



## RURAL UTAH COUNTY MODERNIZES NETWORK, TRANSITIONS FROM TDM TO ALL-IP

### TOOELE COUNTY (UTAH)

#### CHALLENGE

Tooele County is located in western Utah, a rugged, rural area where people are scarce but several critical government operations are ongoing—some of which are potentially hazardous to what populace there is. Just in case, in order to notify residents of potential dangers, the county relies on its Emergency Management System (EMS) implemented in the form of wireless backhaul. However, its dated legacy TDM radios were not up to the challenge. To upgrade to the highest available functionality, Tooele County’s EMS department needed to transition its legacy TDM network to an infrastructure that could accommodate the all-IP microwave platforms of the future.

#### SOLUTION

A long time-time public safety customer, Tooele County has been using Aviat Networks solutions for many years. So when its legacy TDM radios began to show their limitations, Tooele County turned to Aviat Networks for the Eclipse Packet Node microwave radio platform. With capability to support both native TDM and IP protocols, Eclipse Packet Node enables the county’s EMS department to deploy a state-of-the-art wireless backhaul with capacity to grow as the throughput demands from its fellow government customers rise.



“Eclipse Packet Node not only provides native TDM support for our latency-sensitive, mission-critical traffic today but also allows us the flexibility to migrate to native all-IP traffic as our applications evolve. With this platform, we get the best of both worlds.”

**Dave Williams**

Communications Manager,  
Emergency Management  
System, Tooele County  
(Utah)

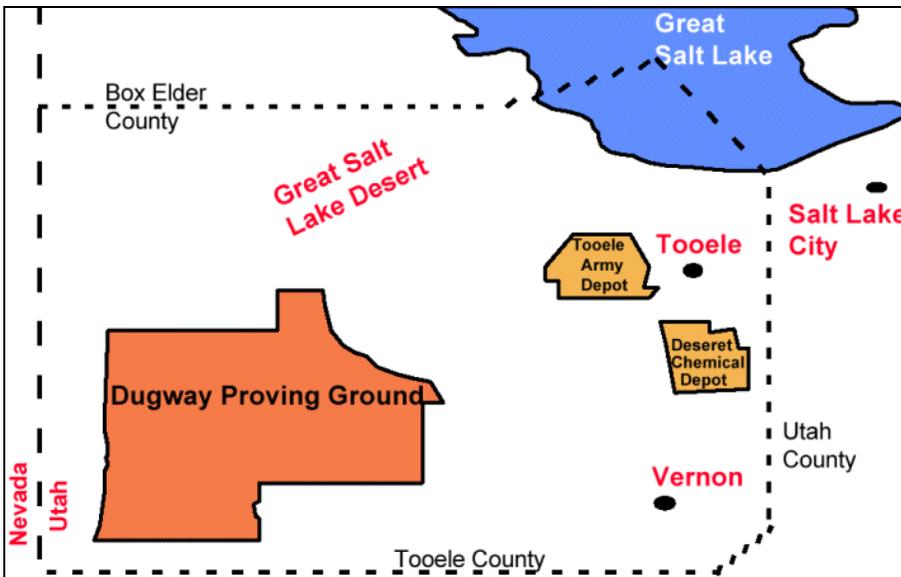
#### PROVIDING A PUBLIC SERVICE: SAFETY FIRST

Tooele County in western Utah, United States, is a rugged, semi-remote, sparsely populated locality. In this isolated location, government installations dominate the landscape—literally and figuratively. There is even a popular rumor, more humorously repeated than seriously believed, that the successor airbase to Nevada’s notorious Area 51 has been set up secretly in the county. This so-called “Area 52” would now be the national host for UFO technology and any living extraterrestrials—or so the rumor goes.

“Area 52—that’s the Dugway Proving Ground,” says Dave Williams, communications manager for Tooele County’s Emergency Management System (EMS) department. “It’s fun to talk about that among us locals, but quite serious work goes on at Dugway—it’s the U.S. disposal site for obsolete chemical weapons.” With a facility covering a large portion of the southwestern county, Dugway Proving Ground (DPG) is one of EMS’s largest customers. “With all the hazardous substances, such as VX nerve gas, at DPG, we provide the primary means of alert in case of a leak or accidental release,” Williams says.

