Success Story

Eagle Ford Oil Field

Wireless mesh delivers reliable broadband communications for oil fields

Customer Highlights

Challenges

- Reduce CAPEX and OPEX for expanding communications in remote oil fields
- Reliable SCADA communications for field automation
- High network capacity to concurrently support mission critical and corporate productivity applications
- Support for VoIP applications to improve worker safety
- Physical obstructions making wireless communications difficult

Solution

- A wireless broadband network with high reliability and capacity plus the ability to easily scale
- A mesh network that automatically uses many paths, RF channels and RF bands to dynamically route around interference
- Multi-layer, standard-based, security to secure the RF links themselves as well as access to the network
- A multi-use infrastructure with the capacity and QoS to concurrently support latency sensitive SCADA and VoIP applications as well as other corporate applications

Results

- Significant cost savings – installed TropOS node costs 40% of installed (legacy) PTMP node
- Better coverage, fewer towers – TropOS required 10 utility poles instead of 120 towers for PTMP to achieve similar coverage
- A single network foundation with capacity to support multiple applications

Systems and Services

- ABB Wireless broadband wireless mesh network
- >2500 TropOS mesh routers
- Tropos Control (now SuprOS) wireless network management system

Eagle Ford was a greenfield project for this exploration production company. They had no existing field communications infrastructure in place when they began. The terrain includes rolling hills and wooded areas making it challenging for many wireless technologies that rely on direct line-of-sight.

Challenges

For initial field communications the company used VSAT for carrying critical SCADA control and monitoring traffic. VSAT provided connectivity where needed however was suboptimal with its relatively low speed and high operational costs. As they expanded operations from drilling to include both drilling and production, the company augmented VSAT services with a 900 MHz point-to-multipoint (PTMP) radio system which could provide higher capacity but was susceptible to interference from other operators utilizing similar systems across the Eagle Ford area. Long haul point-to-point (PTP) radios were used to backhaul the traffic from the field to the nearest public network point of presence (PoP).

To achieve desired coverage, the PTMP radio system required construction of costly radio towers. PTMP radios, which require clear line-of-sight, were mounted high off the ground to overcome potential obstructions (differences in terrain elevation, seasonal foliage changes, and the curvature of the earth). In 2010, the company constructed 19 such towers and in 2011,

an additional 120 towers. With a typical tower cost of over $15K per tower, this translated to more than a $2M investment in towers alone.

In 2012 the company sought to identify a wireless communications infrastructure that would be used to extend coverage and meet more stringent criteria than the PTMP radio network as they deployed additional and more demanding (higher bandwidth and lower latency) applications. They wanted to identify a single network that could support mission critical SCADA as well as productivity enhancing application such as email, Web, Citrix, broadcast corporate video streaming, and VoIP.

The VoIP application extends the corporate voice network to control offices and mobile workers across the field via a SIP client on various types of handheld devices. VoIP had been identified as an important application for not only general communications but for improving field worker safety. VoIP would enable workers to quickly request help when critical situations arose in remote locations where other communications were unaccessible.

In addition, the company desired a network with some nodes that could be easily installed and moved between different locations within Eagle Ford to comply with lease agreements that did not permit installation of permanent structures other than the wellhead equipment itself. To accomplish this, they planned to use some transient nodes mounted on trailers. After drilling was completed, these trailers could be relocated close to new drill sites. The ability for transient nodes to quickly re-establish network connectivity without manual intervention was important for streamlining operations.

Wireless network goals:
- High capacity
- High reliability (99.999%)
- Ability to support multiple concurrent applications
- Significantly lower total CAPEX than 900 MHz PTMP radio systems
- Ease in deployment with new nodes/re-located nodes to quickly and seamlessly join the network

Solution

The company selected a TropOS wireless mesh network and initially deployed it in Eagle Ford. The flexibility of the TropOS mesh enabled them to easily deploy across the varied terrain and provide desired coverage and capacity. Additionally, since the TropOS mesh does not require long links, they were able to utilize 40 foot utility poles to mount the TropOS routers and solar to power the units. This approach was far easier and faster to install than towers.

Results

The cost per TropOS node installation including the utility pole, cabinet, solar power panel, TropOS 6320 mesh node, cabling, and labor is only about 40% of the cost of a PTMP node and its associated tower. The TropOS system offers better coverage because of its mesh capability and requires fewer nodes. In some instances one TropOS node provides communication for multiple wells (pad type) while wells farther apart each have a dedicated TropOS node. With TropOS, far few towers were required for construction allowing the company to add 10 utility poles in 2012 for TropOS nodes whereas with the PTMP nodes it was estimated they would have needed 120 towers to cover the same area.

Currently the company has more than 2500 TropOS mesh routers installed. They are using existing PTMP radios to provide backhaul (up to 12 Mbps) for each TropOS gateway router. They have begun rollout of new PTMP radios that will increase backhaul capacity to between 20 to 40 Mbps per gateway. This will allow them to reduce the number of gateways while increasing overall capacity.

Click the link to learn more about ABB Wireless communication networks for oil and gas.

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