



WIRELESS NOW

THINK BEYOND THE WIRE

INNOVATIVE FIRST MOVERS GAIN A COMPETITIVE
ADVANTAGE, EVEN AS THE LAST BARRIERS TO
WIDESPREAD ADOPTION FALL

PLUS: 3 WAYS TO PUT WIRELESS TO WORK TODAY

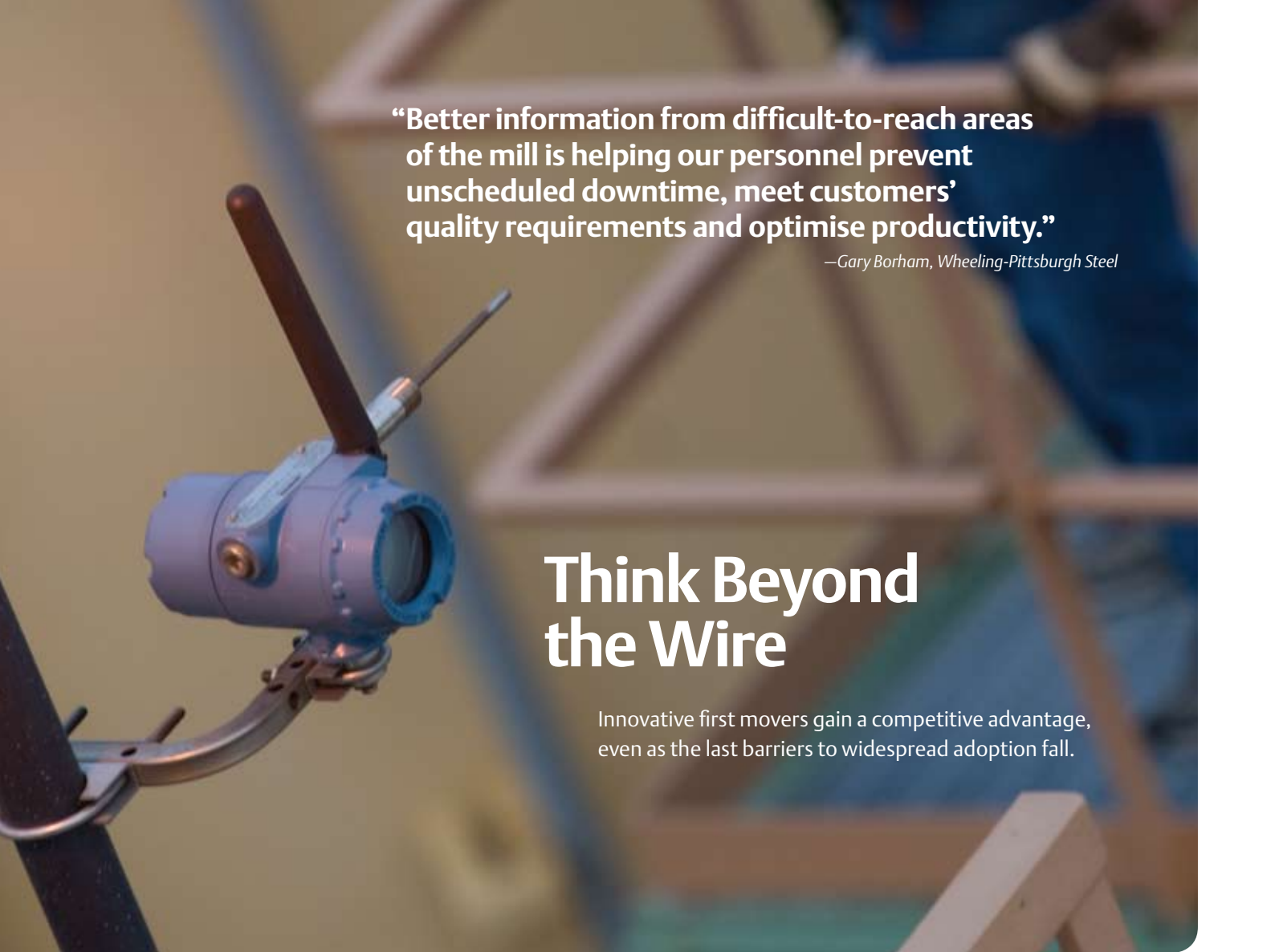
MEASURE AND GATHER
NEW PROCESS DATA

BOOST YOUR
WORKFORCE PRODUCTIVITY

BETTER MANAGE
YOUR BUSINESS, YOUR PLANT



EMERSON
Process Management



“Better information from difficult-to-reach areas of the mill is helping our personnel prevent unscheduled downtime, meet customers’ quality requirements and optimise productivity.”

—Gary Borham, Wheeling-Pittsburgh Steel

Think Beyond the Wire

Innovative first movers gain a competitive advantage, even as the last barriers to widespread adoption fall.

NEW TECHNOLOGY has historically brought disruptive change in the process automation field - not because of the technology itself, but because of the capability it enables that brings new value to the fore.

This happened as the introduction of microprocessors and digital communications led to distributed control systems and the migration of intelligence into field devices. These technology changes enabled users to gain more insight into their plants - not only about process variables, but also about the current and future health of the devices and the process. The additional information enabled them to make a step change in the performance of their business through more flexible operations, increased safety, decreased operations cost, reduced downtime and decreased cost of change.

However, even with these innovations and the benefits of a digital plant, there are still untapped opportunities to reach new levels of process and business performance. Valuable information that can enhance productivity may still be out of reach because accessing it would be cost-prohibitive or technologically impractical.

For example, what if you could immediately detect leaks and emissions before they lead to environmental problems and potentially millions in fines? Or pinpoint corrosion inside piping and vibration or temperature excursions that are attacking equipment life? How much more productive could your workers be if they had access to process and control information even when they’re not in the control room or maintenance shop?

Early adopters of wireless technologies are already

“thinking beyond the wire,” addressing these and other challenges. With the recent completion of the *WirelessHART™* standard, the floodgates of newly interoperable wireless instruments and systems are poised to open further.

“It has been exciting to see how in-plant wireless functionality has captured the imagination of managers, engineers and operations personnel,” said John Berra, President of Emerson Process Management, speaking of the company’s Smart Wireless products. “Once they started using the technology, they were able to envisage additional applications. These innovative first movers are already confident and are well down the path to broader implementation of wireless. We are pleased that, thanks to them, our Smart Wireless products have a track record of success in installations across industries and worldwide. As a result, we’re expanding - adding to the industry’s broadest wireless solution set.”

