Oil and Gas:Ringing UpRemote Assets

Jim Gardner, a radio modem expert, discusses the pros and cons of Ethernet technology

By Joy LePree

After investing millions of dollars in legacy serial communications systems &#151 and in many cases, millions more in older SCADA RTUs (remote terminal units) and EFMs (electric flow meters) &#151 many oil and gas producers are finding themselves in a pickle. Why? Because they are now being driven by IT to convert these systems to Ethernet. While it may sound like a difficult and costly undertaking, Jim Gardner, business development manager of oil and gas for FreeWave Technologies, a manufacturer of 900 MHz and 2.4 GHz license-free spread spectrum radio modems and licensed-band radio products, says the benefits of Ethernet usually make it worthwhile. "The first advantage is that people have been using licensed radios in the oil and gas industry for almost 20 years, and the frequency allocations are pretty well used up in areas where there's a large oil and gas production industry such as Midland, TX. New frequencies just aren't available," he says. "With spread-spectrum radios, we now have the ability to put in radio systems that don't need FCC licenses. And with some of the newer products, there are new allocations of frequency, so we've opened up a new world for people to purchase a license from the FCC and have their own dedicated frequency." In addition, Ethernet allows producers to easily manage remote assets. In this month's Q&A, Gardner details the benefits of Ethernet as well as the associated costs of converting old communications technology.

Q: What are some of the benefits of Ethernet technology for the oil and gas industry?
A: Everyone is trying to monitor and control remote assets without sending personnel out to distant locations. It's expensive to send someone on a three- or four-hour drive several times a day to check a well. People want to get the same benefits without leaving the office, and Ethernet technology allows personnel to be virtually on location. Processes can be started and stopped, gas production levels can be monitored, and tank levels can be checked, just as if someone were physically at the location of the asset. Radio is the key that allows us to create a link in the office and do all this.

Q: What are other benefits associated with Ethernet?
A: Security is one of the best reasons to make the switch. Serial radios just can't provide all the security features of Ethernet. You can supplement serial to get certain levels of security, but it's still not as secure as Ethernet. With Ethernet technology, the radios themselves become individually addressable, and you know that you are talking only to that radio. You can also create a "white list" or "black list." The white list would include TCP addresses that are authenticated on the system and are permitted to talk. This prevents someone from finding or stealing a

radio and talking with a major oil company's network. Users have to be authenticated or the system won't respond.

Q: Is there a disadvantage to deciding to use this technology?
A: If you have a lot of very remote assets, they are probably powered with solar and back-up batteries, and, when using Ethernet, your computer talks to the network all the time so there is always a condition of "open to talk," which consumes a lot of power. In oil and gas operations, it is common that there's no discussion going on most of the day, so it becomes expensive to keep the power going when there's no dialogue. With serial, this isn't an issue because the radio goes into low-power mode between conversations. A serial radio polls and checks for data and then goes into low-power mode after receiving a reply from the asset. With Ethernet, they never go to a quiet mode because they have to be available for questions and security at all times, which consumes a lot of power and becomes costly.

Q: How costly is it to convert to Ethernet, and what is the ROI?
A: There are several aspects to consider when switching to Ethernet. First, there is the cost of the radio. Some are inexpensive with short range, while some have a great range but are expensive. And, lifecycle costs of the equipment must be considered. For example, there are some radios you can buy for $500, but it would cost you $20,000 a year to install and operate solar power and batteries out by your remote locations, so you might want to consider different equipment. But if your location is someplace where there's AC power and you can just plug in the radio, then the less expensive radio might be a good fit. Part of the magic is understanding what a product can do, as well as the power consumption, range, and throughput of the product and matching it to your needs. You must find the right product for your needs in order for it to be cost-effective. As far as ROI, if you choose the right product, the return will be fast &#151 probably less than 90 days &#151 just based on not having to drive out to the asset several times a day if you factor in the wages, hours of driving time, wear and tear on vehicles, etc. Also, more critical, but less tangible, is the availability of alarms. If you get an alarm that says a tank is full, someone can take care of it before there's an EPA mess on your hands. It's hard to put that into quantifiable numbers, but if it happens, the pay-off is in minutes.

Q: Could this technology be applicable to other chemical processors?
A: Absolutely. Any time you have systems where there are remote points that you need to monitor to understand how the entire system is working, there are benefits. For example, if there's a large petrochemical factory with tanks in one place and chemical injection processes in another, users can wirelessly bring all the information back into a control center. There are huge advantages in being able to do that in real time and monitor all those assets right there in front of you.

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