

## Customer

The state's 911 system, which was developed four decades ago failed to provide the most effective and efficient emergency response possible. An upgrade to optical fiber brings in much-needed updates to the antiquated systems.

## Challenge

Although most calls to 911 are wireless, 911 Centers today need to upgrade to receive text or photos. The next-generation system requires seamless information sharing between 911 centers, first responders, trauma centers, and other emergency response entities.

## Solution

- The initial phase of the deployment included the TJ1270 and TJ100ME, both are high-density Multi-Service Provisioning Platforms (MSPP).
- The subsequent phases included the next-gen products, TJ1400-7 and TJ1400P which provided integration between packet and TDM capabilities.
- All phases included remote management of services with Tejas' easy to use NMS (the TJ5000).



## Tejas Networks upgraded a 911 Emergency Response System from an existing Microwave-based Solution to a High Capacity Optical Backbone Network

In 2011, a US state was looking to replace their existing microwave-based critical infrastructure backbone network with a high capacity optical backbone network. This network carried traffic from 911 calls, police, troopers, EMS, DOT, and many other state agencies. This project evolved over 7-years to provide service to every county in the state with over 230 network elements from Tejas. The network continues to evolve even to this day from a primarily TDM network to a packet network seamlessly, without network interruption.

### Network Requirements

911 service is a vital part of the nation's emergency response and disaster preparedness system. State and local authorities continue to expand 911 coverage and upgrade 911 services. A few of the requirements are listed below:

- The deployed products were required to have built-in modularity, which allow easy upgradeability
- The network had to ensure high availability, reliability, and uptime. Hence, the equipment had to support multiple levels of optical protection
- The solution had to be a proven technology that integrated multiple generations of technology
- The deployment, moving from microwave to fiber was over a terrain with a diverse landscape which varied from lush wetlands to rugged forests
- Simple operations were required from end-to-end

- The equipment had to support stringent power requirements

### Tejas Networks' Solution

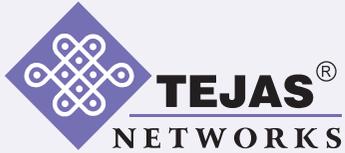
Tejas deployed a unique multi-generation solution to cater to the requirements of the critical infrastructure. The initial deployment started with approximately 160 of Tejas' TJ1270 and TJ100ME packet optical transport products.

The TJ1270 is an ultra-compact, high-density Multi-Service Provisioning Platform (MSPP), which packs many types and a large number of interfaces in a compact 1U form factor. It can progressively scale from OC-3 to OC-48. In addition, it supports line-rate FE and GigE interfaces with Carrier Ethernet capabilities. The TJ100ME supports OC12/48, an add-drop Multiplexer (ADM) designed for an optical backbone, high-speed point-to-point links, and high-density digital cross-connects.

The products support end-to-end

provisioning and management of services across all segments of the optical network using the TJ5000 NMS which also supports point and click provisioning.

The next stage of deployment used the TJ1400-7 hybrid packet optical transport product which provides integration between packet, PON, WDM, SONET/SDH and TDM capabilities in a single compact platform. Based on the next generation Packet Transport Network (PTN) technology, the TJ1400-7 is a 2U packet aggregation solution with a full PTN feature set enabling end-to-end pseudo-wire and Ethernet point-to-point and multipoint services. The TJ1400-7 increased the network reliability by providing optional redundant switch fabrics and the ability to support protected UNIs and NNIs across interface cards. These capabilities significantly increased service availability allowing the network to meet stringent SLAs. Modular interfaces also decreased the meantime to repair by requiring only the affected module or



“The Tejas 1400 family of products is one of the most highly integrated packet optical products in the industry, providing Ethernet switching/MEF services, PON, WDM, SONET/SDH, and circuit emulated TDM services all on the same platform. Its ability to be right sized for any customer application also makes it one of the most economical choices”

