



TC COMMUNICATIONS®

Multi-County Public Safety Agency Upgrades Microwave Radio Network While Preserving Existing Equipment

Case Study



The Challenge: The Search for a Modern Solution

Created at a cost of \$14 million in response to the 9/11 terrorist attacks on the World Trade Center, STARCOMM was first deployed in 2006 to allow police, fire, and emergency first-responders to immediately share information between all entities in real time.

The 2006 STARCOMM network consisted of a multi-site, 6-channel digital 800 MHz Motorola P-25 Trunked radio system. The Motorola system operated on a five 5-site Alcatel microwave system with 4 OC3 sites, 8 radio rings, 1 DS3 site, and 4 radio hot standby spurs.

The original Alcatel system used multi-service concentrators and intelligent T1 multiplexers along with 2 servers to operate a primary and backup system manager software system for management and alarm monitoring.

This system linked all STARCOMM and 911 sites back to the Woodbury County 911 and Dakota County 911 PSAP's by single mode fiber optics.

The 911 system consisted of a 7-site Woodbury County Fire paging and Talk-Back radio system that used the STARCOMM microwave system along with three 4.9 microwave system links to the Alcatel microwave system.

Much of the STARCOMM upgrade focused on modernizing equipment and software that operated its microwave radio and fiber optic system. Some of the more pressing performance and reliability issues were equipment obsolescence and failures, network management, and network expansion.

Additional requirements included:

- Providing standard 2/4 wire telephone and radio circuits
- Providing T1 circuit connectivity
- Providing its own PBX telephone dial tone and ring down circuits
- Providing Windows-based Network Management software
- Operating with redundant hot-standby -48VDC & 120AC power supplies

Objective

Modernize equipment and software for its microwave and fiber optic system

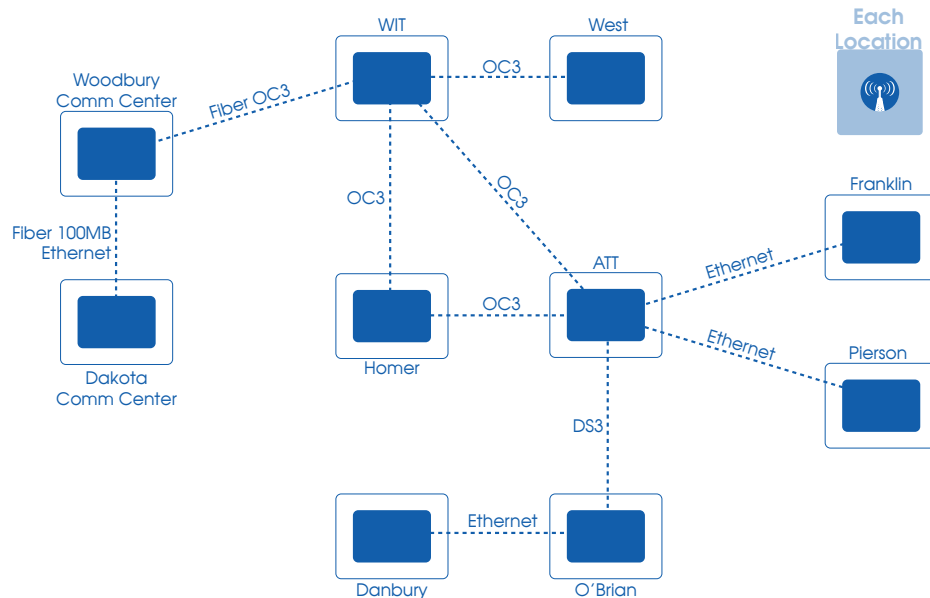
Products Used

- [JumboSwitch®](#)
- [TCView®: Network Management Software](#)
- [TC3844-3: Ethernet over T3/E3](#)
- [TC3844-5: Ethernet over OC-3](#)
- [TC3846-6: 4ch 600 ohm Analog and Dry Contact over IP Gateway](#)
- [TC3848-1/-2: VoIP](#)
- [TC3848-3/-4: Modem over IP](#)

Key Benefits

- Preserved existing DS-3 and OC-3 microwave
- Vastly improved audio quality
- 3X redundancy using JumboSwitch system
- JumboSwitch worked seamlessly with different radios
- Supports VoIP, MoIP, T1, DS-3, OC-3, 2/4-Wire Analog, Ethernet, and fiber
- Replaced nine old NewBridge ATMs with minimal downtime

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STARCOMM Network Before Diagram



One of the biggest concerns with STARCOMM management was cost of ownership, but the main technical challenge was keeping downtime to a minimum while maintaining a functioning system throughout the entire project. Two other big challenges were interfacing all of the different types of legacy circuits into a platform that would ride across the microwave and the need to preserve microwave backhauls.

- Tony Carpenter

Vice President, Calhoun Communications

About TC Communications

TC Communications specializes in TDM over IP network solutions including Analog Radio, Voice, Serial and T1 products. Applications include Leased Line Replacement, Voter Comparator over IP and Multi-Service communication networks. Focused on mission-critical applications, TC products are designed to help Public Safety networks transition to IP/Ethernet without replacing existing analog equipment. All services including engineering, manufacturing, and support located in Irvine, California, USA since 1991.