Today, much discussion of the potential for wireless focuses on quickly adding a transmitter for a difficult-to-reach process parameter, or on the ease with which a new measurement point can be added to a current installation. But wireless, like *FOUNDATION™* fieldbus before it, also promises to reduce the cost of routine instrumentation tasks significantly - and ultimately has the potential to revolutionise control system strategies.

Whether retrofitting a current system or designing a greenfield project from scratch, wireless now gives system designers out-of-the-box access to multiple instrument variables and a wealth of onboard diagnostics. Who can say

what creativity that will unleash? Additional new project benefits come from reduced physical space requirements and from the increased flexibility and ease of expansion inherent in a wireless system.

WHAT CAN WIRELESS DO FOR YOU?

In past technology shifts, it wasn't the technology itself (such as microprocessors or digital communications) that drove the shift; it was the applications that took advantage of the technology to deliver value. Similarly, the adoption of wireless technology is being driven by the ability to extend and manage the flow of information around the plant more easily and cost-effectively.

Wireless technology is not a complete replacement for wires, at least not for a while. But it is already enabling new tools that give you the freedom to solve problems you could not address cost-effectively in the purely wired world. The possibilities are limitless. Imagine a plant where:

- Safety relief valve emissions are monitored for more effective regulatory compliance;
- Safety showers are monitored 24/7 so help can be dispatched immediately;
- Wireless vibration sensors give you a real-time indication of equipment reliability every day, not just once a month/quarter/turnaround;
- The status of previously unmonitored plant equipment

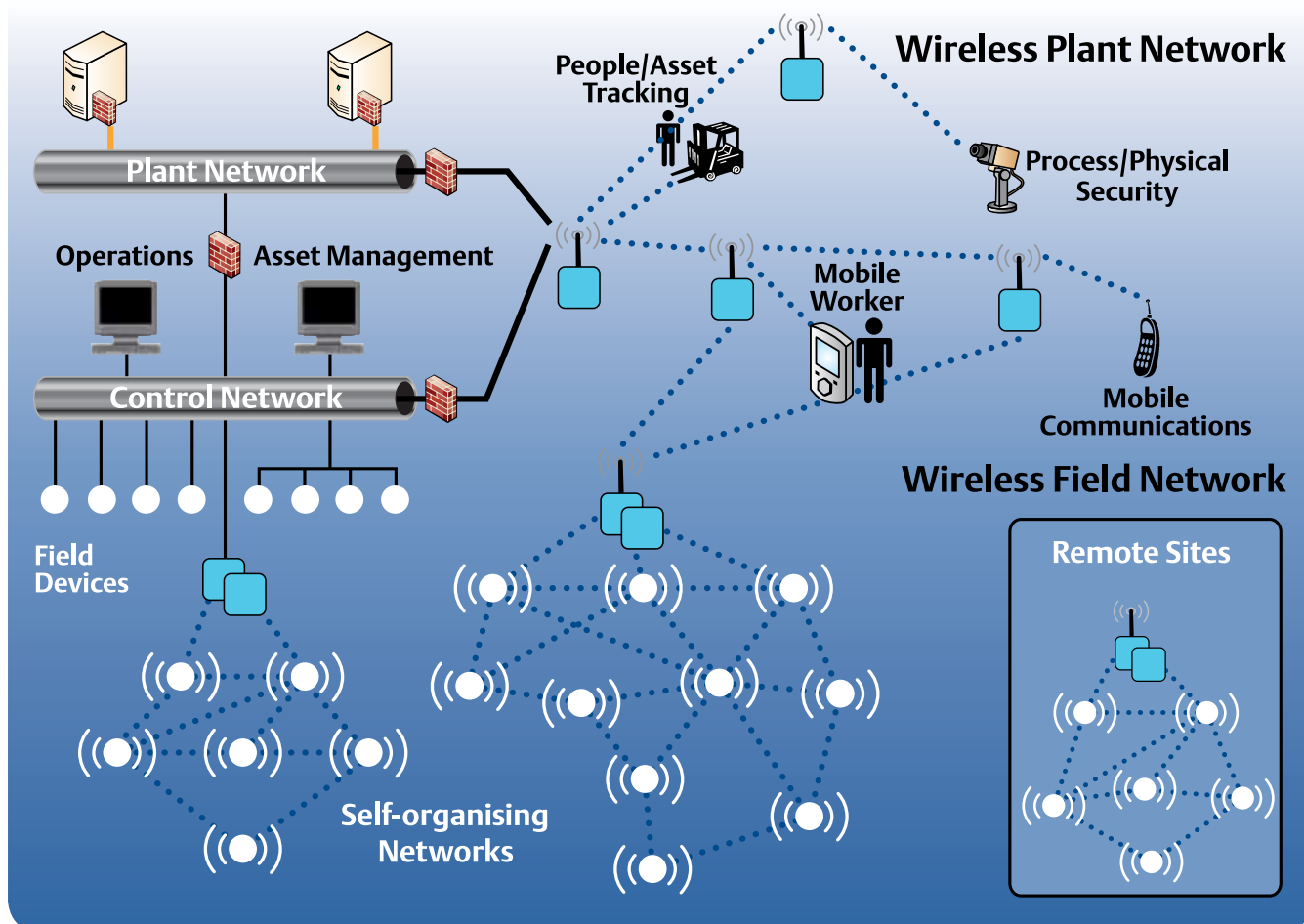
such as on-off valves is known and recorded in real time, providing a safer, more productive operating environment;

- Operators don't have to make "clipboard rounds" to collect data;
- Diagnostics in HART® devices - including those that couldn't be accessed before - are available for asset management;
- Workers can access desktop applications and perform tasks - including viewing and responding to alarms from the field - wherever they are;
- The locations of personnel and physical assets in the plant are tracked at all times;
- You can broadcast messages to specific groups of workers wherever they are;
- Security systems track and ensure authorised plant access;
- Video systems not only patrol the fence line, but keep a cost-effective eye on the process;
- Corrosion in equipment and piping is monitored by wireless sensors.

