

SCADA simplified



Parker Water & Sanitation District updated its communication network with wireless radio technology integrated into its SCADA system.

By Tony Milone

Steps to a successful communication network

When Parker Water & Sanitation District in Parker, Colo., wanted to give its communication network a complete overhaul, it looked to technology solution partner Process Control Dynamics Inc. (PCD Sales) for help finding a real-time, reliable option for wireless technologies. PCD Sales identified a wireless radio technology that was within the district's budget and would easily integrate into the existing SCADA system. By offering a faster, more reliable communication network, not only would the district ensure optimization of water operations, but also help enhance public safety by constantly monitoring critical data, such as tank level, temperature and pressure on a real-time basis.

The radio vendor also provided Parker Water & Sanitation District with complimentary network design, path study analysis and diagnostic tools. It mapped and identified locations for network gateways. The district then had a clear path of development and a chance to test the radios before integrating them into its overall communication network.

By selecting a wireless technology provider, Parker Water & Sanitation District has increased its bandwidth a hundredfold. Much of its success in establishing an integrated communication network can be attributed to network design and path studies. These have allowed the district to develop a network that is capable of delivering real-time communication across long distances, despite the hilly terrain and rapidly changing weather of Colorado. Parker Water & Sanitation District staff also cites its ability to diagnose and configure communication issues from a desktop, along with top-notch customer support, as key success factors.

By utilizing the steps above as a starting point, it is possible to develop a network that not only meets current needs, but establishes a game plan for future growth. This future growth can and should be physical as well as spatial. An ideal communication network is a solution that considers budgetary constraints and technological advancements. It combines existing infrastructure with future hardware selection and deployment. It anticipates the unexpected and is prepared for reliable delivery. It maintains control

of resources and processes, and the security to protect critical infrastructure.

Getting Started

Water and wastewater operators looking to build a communication network most likely will have dozens of technology options to choose from. Investing sufficient time and effort into research, planning, testing and implementing this process can become challenging and expensive. Additionally, if the best-fit or suitable technology is not selected or implemented correctly, the operator can expect to spend a significant amount of time and money dealing with network issues and communication failures. With assistance from reputable technology vendors, however, water and wastewater operators can simplify their communication network building process and avoid uncertainties and wasted resources. The end result is the streamlined implementation process of a reliable SCADA network.

Steps for Success

In order to achieve the successful implementation of a communication network that meets current needs and long-term objectives, time must be invested in understanding goals, available resources, different technologies and industry trends. It then is possible to build a communication network strategy complete with tactics and measurable objectives.

The following are some tips and best practices to consider:

Identify needs, goals and limitations. Operators should consider the equipment and locations with which they want to communicate. Additionally, they must understand the future communication plan. As a starting point, it is important to speak with managers and other internal personnel in the organization and understand the efforts that have been made to date on the communication front, the challenges that have been overcome and the lessons that have been learned. The IT department is a great place to start. It also may be helpful to seek out external trusted sources that have recently gone through the process, and learn from their planning successes and failures. From this information, operators can identify the needs of the system and better understand inherent limitations.



A reliable communication network ensures the optimization of water operations.

ARTICLE SUMMARY

Challenge: Parker Water & Sanitation District needed a communication network overhaul.

Solution: The district's radio vendor recommended a wireless radio technology that was within budget and would integrate into the existing SCADA system.

Conclusion: The district has increased its bandwidth a hundredfold.

CRITICAL communications

The importance of workforce communications

By James Mustarde

Identify budgetary concerns or restrictions.

After determining the communication network's requirements, the next step is to analyze its costs. It is important for operators to know how much they can spend for capital expenditure and operating costs. Many costs are hidden in the actual rollout and long-term support of a system. Depending on the technology, the initial purchase (budgeted capital dollars) sometimes is dwarfed by the cost of maintaining a system (operating budget). Know which support is available from both the seller and the manufacturer, including warranties and "promises."

Know the market and available technologies.

Research all available options to learn what is available now and what is going to be available in the future. It may be helpful to talk with colleagues or attend association meetings or trade shows. Each manufacturer and technology has advantages and disadvantages, so investigating as many options as possible is essential. An operator can benefit from learning how various generations of products from the same manufacturer work. If, for example, a radio manufacturer is not compatible with past, current and future generations, an operator needs to work with the manufacturer to figure out a strategy for upgrading when the network needs to be expanded.

It also is important to understand the interoperability between devices and vendors. If mobile access to a SCADA network is required, then it may be best to source a vendor that already has this capability integrated into its offerings. Another example is the need to piggyback slower licensed radio networks onto a faster 902- to 928-MHz frequency-hopping, AES-encrypted network. Operators need to be aware of how combining separate wireless networks of varying technologies and vendors is possible. These are just a few examples that show that a combination of technologies may be the best choice.