## GOVERNMENT TO GOVERNMENT

While only providing a backbone comprising 10 hops, Tooele County EMS is a crucial link in government communications throughout the region. For example, it backhauls an 800 MHz trunk for the Utah Communications Agency Network (UCAN), a public safety network serving 18,000 first responders statewide. "UCAN has 550 repeaters, so we supply our part and backhaul the network all the way to Salt Lake City," Williams says. "UCAN and other government data is taking up more bandwidth on the backbone all the time to where our legacy TDM network of 28 DS1s could not scale with further expected increases in traffic. Plus, we need more capacity for LTE. To backhaul Long Term Evolution, we'll need at least 150 Mbps bandwidth."



Tooele County's Emergency Management System has a big responsibility providing backhaul for one of its largest government customers, the federal Dugway Proving Ground. As the central site in the U.S. for disposal of chemical weapons such as VX nerve gas, EMS has the charge to relay alerts to the public with radio-dispatched "shelter in place" notices if Dugway has a gas release.

To provide the scale for Tooele County EMS to service DPG, UCAN and its other government customers, the department decided to transition to the Eclipse Packet Node IRU 600 radio. With 22 radios installed into the 10-hop backbone, the network can now scale as necessary.

"The IRU 600 has given us a state-of-the-art network with all the whiz bang stuff we need to fully migrate to IP, when the time has come," Williams says. "We've had a really good support experience from Aviat Networks, and I'm looking forward to cooperating with company more in the future."

Tooele County EMS purchased 22 IRU 600 radios each with a DS1 jackfield, with all 28 DS1 channels wired to the jackfields, as well as DS3 and DAC GE cards. Equipped with RAC 30 cards, EMS has backhaul capacity up to 155 Mbps with the possibility to upgrade to the RAC 60 card for Layer 1 link aggregation and frequency diversity options to increase throughput.



Tooele County's 22 Aviat Networks Eclipse Packet Node IRU 600 radios enable its Emergency Management System to migrate from TDM to IP for increasing data backhaul.

## ECLIPSE MICROWAVE BACKHAUL

Eclipse Packet Node, an industry-leading platform for microwave backhaul, has proven itself in network rollouts all over the world for a wide variety of applications. This includes for Tooele County in migrating from legacy TDM to futureproof all-IP backhaul. Also, Eclipse Packet Node was the first radio platform to offer features such as:

- Super-PDH™ capacity migration
- Advanced nodal networking
- Liquid Bandwidth for assigning radio capacity to TDM or IP traffic

All these features deliver high-end performance at lower overall cost of ownership. It's backed by lifecycle professional services such as Aviat Networks System Integration Services, which fully configured and tested the county's 22 Eclipse Packet Node IRU 600 radios for "plug and play," all-indoor installation.

As an all-indoor radio, IRU 600 offers Tooele County ease and flexibility of maintenance and upgrades for evolving to all-IP backhaul. All-indoor was the county's only answer, considering its radios operate in harsh elements at high elevations and need protection of a controlled environment. And tower climbs are minimized for safer rollout.

Eclipse Packet Node provides the most comprehensive wireless solution for all types of backhaul traffic—from high-capacity SONET to Carrier Ethernet.

Overall, Eclipse Packet Node and Aviat Networks System Integration Services have allowed Tooele County to have a nearly worry-free rollout with promise to contain operational costs.

### 10 HOPS TO PEAK BANDWIDTH

Though the Tooele County EMS network is only 10 hops, it traverses some of the most rugged territory in North America. The last hop was installed on a 9400-foot mountain. "And that last set of radios involved a helicopter airlifting equipment up the mountain," Williams says.

With the extreme elevations of Tooele County topping out at 11,031 feet on Deseret Peak, upgrade and migration of the EMS backhaul had to take place during late spring and summer to minimize effects of snow and other inclement weather on the installation. But due to jurisdictional issues, the clearance to install the last hop pushed the rollout into early December. "But with help from Aviat Networks' field team we set up the last repeater before the snow and ice," Williams says.



From a 9400-foot mountaintop, the last hop in Tooele County's Emergency Management System backhaul covers the vast western desert of the 7000-square-mile county. Run on solar energy with generator backup, Eclipse Packet Node IRU 600 has better power usage characteristics compared to its TDM predecessors, sparing EMS costly maintenance trips via helicopter.