Many of these applications are possible without wireless, but wiring costs or technical limitations make them impractical. Today's cost-effective and easy-to-integrate wireless technology overcomes these barriers, enabling you to gain better insight into your plant - and ultimately make

WIRELESS ARCHITECTURE INTEGRATES SEAMLESSLY WITH EXISTING INFRASTRUCTURE

Emerson Process Management's Smart Wireless solutions operate on an integrated wireless architecture for plant- and field-level communications. A complete set of technical documentation, online tools and information about the newest additions to the Smart Wireless portfolio is available at www.EmersonProcess.com/SmartWireless





EVERYTHING YOU NEED TO GO WIRELESS, RIGHT OUT OF THE BOX

Emerson Process Management’s Wireless SmartPack™ Starter Kit consists of SmartStart™ services; from 5 to 25 wireless devices from Emerson; a Smart Wireless gateway; and the AMS® Suite software application for access to predictive information. Completely pre-engineered, checked out and configured, the network will form right out of the box, with no additional user input or setup. More details are available at www.EmersonProcess.com/SmartPack

your workforce more productive.

“We are building an infrastructure that opens up opportunities for more applications,” says Gary Borham, operations manager at steelmaker Wheeling-Pittsburgh Steel Corp., where wireless transmitters measure cooling water flow and monitor grease system health in the congested, hot steel-mill environment. “The result is better information from difficult-to-reach areas of the mill,” Borham says, “and this is helping our personnel prevent unscheduled downtime, meet customers’ quality requirements and optimise productivity.”

“Especially important was the easy, flexible self-organising wireless network that could be installed and operational in a very short time.”

—Cliff Esmiol, Milford Power

EASILY TAP PLANT AND PROCESS INFORMATION

The more you know about the process, physical assets and overall operations of your plant, the safer and more profitable your business can become. More (and better) measurements mean more opportunities for reducing operational costs and improving quality, throughput and availability. In addition, new environmental and safety requirements have been established after many of today’s facilities were built, and plants have struggled to get access to measurement and diagnostic information that could ease compliance.

So, why aren’t more plants “measuring up”? Too often, the cost or difficulty of adding new measurements has outweighed the perceived value.

With traditional wired technologies, distance or complexity can make connecting the measurement point to a control, asset management or maintenance system, or data historian, impractical or cost-prohibitive.

Wireless technology removes the barriers of traditional wired solutions and gives you unprecedented access to data that was previously out of economic or technical reach. Imagine, for example, the benefits of additional temperature measurements to detect cool spots in steam lines, or the advantages gained by cost-effectively instrumenting a remote tank farm.

REMOTE INFRASTRUCTURE?

At Milford Power, a 500-megawatt plant on the Connecticut coastline in the U.S., wireless transmitters monitor temperatures in 11 remote buildings that house infrastructure equipment, including water circulation pumps. In the winter, small heaters in each building prevent pump systems from freezing, knocking that pump out of commission for three days and costing up to \$20,000 to repair. A wired solution would have been cost-prohibitive, so temperatures were checked when operators made rounds to perform their visual checks of the pumps.

But wireless saved \$75,000 in installation and capital costs, making automatic monitoring possible. “It only took two hours to place the eleven devices in the pump buildings and have them communicating to each other,” says Cliff Esmiol, maintenance supervisor. “They easily communicated around buildings and other obstructions.”

In fact, when a new steel and concrete building was constructed in the plant, it completely blocked a transmitter from the other transmitters in the mesh. The signal, however, was unaffected.

START ANYWHERE, START TODAY

Emerson Process Management's approach, called Smart Wireless, is neither a top-down nor bottom-up model. You can begin at the plant level and work down to the field, or at the field and work up. Start anywhere based on what your highest priority needs are. You're not required to invest in an expensive wireless infrastructure throughout your facility to try out a simple monitoring application. The company's gateways, devices, access points and software use wireless communication standards and have gone through rigorous coexistence testing. This ensures that wherever you start in the architecture, you can seamlessly and easily expand later as your budget and confidence in the technology evolve.

For example, would additional process measurements help you improve product quality or reduce energy usage? Build a self-organising sensor network at the field level starting with just a single gateway. Need to provide mobile access to plant information? Set up plant-level wireless access points so workers can get the information they need wherever they are. Are both types of applications important? Implement them both at once, using the plant-through-field strength of the unified Smart Wireless architecture.

In short, flexibility and scalability mean you can start wherever it makes sense for you - without investing in more infrastructure than you need. The products and knowledge are in place and the value clear for starting wireless now. By picking an application - even a small one - you'll join early movers enjoying the satisfaction of application improvements they could only imagine before wireless. And you'll gain confidence and knowledge in the use of wireless, a technology set to make broad inroads industry-wide because of the significant improvements in efficiency and performance it delivers.

And wireless isn't just opening access to traditional measurements, such as temperature and pressures, but to instrument and equipment information as well.

For example, millions of smart HART-based devices in the field today have some level of diagnostics capability. Unfortunately, many plants don't have the infrastructure to receive HART data into the appropriate system. Since only a fraction of these devices are digitally monitored, the potential gain from accessing such 'stranded' diagnostics is significant.

"Five minutes after installing it, the network came to life. It's been there ever since."

— Tim Gerami, PPG

With wireless technology, the data doesn't have to be stranded anymore. Existing wired HART devices can be upgraded with a wireless adapter to transmit diagnostic information back to the control room or maintenance shop, where appropriate personnel can take corrective action as needed. Process control signals continue to

be communicated over the wired connection.

The possibilities are almost limitless. Just think of all the things you've always wanted to measure, but couldn't justify the investment. The chances are that now you can.

Indeed, the ease with which new measurements can now be implemented has proven to be a game-changer for early adopters. "When Emerson approached me with their industrial wireless solution, they said 'We're plug-and-play,'" says Tim Gerami, a senior design engineer at PPG Industries' Lake Charles, Louisiana, facility in the United States. "I've got to admit, I laughed. Nothing I'd seen so far was that easy," he continued. "But I'm a believer now. Five minutes after installing it, the wireless network came alive. It's been there ever since."

ENABLE A MOBILE WORKFORCE

In an era when an aging workforce and loss of experience are among the most pressing business problems process manufacturers face, wireless technology can empower next-generation plant workers, just as cell phones and PDAs have empowered the mobile business person today.