System design, deployment and support.

Taking the extra step of having path studies and network design models completed is key to success. Most reputable organizations will offer these services for little to no charge or will waive the fee if the operator buys the equipment. In addition, most vendors have networks of integrators, engineers and consultants who also can be utilized in this process. After reviewing the path study and network design information, an operator can focus on preparing a project plan that details the installation stages prior to actual deployment. Once the installation strategy is complete, an operator should evaluate the need for accessories—coaxial, antenna, surge protection, band-pass filters and proper sealing against the elements are just a few.

Lastly, make sure the company that sold the equipment is committed to its success. It is not unreasonable to expect a dedicated technical contact that is available to assist you by phone 24 hours a day, seven days a week, 365 days a year. **WWD**

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The water industry is one of the most critical, processing and delivering water to customers while under high scrutiny and strict health and safety regulations. Pushed to modernize, yet plagued by rising costs, the industry is on a constant lookout for ways to improve performance, meet customers' and regulators' demands, and add value without adding significant cost to operations.

Water industry decision-makers often face a difficult choice: invest in infrastructure upgrades and risk financial pressure, or stay static in development and conserve costs. This dilemma leaves many searching for ways to do more with less. With funding often insufficient to cover both operational costs and improvements to infrastructure, strategic asset management is key.

Many operations in the water treatment industry rely on proven but dated devices and systems—such as two-way radios or carrier-based push-to-talk (PTT) networks—for the bulk of their mobile workforce communications at treatment plants and other facilities. While these systems are durable and reliable, they have always been limited in their range and functionality, and their proprietary nature did not allow for interoperability with other networks, forcing users to carry multiple devices if they desired cross-team communications. However, two-way radios continue to be deployed for maintenance work, where crews are familiar with their relative simplicity and durability.

Integrate to Improve

Rather than seeking to replace radio systems from the ground up, water professionals can modernize overall communication capabilities by extending the life and efficacy of older systems and letting them work alongside newer devices such as smartphones.

Software applications that can dramatically expand the reach, flexibility and interoperability of PTT systems are available. Adopting new systems can seem daunting to facilities operators, but the water industry has already seen the benefits of adopting new technologies in myriad facets of their operations—smart meter installation, energy use monitoring, water analysis and asset management all come to mind as areas in which the industry has adopted software solutions to increase efficiency and empower workers to be more effective.

By enabling workers to use devices such as smartphones for instant PTT communications, software applications can expand the solutions available to staff members while still incorporating existing devices such as two-way radios. Server- and device-based applications can allow workers using almost any type of device—two-way radios, smartphones, desktop PCs and more—to communicate with one another, letting operators take advantage of existing communication assets in addition to newer, smarter devices.

With PTT solutions that can be run securely from a smartphone application interface, workers can access voice communications and other critical software from a single device, eliminating the need to for them to carry and maintain multiple devices. Software applications also can provide a high degree of flexibility and interoperability that can allow disparate teams and organizations—water processing facility staff and local emergency first-responders, for example—to seamlessly bridge voice communication systems in case of an incident.

With connectivity via an IP data network, operators of pump stations gain instant connectivity with mobile teams and back office staff to ensure water systems function properly and errors are immediately addressed or avoided altogether.

Coordination across workers and departments must be efficient not only for operations to run smoothly and quickly, but also to adequately meet consumer demands and follow safety measures. The water industry's concern with health and safety risks means that seamless communications between teams are critical as a part of prevention and incident response scenarios. Facility staff are the front line of defense against health and safety issues, and they are often required to work with organizations that operate on entirely separate communication systems.

New Possibilities

When Sprint's iDEN network was decommissioned in 2013, a significant shift began in the industry. Because iDEN was previously the mainstay for service provider PTT nationwide, its closure opened a new realm of possibilities for water treatment organizations. No longer are they tied to a single service provider solution for PTT voice communications. Instead, the door has opened for operators to find innovative, modern ways to solve problems, paving the way for device- and network-independent communication solutions.

The ability to connect and extend communication systems without major infrastructure investments is a proposition that operators cannot ignore. As water professionals and IT managers look for ways to streamline and upgrade communications, it is critical to find flexible solutions that provide both the business-class functionality and mission-critical reliability on which mobile workforces can depend for everyday and critical communications. Interoperability software offers exactly that—giving operators the real-time connectivity to mobile staff necessary for efficient operations. **WWD**

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