

Deploying Industrial Wireless Solutions

KEY POINTS

- Self-organizing networks can now offer unprecedented data reliability
- Advanced power-management techniques and energy scavenging technologies help minimize power consumption.
- Multiple security measures make properly-implemented wireless networks as secure as traditional wired networks.



OVERVIEW

Most of us take advantage of wireless technology every day – whether we're listening to the radio, talking on a cell phone, or changing channels with a television remote control. People around the globe can even wirelessly access the Internet while visiting "hot spots" with Wi-Fi service. Wireless technology is also nothing new for parts of the process industry. Oil and gas companies, for example, often use it to monitor remote fields and pipelines.

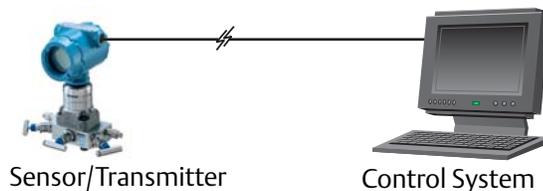
However, wireless technology has not been widely adopted for in-plant applications. Concerns about reliability, security, and battery life of wireless devices have slowed adoption of wireless options even where traditional wired solutions were cost-prohibitive or operationally difficult. That's changing as improvements in wireless technology address these concerns.

Self-organizing networks offer unprecedented data reliability, even when changes in the plant environment interfere with existing transmission paths.

WIRELESS ARCHITECTURE

In the traditional "wired" world of process automation, for example, a measurement transmitter (the source) sends data through twisted-pair wiring (the medium) to a distributed control system or other host (the receiver).

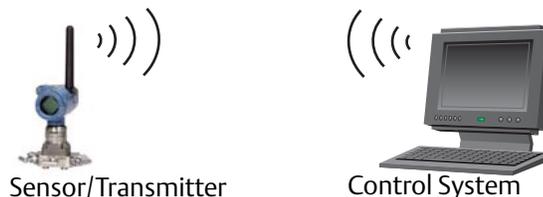
A wireless solution uses radio waves instead of physical wires as the communication medium. A radio and antenna convert electronic signals from the measurement transmitter into radio waves, and another antenna and radio at the host convert the waves back into usable information.



WIRELESS TECHNOLOGIES

There's no shortage of wireless technologies: Bluetooth. CDMA. GSM/GPRS. 900 MHz. REFLEX. Microburst. Wi-Fi. Wi-Max. While there's no single wireless solution for all process-industry needs, certain technologies are well suited for some common applications. For example,

- **GSM/GPRS** is a technology widely used in cellular networks, it works well for remote data-collection applications like inventory-tank monitoring.



- **Self-organizing networks** offer high network data reliability for in-plant applications -- and can be especially cost-effective when they take advantage of advanced power-management techniques.
- **Wi-Fi** is well established, robust, inexpensive, and based on open standards. When used in conjunction with self-organizing networks, it can provide an excellent backbone for data concentration and networking.

INDUSTRIAL APPLICATIONS

No matter how exciting a technology may be, you're not going to invest in it unless there's a practical application in your own operation -- one that solves a problem or brings new benefits. With the broad range of wireless technologies and solutions available today, however, most process-industry operations can easily find applications where wireless offers a strong return on investment.

Remote applications. When the data you need is kilometers from where you'll use it, hard-wired connections are usually impractical. Examples include monitoring inventory in remote storage tanks, gathering data from paper-chart recorders in remote areas, and accessing diagnostic information from equipment in remote oil and gas fields. Using cellular technology, for example, data from such remote locations can be affordably transmitted through existing communication networks. You'll no longer have to wait until the next time someone visits a remote operation to know what's happening there.

Near-plant applications. Even when the information you want isn't coming from far away, barriers like highways, railroads, or rivers can make wired connections impractical. That's often the case for unstaffed or hard-to-reach areas on the periphery of plants, such as tank farms or water-treatment operations. Wireless technologies like Wi-Fi, however, can easily connect those areas with your control room or other in-plant location -- so you can see what's going on in time to take appropriate action.

In-plant applications. Although communication distances inside a plant are relatively short, the high cost of installing traditional wired connections can sometimes outweigh the benefits of bringing in additional information. Self-organizing networks can shift the balance in your favor. These easily installed, easily expanded networks dramatically lower the cost of adding new measurement points.

WHY WIRELESS NOW?

Built-in encryption, authentication, verification, key management, anti-jamming, and other security measures can make properly-implemented wireless networks as secure as many traditional wired ones -- or more so. Advanced power-management techniques, low-power electronics, and energy scavenging technologies help minimize power consumption so wireless devices can operate for years without battery replacement. Self-organizing networks offer unprecedented data reliability, even when changes in the plant environment interfere with existing transmission paths. Emerging industrial standards such as Wireless HART and SP 100 are addressing concerns about integration and long-term compatibility.

At the same time, users are looking for ways to wring even more productivity (and costs) out of their operations. Wireless technology offers a cost-effective way to get the information -- from additional process measurements to equipment diagnostics to inventory levels -- needed to achieve those goals.

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Emerson Process Management

Rosemount Division
8200 Market Boulevard
Chanhausen, MN 55317 USA
T (U.S.) 1-800-999-9307
T (International) (952) 906-8888
F (952) 949-7001
www.rosemount.com

Emerson Process Management

Heath Place
Bognor Regis
West Sussex PO22 9SH
England
T (44) 1243 863 121
F (44) 1243 867 554

Emerson Process Management

Emerson Process Management Asia Pacific
Private Limited
1 Pandan Crescent
Singapore 128461
T (65) 6777 8211
F (65) 6777 0947
Enquiries@AP.EmersonProcess.com

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For more information:
www.rosemount.com


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