Even during normal operations, it's not uncommon for a large plant to



IT'S NOT TOO LATE TO ENTER INNOVATORS CONTEST

Nominations for the Smart Wireless Innovators Contest, seeking to recognise engineers and companies for their leadership in applying technology for plant improvements, are open until July 31, 2008. A panel of customer peers will judge entries and designate two winners who will be awarded a crystal plaque, cash reward, and expenses-paid trip to the 2008 Emerson Global Users Exchange in Washington, D.C., where they will be formally honoured. More information is provided online at www.EmersonProcess.com/SmartWireless

have hundreds of people working throughout the plant, often far from their control rooms, maintenance shops or offices. The new wave of wireless tools are dramatically improving their productivity by providing instant access to information they otherwise would have had to cover considerable distance to get, or take valuable time from other plant personnel to find out.

For example, although technology has enabled operators to perform many of their control and monitoring duties from the comfort and safety of the control room, there are still times when they have to go out into the field. Some companies routinely have their operators make rounds to see firsthand how the plant is running. By providing remote access to control and asset-management systems, a rugged, wireless PC can greatly enhance operators' efficiency, as they will be able to immediately relate what they see to

what is happening to the process and take quick corrective action.

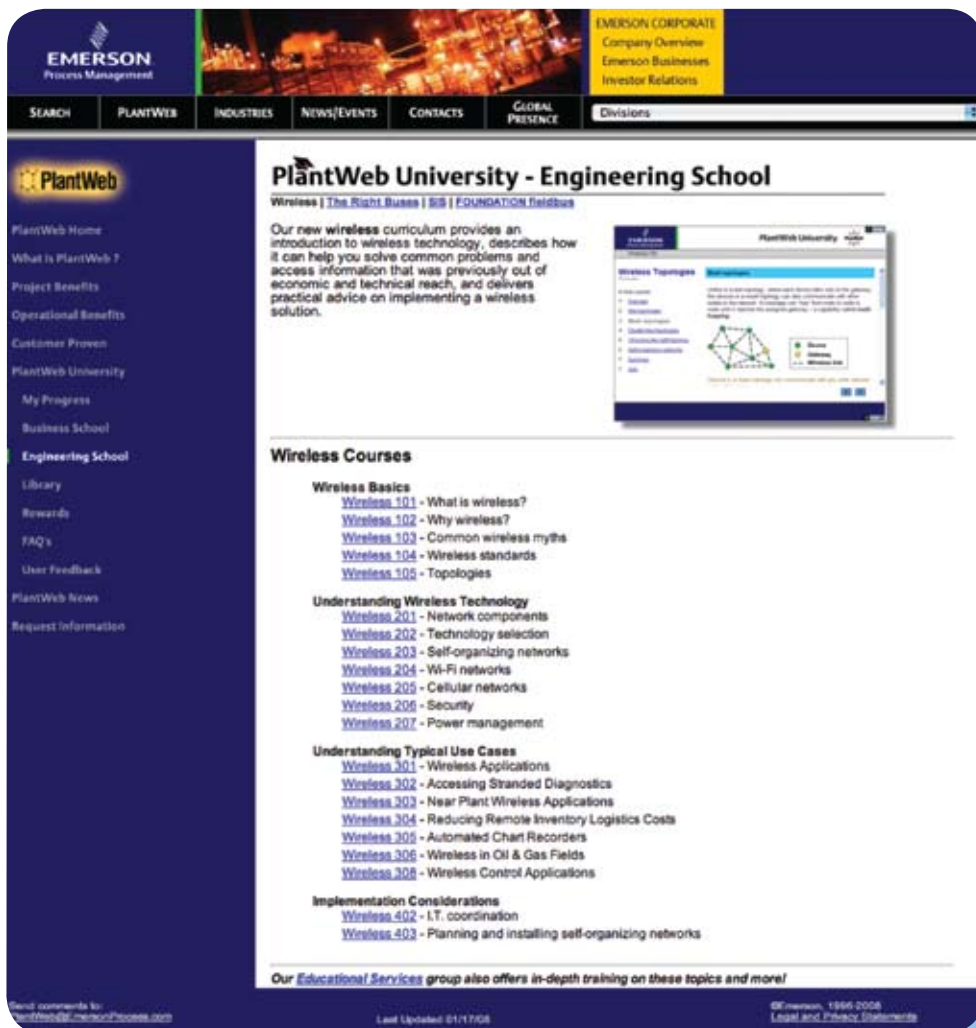
When operators are in the field, there may be no one in the control room watching for alarms. But with wireless access points throughout the plant, operators can use these PCs or similar tools to access critical process information, historical data, graphics and other key functions that normally reside in the control room or elsewhere in the plant.

IMPROVE BUSINESS AND PROCESS MANAGEMENT

Wireless applications, such as personnel and asset locating, as well as wireless video surveillance for security and safety, have changed the way offices, hospitals, warehouses and retail stores operate. These applications can also address business needs such as improving safety and security inside process environments.

Many plants are already using wireless technologies to improve security. Wireless closed-circuit television cameras and RFID-equipped access badges enable intelligent security monitoring and control from restricting access to specific areas based on levels of security, to tracking attempts to violate security protocols and helping security managers identify potential vulnerabilities.

Wireless location technologies allow you to quickly find and track inventory and valuable assets - even workers - moving inside and outside the plant quickly. Time spent looking for assets can be reduced dramatically, which can have significant benefits during major turnarounds, emergencies and new construction projects. Being able to locate each worker quickly also offers safety and productivity benefits.



WIRELESS IMPLEMENTATION STARTS WITH EDUCATION

In order to begin to take full advantage of the promise of wireless, a basic understanding of how wireless works - and how it can be used to improve plant, process and project performance - is needed. And Emerson Process Management's online PlantWeb® University is a great place to start.

PlantWeb University features a broad range of online engineering and business training. This now includes a new 21-course wireless curriculum encompassing an introduction to wireless technology, how wireless can help you solve common problems and access information that was previously out of economic and technical reach, as well as practical advice on implementing wireless solutions.

"The new PlantWeb University courses will help users understand the basics of wireless technology, what it can do for them and how they can put it to work in their own operations," says Jane Lansing, Vice

President of Marketing, for Emerson Process Management. Join 60,000 other registered learners at www.PlantWebUniversity.com



Measure and Gather New Process Data

Wireless transforms the economics of what's feasible
and the physics of what's possible.