### SYSTEM INTEGRATION CENTER OF EXCELLENCE

"Considering the site's harshness, elevation and small square footage, we didn't have the luxury of assembling components at the hop, hoping they would all work together," Williams says. "Fortunately, the Eclipse Packet Node IRU 600 and related equipment was prewired at the factory, so we installed it as one unit." That's because Aviat Networks' System Integration Services does most integration and testing before microwave solutions ever reach customers. "All we had to do was plug into the solar power supply, with backup generator, and turn it on," Williams says.

Aviat Networks' System Integration Center of Excellence in San Antonio, Texas, has performed system integration and testing for customers, such as Tooele County, worldwide for over 25 years. It has expertise integrating complex multivendor, multi-tech systems surpassing industry best practices, including TL 9000 certification for quality requirements designed specifically for communications technologies.



Though Tooele County's backbone only comprises 10 hops, the final one posed a challenge at 9400 feet elevation, needing a helicopter to bring in equipment.

### OPERATIONAL ISSUES: TOOELE MOUNTAIN AIRLIFT

The image of a helicopter airlifting heavy equipment to a high mountain peak on the edge of winter may bring to mind an action movie or a top-rated TV show. Far from a "Mission: Impossible" sequel or a lost episode of "24," it was one more day for network installers of Tooele County and Aviat Networks Field Services.

"This last hop was so inaccessible," Williams says of the site 1.7 miles above sea level. "Considering the operational cost of helicopters, we couldn't afford to spend much time there in the wind and cold. That's why it's so critical that we had the IRU 600 radios preconfigured and tested before installation." It paid off; during rollout, there were only three failures in the field, two of which were fans.

### ABOUT TL 9000

The TL 9000 quality management system was developed to meet the supply chain quality requirements of the global communications industry. Based on ISO 9001, it is designed for the communications industry. TL 9000's purpose is to define unique communications quality system requirements for development, design, production, delivery and service. It specifies measurements for companies to help evaluate the effectiveness of quality improvement and implementation programs.

### UPGRADE MANY YEARS IN THE PLANNING

Originally funded by money from the Federal Emergency Management Agency (FEMA) in 1995, the Tooele County EMS backhaul upgrade was many years in the making. Back then, a backhaul network consisting of 28 DS1s seemed like enough capacity to last a lifetime. “Our backhaul network was first established to service the Chemical Stockpile Emergency Preparedness Program—CSEPP. Another vendor’s product was in here then, but it didn’t meet the program’s needs,” Williams says. “We were only able to drop discrete DS0s at VHF basestations. But now the IRU 600 allows us to run cameras and alarms for the sites based on IP—all from the office.”



From the county seat, Tooele County’s Emergency Management System department manages the backhaul of a number of government bodies including the federal Dugway Proving Ground and the state Utah Communications Agency Network. The department administers everything from the office including alarming and notification systems using Aviat Networks’ ProVision EMS software.

### ‘COMMONALITY’ OF EQUIPMENT

One of the main drivers for upgrading to the IRU 600 was the opportunity for a “commonality” of equipment, as Williams puts it. “With the IRU 600, the entire design is highly modular, and we are able to drop in new network cards with the latest technology. We just swap new cards for old,” Williams says. “So not only does IRU 600 provide native TDM support for our latency-sensitive, mission-critical traffic today but also allows us the flexibility to migrate to native all-IP traffic as our applications evolve. With this platform, we get the best of both worlds.”

### ROAD TO SAN ANTONIO: PROVISION SUPERVISION

Operating a legacy TDM network, the Tooele County Emergency Management System was used to a simplistic network management regime. But with a shift to all-IP/Ethernet wireless networking, the entire department needed training on ProVision, the carrier-class element management system that is the counterpart to the Eclipse Packet Node platform.

At the Aviat Networks site in San Antonio, Texas, the EMS staff received training intended for Network Operations Center operators and engineers involved in the installation, operation and maintenance of ProVision software. Training consisted of a combination of classroom lecture and practical exercises. Training covered areas including:

- Deploying and managing radios
- Managing events
- Managing services
- Performance monitoring
- Eclipse features
- ProVision installation and administration

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