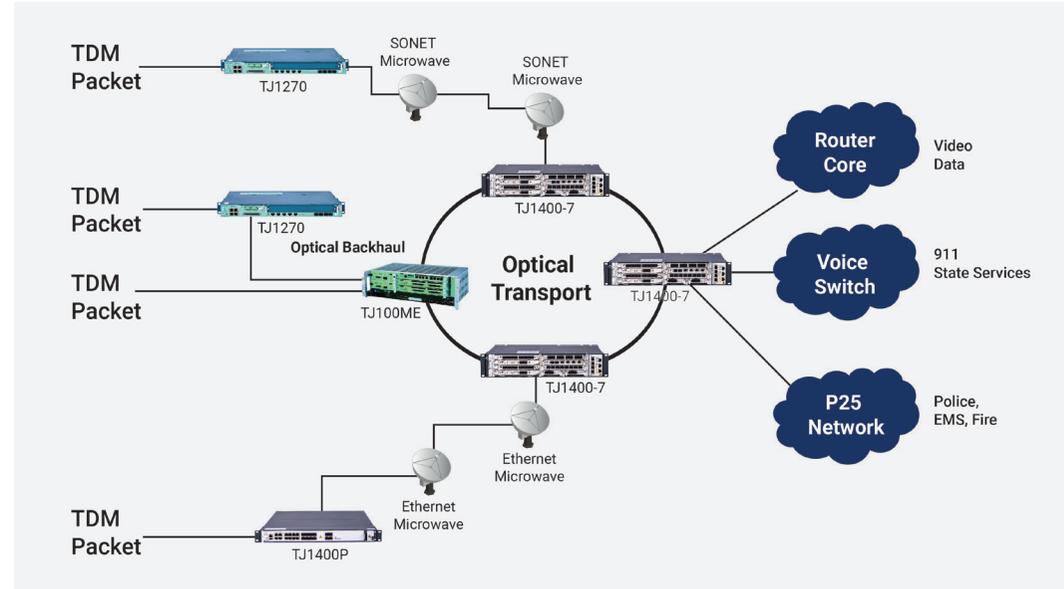
**-Rob Adams,**  
CTO of North America,  
Tejas Networks

pluggable optic to be replaced, not the entire unit. The addition of TJ1400P, which is a 1 RU form factor product in the TJ1400 family, helped deliver integrated packet and circuit emulated TDM over Ethernet microwave spans. In addition, the TJ1400 family also provides 5 RU and 7 RU form factors with varying capacity to further cost optimize for any customer’s needs.

### Why Tejas Networks

After a thorough evaluation, the project used Tejas’ high capacity packet-optical products, which provide a reliable and cost-effective solution for public infrastructure. The key deciding features of Tejas’ solution were:

- A detailed support model with fast response
- An easy evolution to new capabilities with a simplified provisioning model
- Support for an MPLS-TP based connection-oriented Ethernet which allows networks to easily scale from a few services to thousands of services
- Standard G.8032 which provides 50ms protected rings for greater resiliency
- Ethernet OAM which allows real-time monitoring of end-to-end circuits enabling quick detection and isolation of faults
- MPLS-TP based performance and OAM for MPLS-TP based PW services



- For .1q/1ad based MEF services, Y.1731/802.1ag based CFM OAM (Port level and service level) and Y.1731 PM counters
- Tejas’ patented software-defined hardware which allows for easy upgrades through software for features that may require hardware upgrades for other vendor’s products
- An easy to use manager with point and click provisioning making provisioning of services simple and consistent

### Results

The high-capacity optical backbone network project is still evolving with

5 phases over the last 7 years. The last phase was recently concluded with the first deployment of state-of-the-art next-generation Tejas products. Future phases will involve evolution to additional packet capabilities and multiple 10G connections per node. The customer was quoted as saying, “The reliability of Tejas Networks solutions is an integral part of maintaining the safety of first responders and citizens thorough out the state. These solutions will continue to support this critical infrastructure for years to come.” This sums up the deployment experience with Tejas’ products and solutions.

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