“WE MADE a strategic choice to start where customers could get the fastest and easiest return,” says Bob Karschnia, Vice President of Wireless for Emerson Process Management, referring to the company’s release a couple of years ago of wireless, self-organising solutions at the instrumentation level. “This is because field sensor networks can be easily installed and deliver significant value without the need for investing in a plant-wide wireless infrastructure,” he says.

But a wireless field device isn’t just a different kind of transmitter; it is the product of a real breakthrough in technology and practice that is just now being seen for what it is, according to Peter Zornio, chief strategic officer for Emerson Process Management. “The adoption of wireless technology,” Zornio explains, “will be driven by the ability to extend and manage the flow of information around the plant truly without limits. This will drive work process and operational practice change as this new capability is utilised. That’s the definition of a technology discontinuity.”

Indeed, the implementation of process control strategies has long been constrained by a simple set of instrumentation costs: the transmitter itself, the time and labour required for engineering and implementing the installation, the running of wire back to a central control room, and the distributed control system input/output (I/O)

hardware itself. Over the years, the cost of transmitters has steadily decreased, as has the cost of I/O. It is the middle part, the installation and the wiring of the device to the control system, that continues to be the limiting factor.

“Wireless devices typically take two hours to install compared with two days for a wired device.”

—Geir Leon Vadheim, StatoilHydro

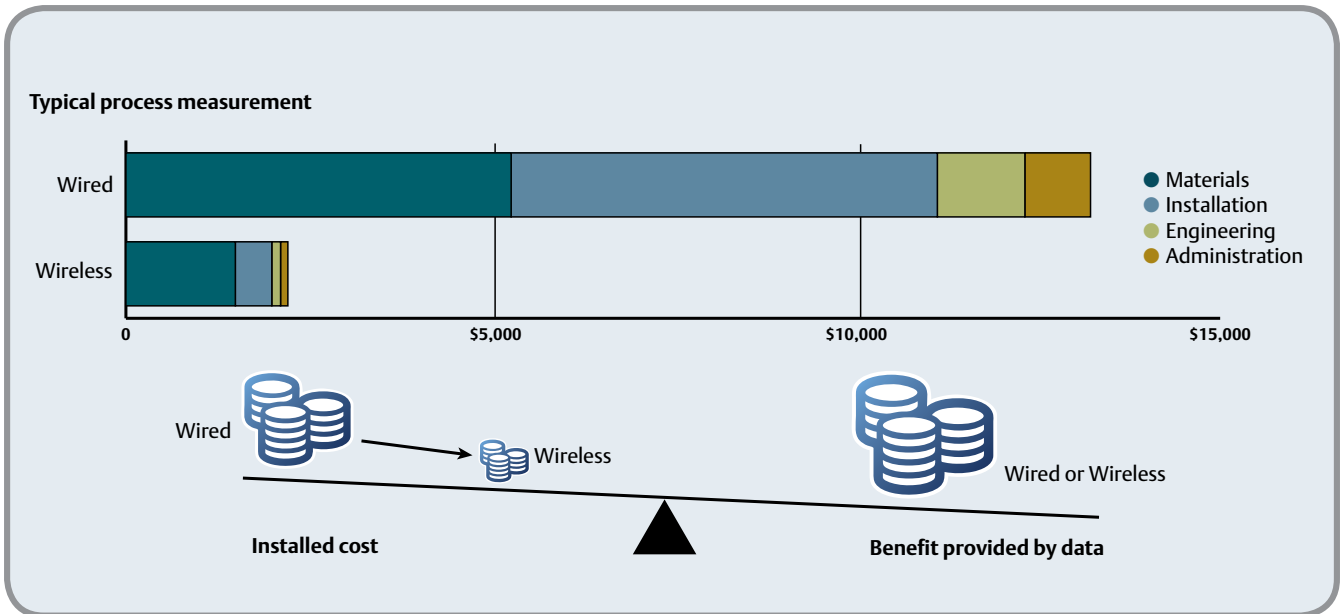
And what a limiting factor it is! Because of the high cost of wiring, many secondary process variables go unmeasured, and large pieces of process equipment go uninstrumented. Today, however, wireless is giving users low-cost access to additional measurements and process variables that were previously economically unfeasible. Estimates range up to 90% savings in installation cost per measurement using wireless.

FIRST MOVERS OFF AND RUNNING

Early adopters of wireless have been able to access many such measurements, and not all of them have been traditional analogue process variables. For example, one early adopter uses wireless to advise in real time when

ADD NEW MEASUREMENTS QUICKLY AND EASILY

At StatoilHydro’s Grane offshore platform (pictured above), wireless transmitters install easily and perform well despite an environment crowded with metal. “Following a short training programme, our instrument engineers are very confident about adding more wireless devices to our installation as required. These typically take about two hours to install, compared with up to two days for a conventional wired unit,” says Geir Leon Vadheim, StatoilHydro instrument lead. (Image copyright Jo Michael, StatoilHydro.)



WIRELESS SLASHES MEASUREMENT COSTS

With total installed costs reduced by up to 90%, wireless technology is dramatically changing the cost/benefit equation for incremental measurements. To see how much you could save, access Emerson’s wireless savings calculator at www.EmersonProcess.com/SmartWireless

pressure relief valves open and close. This minimises the fines from regulatory agencies for accidental environmental discharges.

Another early adopter uses wireless to annunciate activation of emergency stop buttons, pressure and temperature switches and other alarms to the centrally located operator.

the Emerson Smart Wireless network in these challenging conditions,” says Geir Leon Vadheim, StatoilHydro instrument lead. “Following a short training programme, our instrument engineers are very confident about adding more wireless devices to our installation as required. These typically take around two hours to install compared with up to two days for a conventional wired unit.”

“No matter where a tank wagon is positioned on-site, the quality of the transmissions is unaffected, and the signals integrate seamlessly into our control system.”

—Denny Fetters, Croda

GET THAT STRANDED DATA

There are an estimated 26 million wired HART devices installed and in service around the globe. But fewer than 25% of the installed HART devices have their digital data, including diagnostics, connected to the control system or to an asset management system. For years, it was difficult to connect the digital information stream to controllers and systems that were designed to only see analogue data streams.

Other early adopters are monitoring water temperature and pressure at eye-wash stations and the actuation of safety showers remotely. With the addition of people-locating applications, operators are even able to tell who it was that actuated that safety shower or eye-wash station and route the appropriate assistance to the scene faster and with greater efficiency.

