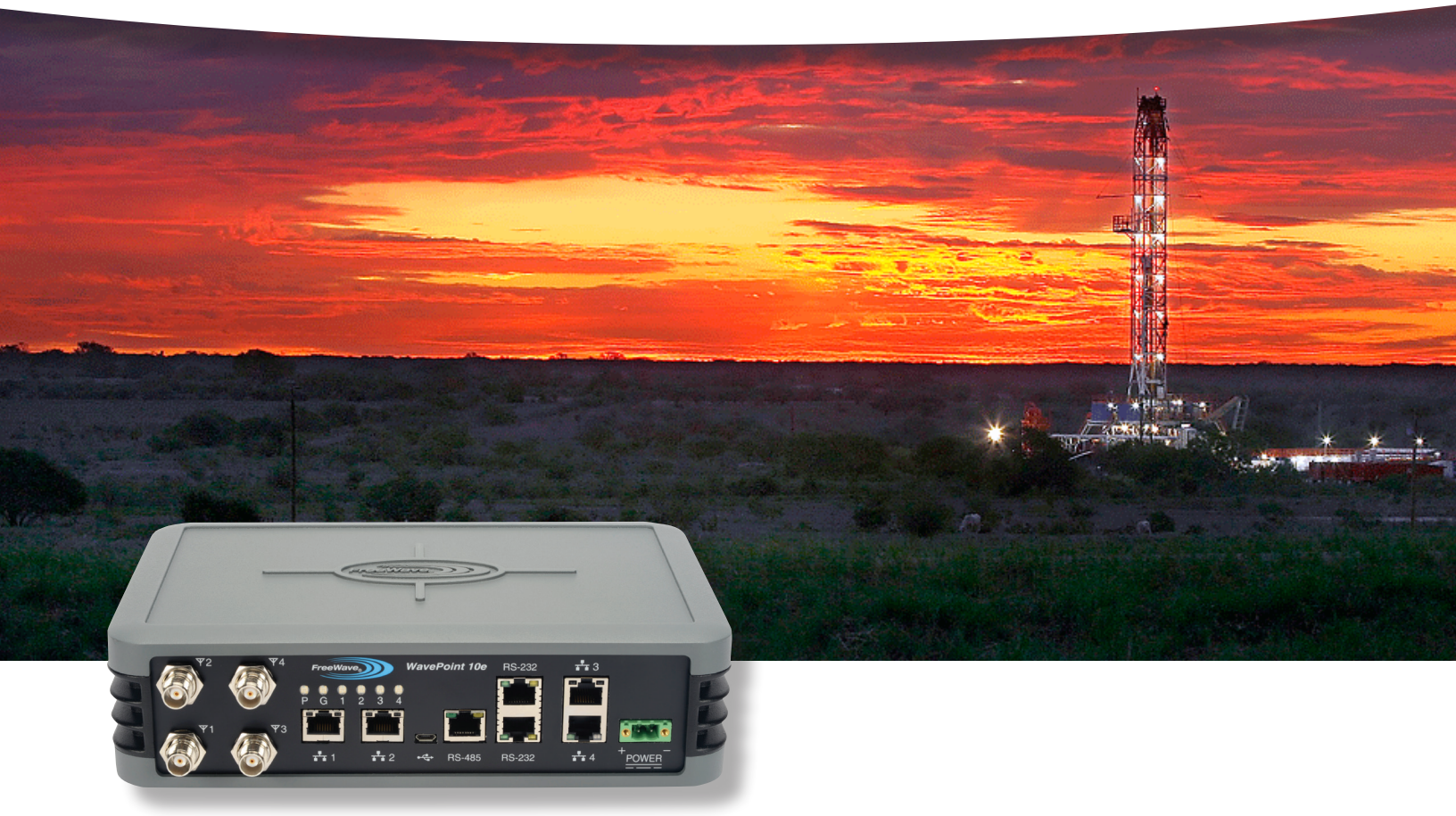
Building the Digital Oilfield of the Future

How Technology is Redefining Oil Field Production and Data Communications

By Dan Steele, Director of OEM, Utility and Energy Markets, FreeWave Technologies, Inc.



