

Success Story

Uinta Basin Oil Field

Broadband wireless mesh network for SCADA and mobile workforce automation



Customer Highlights

Challenges

- High capacity outdoor network capable of reliable operation in extreme heat, cold, wind, and dust conditions and in hilly terrain.
- Concurrent support for multiple mission critical IP applications and thousands of IP end points
- Mobile routers capable of withstanding rugged environmental conditions and adaptively meshing with the network

Solution

- High performance wireless network capable of operating reliably under harsh environmental conditions
- Capacity and security to support multiple concurrent applications
- Deployment flexibility – routers deployable as mesh nodes, Wi-Fi hot spot, PTP links

Results

- Replacing cellular cards used by field personnel already yielding cost savings of >\$48K per year
- A single TropOS network replaced two networks (900 MHz and Wi-Fi network) providing higher capacity, better coverage, and significant reduced OPEX

Systems and Services

- ABB Wireless broadband wireless mesh network
 - TropOS 6320 mesh routers
 - TropOS 4310 mobile mesh routers
 - TropOS 1410 mesh routers
 - TropOS Control (now SuprOS) Network Management
- Peloton Wellview
- IP video cameras

A large oil field in Utah's Uinta Basin, with over 3,000 active wells, had been using two separate private communication networks as well as cellular data communications. The private networks included a 900 MHz network dedicated to SCADA and a Wi-Fi network deployed in 10 hot spot locations. Both of these networks shared a single point-to-point (PTP) system for backhaul. The Wi-Fi network was used for mobile client access by more than 300 employees on a 24/7 basis to obtain access to email, the Internet, etc. from their handheld and tablet devices. The Wi-Fi network also supported multiple video cameras used by operations. Cellular coverage across the field is marginal, making the private Wi-Fi network the primary network used for mobile field communications, with cellular as backup. Because of the high monthly cost for cellular data service, only 130 cards were issued to workers. If the Wi-Fi network was not accessible, many workers were without wireless communications in the field, which could negatively impact operations and safety.

Challenges

By early 2013, both the SCADA and Wi-Fi networks were experiencing sluggish and unreliable performance. Even with the cellular network serving as a backup communications network for the Wi-Fi network, its poor coverage and performance still was inhibiting operational efficiency.

A network assessment was conducted by an internal IT Network Specialist who identified the shared backhaul as a bottleneck negatively affecting both the SCADA and Wi-Fi

Power and productivity
for a better world™



networks. As a temporary fix, the network was reconfigured so that only the SCADA network, which supported approximately 20,000 devices, utilized the existing PTP backhaul. The reconfiguration provided some immediate relief, but a more permanent solution was desired to increase the performance of the SCADA network, providing operations with greater access to data.

IT determined that the Wi-Fi network was incorrectly configured and that it was more cost effective to replace, rather than improve, the network to achieve the levels of performance and range desired. In addition, IT suggested eliminating use of the cellular cards to achieve a substantial OPEX savings.

Another challenge the IT team needed to take into consideration is the weather. The area experiences extreme weather year round, -18°C in the winter and 8 inches of snow, rising to triple digit temperatures in the summer months. Severe winds are not unusual and often reach 60 mph. On average the area gets only about 8 inches of precipitation each year making the rocky terrain very dusty with little vegetation.

Solution

Based upon previous experience, the IT Network Specialist recommended use of a TropOS outdoor wireless mesh network. While cellular communication was available in some areas, it was not deemed a viable alternative as accessibility was limited and capacity poor in many areas where access was needed.

A decision was made to setup a pilot a TropOS network to allow evaluation of the technology. In less than a month, the TropOS pilot was installed and fully operational.

The TropOS wireless mesh network has now been deployed across the oil field and delivers connectivity to areas where there are active operations. To provide some perspective on distance between the hot zones, the PTP link between a compressor site and the main office for the field is approximately 12 miles.

The deployment uses TropOS 6320 routers powered by solar power; 20% of the routers are configured as gateways. The gateways currently connect to legacy PTP radios for backhaul. These legacy PTP radios are being replaced by higher capacity microwave links enabling the consolidation of backhaul for SCADA and Wi-Fi traffic on a single network, simplifying operations and reducing on-going costs. Additionally, TropOS 4310 mobile mesh routers are deployed as mobile nodes in trucks. The TropOS mobile routers are mounted in the back of the vehicle's cab or under the driver's seat.

By mid-2014, IT plans to have TropOS connectivity to all of the more than 3,000 wells in the field, which will provide connectivity to more than 20,000 IP SCADA devices across the play. Plans are for the TropOS network to support both SCADA and Wi-Fi. Typically, within oil and gas operations, the two types of networks are operated and maintained separately. SCADA and the associated network are usually operated by field operations and Wi-Fi networks for mobile connectivity by IT. Combining the two networks provides significant operational efficiency improvement and costs savings.

The TropOS network supports multiple concurrent applications including:

- Peloton Wellview – a critical application used during well planning and deployment. It provides engineering with key reports, schematics, and analysis tools to bring a new well online. Personnel in the field and at the central office can access the well information enabling them to track the progress of new well deployment.
- Remote Terminal Unit (RTU) – SCADA data is collected at each well pad by an RTU that connects to 7-10 IP devices. As the 900 MHz network devices fail, they are being replaced by TropOS 1410 mesh routers.
- Wi-Fi access – In the field, operators use laptops and smart phones which connect to the TropOS network for a range of applications, for example, email, access to SCADA data, syncing well production data with field accounting, providing operators with their route at the end of the day. On an average day, the network hosts 250-300 unique IP addresses from mobile devices used by 400 operators in the field.
- IP video cameras – most IP video cameras in the field are co-located with a TropOS 1410 mesh router for wireless connectivity. The video feeds are used by operations and deployed at water injection facilities. The IP camera is used to monitor and record incidents such as spills or other operational issues providing quick visibility so problems can be quickly addressed and the cause understood. The cameras store a limited amount of video which can be viewed in real-time by engineering; recorded video is sent periodically to a central location and stored where it can be accessed.

Results

- A single TropOS network consolidated communications for two networks (900 MHz and Wi-Fi network) providing higher capacity, simplifying management, offering better coverage, and delivering significantly lower TCO.
- Approximately 130 cellular cards were in use by field personnel before the TropOS network was in place. Monthly service per card was \$50 and service was inconsistent. To date over 80 of the cellular cards have been replaced by the TropOS network representing an annual cost savings of more than \$48,000 per year. It is expected that service for the remainder of cellular cards will be terminated over the next few months.

Click the link to learn more about ABB Wireless [communication networks for oil and gas](#).

ABB Wireless

3055 Orchard Drive

San Jose, CA 95134, USA

Phone: +1 408 331 6800

E-Mail: wireless.sales@nam.abb.com

www.abb.com/unwired

Power and productivity
for a better world™