Early adopters are also monitoring additional process variables for process optimisation. Temperatures, pressures and flow rates that were far too expensive to monitor at the operator console can now be brought there wirelessly.

On StatoilHydro’s Grane offshore platform, wireless transmitters are being successfully used to monitor wellhead and heat exchanger pressures, providing 100% reliability and stability in a crowded metal wellhead environment. “We are delighted with the performance of



WIRELESS ADAPTER TO LIBERATE HART DIAGNOSTICS

Called the ‘THUM’™ in part for its familiar looking form-factor, this innocuous device is designed to be retrofitted onto existing HART devices. It extracts instrument diagnostics and other information from the 4-20mA signal and transmits them via *WirelessHART* to the host system.

But with *WirelessHART* adapters, like Emerson's soon-to-be-released Smart Wireless THUM™ Adapter, all this will change. The THUM adapter is a device that sits on the 4-20 mA DC loop and is typically screwed into the unused conduit port on the transmitter. It draws its power from the loop, extracts the HART digital data from the field device and communicates via *WirelessHART* protocol to a gateway and, from there, into the host system.

MEASURING THE IMMEASURABLE

Croda Inc., an international specialty chemicals manufacturer, uses wireless temperature transmitters from Emerson mounted on railway chemical tank wagons to send minute-by-minute readings to a central host, improving process performance and boosting overall safety.

Because the tank wagons are moved frequently, hard-wiring of temperature sensors was impractical. Previously, an employee had to climb to the top of each wagon once a day to check the temperatures and record each reading. This was a time-consuming procedure that, during wet or icy conditions, presented a potential for a fall. With wireless, operators are alerted to any unexpected temperature rise in the tank wagons, while saving about \$15,000 per year in reduced maintenance.

"The wireless solution not only saves us time and money, since plant personnel no longer have to monitor those tank wagons daily, it has also greatly enhanced the overall safety of the plant and our personnel," says Denny Fetters, instrument and electrical designer for Croda. "No matter where a tank wagon is positioned on-site, the quality of the transmissions is unaffected, and the signals integrate seamlessly into our control system."

MAKING THE INFEASIBLE PRACTICAL

At PPG Industries' Lake Charles, Louisiana, facility in the US, wireless temperature transmitters monitor the temperature profile of the plant's steam headers. The applications had always been desired, but difficult to implement, according to Tim Gerami, PPG senior design engineer. PPG engineers also wanted to use wireless for some of the redundant measurements they really needed for plant optimisation and asset management.

PPG-Lake Charles formed a wireless committee to look at wireless systematically throughout the plant, from both an IT and an instrumentation/process control perspective. The team chose Emerson Smart Wireless for the in-plant measurements, not only because of its familiarity with Rosemount® transmitters, but also because of the architecture of the Smart Wireless network.

"There were others where the wireless part looked good," Gerami notes, "but it was just point-to-point, rather than mesh. It would work, but it limited the number of devices in a given plant - maybe 50 per radio, 16 channels. That would be difficult in a plant. You need more than a hundred transmitters and several hundred eventually. A mesh network has the potential to be virtually unlimited."

Gerami makes the game-changing nature of wireless clear. "It's an enabler for things you wouldn't ordinarily do," he says.

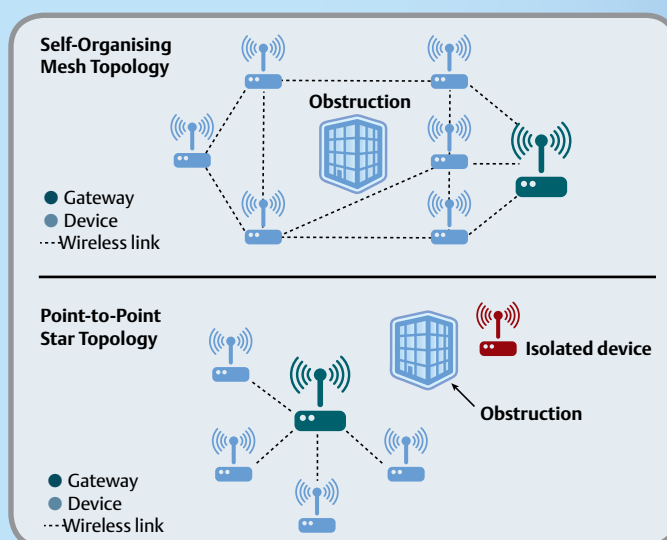
A REVOLUTIONARY PLANT DESIGN

To respond to an increasingly competitive marketplace, pharmaceutical and life sciences companies around

SELF-ORGANISING MESH NETWORKS VS. POINT-TO-POINT

Emerson Process Management's Smart Wireless field networks use self-organising mesh technology that is tried and tested and the basis for the recently approved *WirelessHART* standard. Each wireless device in a self-organising network can act as a router for other nearby devices, passing messages along until they reach their destination.

This capability provides redundant communication paths and better reliability than solutions that require direct, line-of-sight communication between each device and its gateway. Whenever there's a change in the network or in conditions that affect communications, the devices and gateways in a self-organising network work together to find and use the most efficient path for each message a path that optimises data reliability while minimising power consumption.



Self-organising network technology also reduces the effort and infrastructure needed to set up a successful wireless network. One of the difficulties of setting up the traditional point-to-point wireless network is the requirement to do a site survey to be certain that every node in the system has a line-of-sight path. This survey work is expensive. Plus, the resultant point-to-point network may require as many as five times the number of infrastructure nodes as a self-organising network.

Another advantage of self-organising networks is that they are dynamic. As new obstacles are encountered in a plant, such as scaffolding, new equipment or moving vehicles, the networks can reorganise around them. All of this happens automatically, without any intervention by the user.

Emerson's Smart Wireless and now all *WirelessHART* self-organising networks use IEEE 802.15.4 radios with channel-hopping as the physical layer. They are designed and tested to be tolerant to almost all interference and can co-exist with other wireless networks in your plant. The networks are also highly scalable and capable of one-second scanning with low latency. Emerson's wireless devices based on this technology have been proven in use to demonstrate greater than 99% data reliability.

