS-2
- -40°C to +85°C (-40°F to +185°F) operating temperature
- Supports Mulitcast Video

## Benefits

- Minimize congestion and reduce travel times
- Avoids unnecessary personnel dispatches to the field
- Provide accurate, real-time information to motorists