The oil and gas industry is changing. Not only are remote sites continuing to proliferate, the demands of 21st-Century technology and access requirements are expanding at an unprecedented pace. Today, it is no longer acceptable to have lags in data communication. The industry faces challenges moving forward, including remote monitoring of well heads and storage tanks, dealing with 24-hour production demands, and managing high costs in both time and money to manage far-flung sites.

Traditionally, companies were tasked with seeking multiple solutions to address these challenges – ad-hoc communication networks or combinations of networks to try to suit applications. But as wireless broadband has grown in popularity, and the M2M industry has evolved, today's technology offers comprehensive solutions that suit almost any communication need in the field, both local and remote.

FreeWave®

Unlocking the Future of Oil & Gas Exploration and Production Data Communications

In today's digital oil field, the name of the game is speed and reliability. Across the entire utility industry, not just oil and gas, production needs have ramped up exponentially each year, forcing companies to scramble to find the best possible solutions to meet those needs. To successfully meet the increase in demand, as well as address the host of accompanying challenges, companies needed high-bandwidth, two-way connectivity that:

- Enables remote and local M2M monitoring and control of wellheads and pipelines
- Securely connects them to the operations center
- Empowers maintenance team members to connect with video, voice and data communications in real time.

Fortunately for the industry, advanced technology has kept pace.

High-speed Problem Solving

The only way to successfully run oil and gas operations is to ensure that each element and moving piece is functioning as smoothly as possible. When faced with aging pipelines at remote locations, sending a repair team is costly, in both time and money. What if the team doesn't have the necessary pieces for a repair? It's a wasted trip and it railroads the operation, halting production and eroding efficiency. With today's technology, two-way, high-speed communications effectively eliminates these problems. Real-time video and data feeds allow dispatchers to monitor the wellhead or pipeline site, providing them with the necessary information to make decisions quickly and communicate with repair crews in real-time, cutting out the unnecessary lag between the breakdown and the repair.

Broadband connections in the field are a crucial tool for any organization. Providing access to high-speed Wi-Fi access points and 3G/4G cellular backhaul allows field personnel to access information in remote sites, a capability that previously was limited to fully wired sites. Wi-Fi at the wellhead gives workers the ability to log into the system and troubleshoot

on-site, no matter how remote. And imagine how much of a difference that makes for maintenance crews that can perform diagnostics from the cab of a pickup truck during a snow storm or other inclement weather.

Security and Surveillance

One major challenge associated with far-flung sites in remote areas is the ability to establish security and surveillance without the benefit of on-site personnel. With millions of dollars sunk into wellheads and pipelines, it makes sense to protect those investments. Transmitting high-quality video in real-time over a broadband network is an invaluable commodity. Driven by the demand for video and other bandwidth-intensive applications, some of today's newer wireless communication solutions transmit information up to 200 mbps, providing enough bandwidth to enable video surveillance for improved site security.

In addition to high bandwidth, field solutions are incorporating end-to-end Internet Protocol (IP) connectivity which allows all different kinds of traffic to be sent over a single link. In order to ensure that there is no interruption in connectivity, new technologies are equipped with mesh networking capabilities that operate on a "best path" system, meaning, if one path breaks down, the network automatically reroutes itself to the next best option bypassing the breakage and maintaining an uninterrupted flow of the video or data stream. For organizations with numerous locations, being able to rely on communications networks to provide uninterrupted feeds and updates means that asset tracking and trespasser alerts can happen instantly – protective measures that are invaluable both financially and psychologically.

The Future of Wireless Broadband in the Field

Because different kinds of communication networks require different frequency bands, wireless broadband solutions must be able to meet these needs. Some providers offer the ability to leverage multiple radio

modules per unit with high over-the-air data rates, high bandwidth and secure communications. Furthermore, the ability to support a 3G/4G modem in the field provides companies with flexibility on multiple levels: connectivity for mobile devices like phones, tablets and laptops; accelerates network deployments; and, when wired networks go down, a wireless broadband solution can use its drop-in network capabilities to serve as temporary communications until the damaged systems are up and running again.