Appropriate for Wireless	Safety	Class 0: Emergency action (always critical)	Importance of message timeliness
		Class 1: Closed-loop regulatory control (often critical)	
	Control	Class 2: Closed-loop supervisory control (usually noncritical)	
		Class 3: Open-loop control (human in the loop)	
	Note: Batch levels 3 (unit) and 4 (process), as defined by ISA S88, could be class 2, 1 or 0 depending on function.		
Monitoring	Class 4: Alerting Short-term operational consequence (e.g., event-based maintenance)		
	Class 5: Logging and downloading/uploading No immediate operational consequence (e.g., history collection, sequence of events, preventive maintenance)		

WIRELESS IS THE RIGHT CHOICE FOR MANY APPLICATIONS

The application list for wireless is large and expanding. The ISA100 committee has defined the use classes as shown above. Based on proven experience, Emerson recommends that users now consider wireless for the control and monitoring applications indicated, focusing on adding measurements previously impossible to cost-justify, thereby improving safety, reliability, efficiency and environmental compliance.

the world are striving to become more flexible in their manufacturing capabilities. But they’ve struggled for years to integrate process information with their laboratory information and plant business systems effectively.

Wireless instrumentation, together with Emerson’s DeltaV™ digital automation systems, are now making it possible to do exactly that - provide a wireless-enabled, united information system on a unified network throughout the plant. This capability makes possible entire plant designs that were not feasible just a few short years ago.

One major life sciences company designed a multi-story plant in a building with 30 centimetre thick reinforced concrete floors and walls. Modular process equipment can be moved around and reconfigured at will, and because instrumentation communicates wirelessly, reconfiguration requires no re-instrumentation. Indeed, one gateway installed on the third floor maintains communication with all the field devices on all four floors and on the roof of the building.

‘AN ERA WELL BEGUN’

“Looking to the future was one of the reasons to try out the use of wireless sensors,” says Ruud van Dijk, TAQA Energy engineering manager, of his company’s successful test of Emerson Smart Wireless technology at its natural gas production site in Alkmaar, The Netherlands.

“Basically, there was no room for more wires at the site in Bergermeer, and connecting new sensors would have entailed breaking open some hundred metres of paving to install extra wires. This is expensive and time-consuming.”

“Of course we already have years of experience with wireless data transfer in office environments,” adds John Pietersz of TAQA’s metering and control department. “But it is a different matter on the processing level. This world is very reluctant when it comes to introducing new technology.”

The TAQA team determined that it needed the flexibility and robust reach of the self-organising mesh network architecture of Smart Wireless. “In the case of

the Smart Wireless system, this radius is 200 metres,” Pietersz says. “It already leaves a lot of elbow room, but what is special about the solution is that the sensors can pass on each other’s signals. This means that you can apply sensors far outside the initial radius of 200 metres without having to install extra base stations. Future expansions will then only require the purchase of a transmitter, which will naturally also yield economic advantages.”

“Future expansions will require only the purchase of a sensor or transmitter, which will naturally also yield economic advantages.”

—John Pietersz, TAQA Energy

“We have also bought an Emerson AMS asset management system,” Pietersz adds. “Currently we only manage the wireless sensors with it, but we will be putting other instrumentation into the system in the near future. In short, the wireless era has begun well for us.”



Boost Your Workforce Productivity

Mobile connectivity keeps workers in touch.

WHEN IT comes to enhancing overall workforce productivity, wireless technology delivers in another important way. Upfront, wireless can slash the time and effort necessary to add a new measurement point or integrate a formerly isolated PLC or tank farm.

But once up and running, wireless technology goes beyond the streamlining of engineering, integration and installation to provide an ongoing boost to the productivity of plant workers by giving them mobile, instant access to needed information wherever they might be.

Today operators can perform many of their duties from the comfort and safety of the control room - but there are still times when they have to go out into the field to collect data, check on equipment or just see first-hand how the

plant is running. How can you stay in touch with operators and maintenance technicians working throughout the plant - and keep them in touch with the information they need to do their jobs most efficiently?

Put a rugged, wireless PC in workers' hands, and now they can access control and asset management systems remotely and immediately relate what they see to what's happening in the process - and respond as needed. That includes viewing and acknowledging alarms no matter where the operator is.

Communications improve, too. A plant-wide wireless broadband network with VoIP technology can extend communication reach while also enabling "smart" communications - broadcasting, for example, different

WHO SAYS YOU CAN'T TAKE IT WITH YOU?

With wireless PC or PDA in hand, roaming operators can now access control and asset management systems to relate immediately what they see to what's happening in the process and respond as needed.

messages to specific teams based on the IP address of each worker's radio.

Maintenance workers also benefit. Wireless tools such as hand-held communicators let them access maintenance work orders, instructions and other information, and track or report inspections, tests and repairs immediately.

THIS STUFF REALLY WORKS

PPG Industries' Lake Charles, Louisiana, facility in the US is among those early adopters of wireless technology that are already reaping the benefits of mobile data access - as well as the speedier installation time afforded by wireless instrumentation.

"We're currently using wireless tablet PCs in our operational units," explains Tim Gerami, PPG senior design engineer. "Operators can go around and look at the DCS on the tablet PC. The PCs can also be used for calling up operational procedures, looking up information on an existing valve or transmitter or using AMS to calibrate a transmitter."

At StatoilHydro's Grane offshore platform, wireless has eliminated the need for daily visits to the wellhead to record gauge readings manually. Furthermore, this increased process visibility already has led to operational improvements and allows unusual readings to be identified earlier.

At yet another major refinery, operators once visited the calcining unit monthly, manually logging motor-bearing temperatures, pump-casing temperatures, differential pressure across water filters and in-line pressures on chemical injection lines to detect plugging. Today, the operators still make rounds, but without an infrared gun and a manual log. Instead, they use a wireless PDA to interrogate their wireless instruments and connect to the data historian to check trend histories.

The operators' focus is now on solving problems instead of manually reading, logging and entering data. With higher resolution to the process and more accurate measurements, the plant has improved the availability of the coking operation, streamlined maintenance activities, moved the plant to predictable turnarounds and minimised unplanned failures of expensive pumps and motors.

MOBILE ACCESS MEANS GREATER PRODUCTIVITY

Maintenance workers are among those plant employees who can get more work done with wireless information access. Tablet PCs and other hand-held tools let them access maintenance work orders, instructions and other information and track report inspections, tests and repairs immediately.



“Operators can go around and look at DCS displays on wireless tablet PCs.”

