

ANTENNAS AND SITE SOLUTIONS FOR THE OIL AND GAS INDUSTRY

Wireless Network Performance Is Critical for Oil and Gas Operations

The modern oil and gas industry relies on wireless communications. From offshore oil rigs to hydraulic fracturing sites to central refineries, wireless networks provide a communications backbone for both humans and machines.

This communications backbone allows the oil and gas industry to operate safely and efficiently. Automated monitoring and control systems improve the industry's efficiency. So, too, do enhanced communications that keep workers in touch with each other and with central servers. Wireless networks can alert workers to hazards or automatically shut off systems in response to sensor data. Wireless networks also have other applications, such as asset tracking, monitoring for theft, and maintaining safety records. Whether you are involved in exploration, drilling, extraction, pipeline monitoring, or refining, wireless network performance is critical.

Exploration, Drilling, and Extraction

During exploration, drilling, and extraction, wireless networks are used to track vehicles as they move from site to site, to monitor well depth, and to provide on-site voice and data communications. These networks need to provide reliable connectivity with minimal setup time. Because of the distances involved, wireline networks are often expensive and impractical. That makes rugged wireless equipment the optimal choice for these applications.

Remote environments frequently require local coverage throughout the site and backhaul to existing network infrastructure.

Exploration, drilling, and extraction activities might also require satellite tracking of heavy equipment, vehicles, tools, and workers. Generally, low profile rugged antennas connect equipment to a central or mesh network and to the GPS or other GNSS satellite networks. Some monitoring equipment requires only narrowband (such as UHF and VHF) connections for data transfer. Increasingly, however, with the advent of high bandwidth applications such as video monitoring and more complex process automation, equipment, and workers alike need consistent high bandwidth connections. These connections are often provided through 900 MHz, 4G LTE, or WiFi spectrum.

Supporting infrastructure for remote and mobile wireless networks includes not only radios and antennas, but also enclosures, racks, and cabling. All of this equipment must be extremely durable. Salty seas, high winds, extreme temperatures, dusty or sandy environments, and frequent transportation are all threats to a wireless network.



APPLICATION
NOTE

Pipeline Monitoring

Durability and reliability are the most important features of wireless networks used for pipeline monitoring. Pipelines are a safer transportation method than road or rail, but they are still vulnerable to leaks, spills, and dangerous accidents.¹ Wireless communications enable remote monitoring of pipeline integrity and valve control for flow adjustment. This allows pipeline operators to respond

quickly to potential hazards. Performance critical antennas are a crucial part of a reliable pipeline monitoring network. GPS and multiband GNSS antennas provide both location information and network timing. Directional antennas transmit both monitoring and location data over long distances. These antennas need to function continuously for many years. Durability and consistent performance are essential.



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Refining

Refineries, much like drilling and extraction sites, require complex networks to support both humans and equipment. Unlike remote drilling sites, refineries rarely require portable solutions or long-distance wireless backhaul. However, the demands on the network in terms of coverage and capacity can be much higher. Voice communications networks at refineries carry a heavy traffic load and must perform reliably for long periods of time. In addition to managing high traffic levels, wireless equipment in refineries must survive the wear and tear of an industrial environment, including exposure to corrosive chemicals or to weather elements in outdoor installations. Low profile antennas provide coverage to tucked-away equipment, while larger directional and omnidirectional antennas provide high-speed connectivity throughout the refinery site. Accurate network timing, established using GPS and multiband GNSS antennas, enables both voice communications and automated processes.



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Mission Critical Networks Demand Performance Critical Equipment

Wireless networks for oil and gas aren't luxuries—they're mission critical. That means that wireless network performance is also critical. Every component of the network must function reliably. This includes not just active radio equipment, but also passive components such as antennas, enclosures, surge protection, and cabling.

PCTEL designs, tests, and manufactures performance critical antennas and site solutions for the oil and gas industry. Our products consistently perform the way they are designed, even after years of installation in harsh environments. Our customers include cellular carriers, leading radio manufacturers, and experts in the oil and gas and industrial wireless industries for whom we have developed a complete portfolio of antennas.