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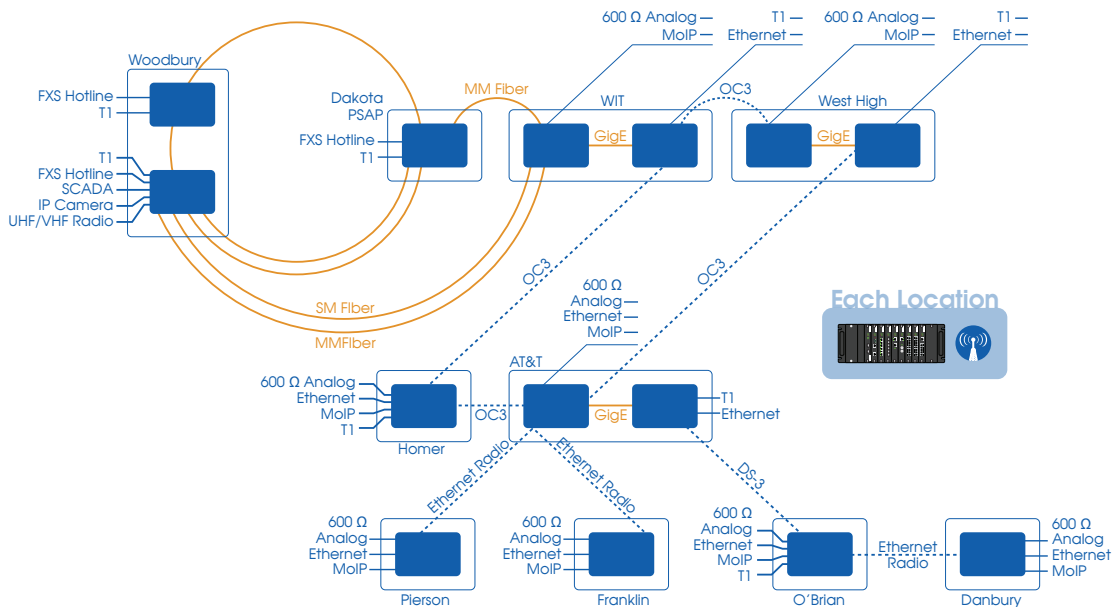
Solution: Upgrading with JumboSwitch®

To design and implement the STARCOMM upgrade, the consortium of public safety agencies from three Siouxland counties – Union, Dakota and Woodbury – selected Calhoun Communications, a local systems

integrator that currently provided maintenance for STARCOMM’s current system and specialized in Public Safety communications networks. Calhoun’s Vice President, Tony Carpenter, called the upgrade project’s requirements challenging.

Calhoun Communications reached out to multiple vendors to find the best replacement solution for the existing STARCOMM network. It ultimately recommended the JumboSwitch® Multi-Service Ethernet Platform from TC Communications.

STARCOMM found the cost of ownership estimates to be very attractive.



STARCOMM Upgraded Network



The JumboSwitch® fit our needs because it not only covered what our existing network was designed to do, but it also was designed to change the existing microwave radio network to a modern IP Radio system,” said Glenn. “And because of costs and future maintenance and warranties, we just felt that TC Communications was the direction to go.

- Glenn Sedivy

Director of the Woodbury County Communications Center

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STARCOMM replaced its aging multi-service concentrators and some T1 multiplexers with a modern JumboSwitch® Multi-Service Ethernet Platform. Using JumboSwitch, they created a single interoperable network platform that uses Radio-over-IP (RoIP), Modem-over-IP (MoIP), T1, Ethernet and VoIP interfaces over OC-3, DS-3, fiber, and microwave radio transport mediums. This enabled all voice communications for law enforcement and emergency services to be shared between all parties in real time.

Results: Migrating, Improving, Managing

Legacy to IP Migration

Using an advanced multi-service Ethernet platform (MSEP) gave STARCOMM the flexibility to replace existing legacy equipment and cutover to the new system with minimal downtime. In fact, Glenn noted that “police officers, firefighters and other end users had no clue that we were even doing anything to the system” during the cutover.

A key reason the JumboSwitch prevented major downtime during the installation was its ability to run over the existing SONET network, according to Tony. “It also allowed for smoother cut-over of T1, 2/4 wire circuits, phone service and added MoIP capability for alarm monitoring communications.”

Because the microwave system is set up in a ring topology, the JumboSwitch units can be integrated one at a time into the network. Linking up to 60 microwave circuits directly to the JumboSwitch with a single connection was an important improvement over the previous MSEP, which required cutting over one circuit at a time.

Improved Audio Quality

The JumboSwitch also improved audio quality, performance and reliability and met all of STARCOMM’s interoperability requirements, including providing interfaces such as VoIP, Modem-over-IP (MoIP), T1 circuits, 2- and 4-wire (analog) circuits, Ethernet, fiber, OC3 and DS3.

STARCOMM was pleasantly surprised by how much the new JumboSwitch network improved voice audio quality.

Simplifying Network Management

Implementing the JumboSwitch Windows-based TCView® Network Management System (NMS) provided STARCOMM with several benefits.



We didn’t realize we had some problems with the audio quality until we switched over to the JumboSwitch® network. The radio technicians said that they couldn’t believe the difference in audio quality between the old system and the new JumboSwitch® system. Until you actually know what it should sound like, it’s hard to believe it could make that much difference... but it did.

- Glenn Sedivy

Director of the Woodbury County Communications Center



TCView® was much easier to operate, less costly to maintain and more user friendly than the previous NMS. Now, one can better anticipate possible system issues before they become a major problem. For example, after the system was installed, it showed a problem with one of the fiber optic links that was unknown before the install. The return path had a 3db lower signal, which caused some packet loss. The problem was found in a bad cross connect

- Tony Carpenter

Vice President, Calhoun Communications