The evolution of wireless broadband in the field is not without its opposition. Some critics hold strong to the belief that wired systems are more dependable and carry less risk than wireless solutions. In the past, these were valid concerns. But wireless systems have been developed to the point that today, across the industrial spectrum; wireless is accepted and incorporated as seamlessly as wired systems. For adopters, huge benefits await, including determining how resources can be leveraged in the most valuable way, achieving greater operational efficiencies, increasing productivity, and improving production quality and innovation within organizations. Additionally, because these wireless solutions require no retrenching, no rewiring, and do not require digging for repairs, the environmental impact is greatly diminished. For an industry under constant scrutiny for its exploratory practices, valid or not, taking steps to mitigate these concerns and criticisms is not simply a token gesture, it is a strong step toward educating the public about companies' abilities to adapt to new technologies and advancements in a way that virtually has no downsides.

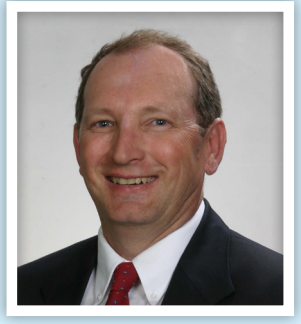
From Wellheads to Headquarters

The growth of wireless broadband technology in the field has come with another set of perks: a wide array of remote monitoring capabilities. Today's "smart" wireless routers allow asset-intensive organizations in the exploration and production field to pull information and data from geographically dispersed sites back to headquarters. This increased level of corporate control is the next generation of remote monitoring. For many organizations, wellhead sites to office or headquarters communications are trending toward an IT-centric umbrella. The digital oil field is rife with opportunities to leverage the ability to connect remotely to corporate networks. Where previous communication models relied on intermittent transmitting and monitoring, the capabilities enabled by today's gateways at the edge, in the form of smart routers, allow for headquarters to track assets in real-time, no matter how hard-to-reach or remote a site may be.

A Brave New Wireless World

The oil fields of today are a far cry from the fields of the past. As with any industry based on innovation, execution, precision and speed, stagnation is a death knell. Each year, technological advancements offer better and more efficient means of achieving the same end. The wireless solutions available are ideal for solving the myriad challenges facing the industry. Keeping up with increased demand of a 24-hour production cycle, monitoring remote sites in far-flung areas with little-to-no on-site personnel, and managing the cost of both the time and money required for crews to go on-site are all very real problems. Now, there are very real solutions.

About the Author



Daniel G. Steele is the director of OEM, utility and energy markets at FreeWave Technologies. Steele has more than 25 years of experience selling Supervisory Control and Data Acquisition (SCADA) networks for the water and wastewater, oil and gas, electric utilities, railroad, traffic, government and process control instrumentation markets. Some of Steele's previous experience includes; Senior Vice President of Sales of Bluewave Antenna Systems, the Western Division Manager for Automation-X, regional Sales Manager for Microwave Data Systems (now GEMDS), Branch Manager for JMC Instruments, Regional Sales Manager for Rockwell Automation; and, Branch Manager for Water Works Equipment Company.

About FreeWave Technologies

FreeWave Technologies (www.freewave.com) is the leading provider of wireless Machine to Machine (M2M) solutions that deliver reliable access to data for leading companies in the industrial Internet of Things (IoT) markets. FreeWave's fast, flexible and easy-to-deploy solutions streamline connectivity over long distances to create significant operational efficiencies for oil and gas producers, government and defense contractors, agricultural equipment manufacturers, energy and smart grid networks, municipalities and more. With 20-plus years of experience in the M2M market and more than 1 million radios deployed in the field, customers repeatedly turn to FreeWave to maximize their value in connecting M2M devices to optimize real-time decision making.

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