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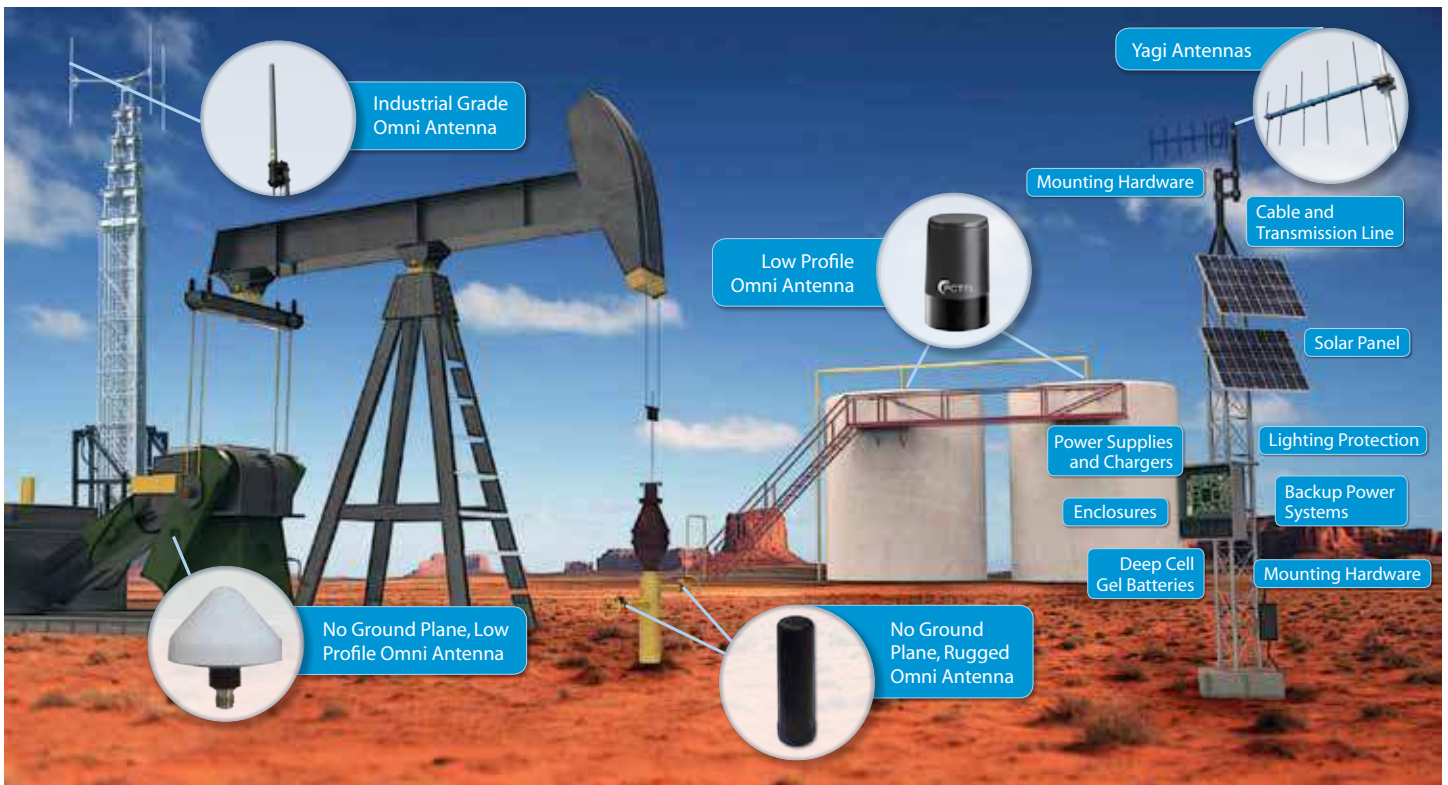
Our portfolio includes low-profile, vehicular, omnidirectional, and directional communications antennas, as well as timing and tracking satellite antennas, including our industry-leading high rejection GPS antennas. We also provide passive equipment needed to provide site connectivity beyond the antenna, including RF cable assemblies, surge protection, equipment enclosures, site hardware, and mobile towers.

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We pride ourselves on both the consistency and durability of our products. To ensure that they perform according to specifications, our antennas are designed and tested using anechoic chambers. To ensure durability, all of our antennas are routinely tested to MIL-STD-810G specifications. We can also accommodate other environmental requirements. Our in-house environmental test equipment includes thermal shock, vibration, humidity cycling, salt spray, and salt fog. Finally, we back our equipment with multi-year warranties that reflect our confidence in the quality and durability of our products.

That's why customers count on PCTEL products when it matters.



In the Field Case: Well Site

A leading global supplier of technology and integrated solutions to the oil and gas industry needed continuous RF communications for controls and gauges at its hydraulic fracturing sites. Communications would be provided by access points temporarily installed on pump trucks. Because these trucks would be deployed with a different orientation at each site, the supplier needed a solution that would be easy to move to different positions in order to provide a reliable communications link. The solution also needed to be robust and durable. The supplier came to PCTEL for a solution because of PCTEL's ability to understand and address complex environmental, performance, quality, and regulatory issues, as well as PCTEL's exceptional engineering response time.



PCTEL's engineers set to work developing a custom solution that met these very specific needs. PCTEL came back to the supplier with a custom portable enclosure and mount coupled with MIMO antennas. In addition to providing the required bandwidth performance, the antennas were vibration resistant and environmentally sealed. The customer was pleased with the solution.



Once the solution was developed, PCTEL packaged the solution into a single SKU part number that allowed for quick and manageable deployment. The first order shipped within weeks.

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¹ Diana Furchtgott-Roth and Kenneth P. Green. "Intermodal safety in the transport of oil." *Studies in Energy Transportation* Fraser Institute, October 2013.

CONTACT PCTEL CONNECTED SOLUTIONS™ FOR ASSISTANCE

PCTEL Connected Solutions designs and delivers performance critical antennas and site solutions for wireless networks globally.