—Tim Gerami, PPG

THE EMERSON MOBILE WORKER OFFERING

Emerson Process Management has been providing wireless remote operations and maintenance products since 2001. The company's products and technologies designed to enhance the productivity of mobile workers include:

For mobile operators: DeltaV Remote Operate, PlantWeb Alerts and Plant Messenger for PDAs.

For mobile maintenance workers: AMS Suite: Intelligent Device Manager Wi-Fi client, CSI 2130 Machinery Health Analyser, CSI 9800 Machinery Health Imager, CSI 7100 Machinery Health Scanner, 375 Field Communicator.

For workers in dangerous areas: A number of Class I/Division 2 and intrinsically safe hand-helds in various form factors to run these applications.

Emerson's mobile-worker applications rely on rugged, wireless access points from Cisco to provide Wi-Fi coverage. The Cisco® Aironet 1520 Series Outdoor Wireless Mesh Access Points are Class I/Division 2-certified and support dual-band radios compliant with IEEE 802.11a and 802.11b/g standards. Visit www.EmersonProcess.com/SmartWireless for more details.

Better Manage Your Business, Your Plant

Plant-level wireless networks are already ensuring physical security and tracking people and assets.

IN-PLANT WIRELESS technology isn't just about communicating and integrating process information flows. It's also about enabling a broad range of business and plant management applications - some well-defined and already at work, and some as yet to be imagined.

"In a plant," explains Bob Karschnia, Vice President of Wireless for Emerson Process Management, "there are a number of self-organising wireless field devices, such as pressure, temperature, and vibration transmitters, wireless discrete switches and wireless adapters to extract diagnostics from wired devices. All these devices are networked through our Smart Wireless gateway in a self-organising network based on *WirelessHART*. That's the first application space where Emerson provides a complete solution for our customers."

"But for business and plant management applications," Karschnia continues, "wireless coverage is provided through hardened Cisco outdoor access points that are also meshed together. This infrastructure allows the plant to deploy applications such as Voice over IP (VoIP), video surveillance and people location, and to use tools such as the DeltaV Remote Client and AMS Device Manager Wi-Fi Client to improve workforce productivity."

By teaming with Cisco, Emerson provides a plant-level, wireless mesh network that is open-standards-based as well as scalable, manageable and secure - all with a low total cost of ownership.

YOUR MOST IMPORTANT ASSETS

One especially powerful application enabled by a plant-level wireless network is for locating employees and visitors.

"Wireless technologies can now help you track everything in a plant, but the most important assets in any plant are its people," says Karschnia. "A plant now

can have a real-time people location system to locate all employees and visitors during emergencies."

For example, wireless sensors can be mounted on safety showers. "Field network wireless technologies allow customers to cost-effectively install wireless flow switches on all safety showers," Karschnia says. "This saves them thousands of dollars in wiring costs. These flow switches are integrated in the control system and the people location system."

"Wireless can help you track everything in a plant, but the most important assets are its people."

—Bob Karschnia, Emerson Process Management

With this new wireless technology, Karschnia points out, "A plant can meet OSHA requirements for initiating an alarm five seconds to 10 seconds after a safety shower is activated. Hard-wiring every plant safety shower or eye-wash station back to the main plant annunciator system is simply cost-prohibitive."

Because of the plant-wide wireless network, an operator can see the location of every employee's RFID-enabled identification card. "We can then use the wireless location system to see who the closest first responder to that location is," Karschnia says.

VOICE, VIDEO BOOST SAFETY AND SECURITY

Many plants are already using wireless technologies to improve security. Wireless closed-circuit television cameras and RFID-equipped access badges enable intelligent security monitoring and control from restricting access to specific areas based on levels of security to tracking attempts to violate security protocols and helping security managers identify potential vulnerabilities and improve systems. Wireless applications also enable you to monitor hazardous applications in order to reduce risk to plant personnel.

High-bandwidth video surveillance systems can use Cisco wireless mesh Wi-Fi networks to move data from the fence lines and other remote plant locations into the control room. This allows plant operators to have real-time video feeds from nearly every location in the plant. And this, in turn, permits operators to be more productive by making some types of operator rounds unnecessary. Operators can decide whether to take their wireless communication tools out into the plant after



ENTERPRISE-WIDE PLANT ASSET INFORMATION DRIVES DECISION-MAKING

Capturing powerful, real-time predictive diagnostics in a secure web browser gives a comprehensive view of asset health. Wireless devices bring visibility to even more assets, enabling fast, accurate decisions to impact your plant's bottom-line results.



AN INTEGRATED APPROACH TO FIELD AND PLANT WIRELESS

Emerson Process Management's Smart Wireless solutions operate on an integrated, architecture of *WirelessHART* for field-level wireless communication and Wi-Fi for plant-level applications.

they know where they need to go, because they have already seen a problem or situation on a video feed.

High-bandwidth video is also helpful when used in combination with RFID-based personnel monitoring. Personnel safety is greatly enhanced when the responders know right from the beginning of the incident whether the 'person down' is in a dangerous situation. Additionally, when two-way communications are enabled via VoIP portable communications devices, responders can coordinate their actions and maintain a high degree of safety at the same time.

Peter Zornio, Emerson Process Management chief strategic officer, summarises the disruptive, game-changing potential of today's wireless technology as "measuring the immeasurable - including inaccessible process readings, people and asset locations and security data. Further, wireless presents the opportunity to extend Emerson's PlantWeb architecture and predictive technologies to places where they were previously cost prohibitive - including unmonitored

valves, rotating equipment, vessel and pipe health, and stranded smart devices."

"Wireless is a more cost-effective alternative to wired for newly mandated environmental and safety applications - and for applications we don't even know about yet."

—Peter Zornio, Emerson Process Management

"It's as immediately straightforward as a more cost-effective alternative to wired for newly mandated environmental and safety applications - and as potentially game-changing in the future as to enable applications we don't even know about yet," Zornio adds. "It's all the information on the move, anywhere."

FEAR ~~WIRELESS~~ SAFETY.

Smart Wireless goes places so your people don't have to.

You now have the means to make your safety practices even safer. Emerson Smart Wireless lets you cost-effectively add automated monitoring and measurement points in hazardous areas, so personnel are kept out of harm's way while critical assets are still continuously monitored and protected. And when workers are on the move, Smart Wireless helps you wirelessly monitor their whereabouts and maintain continuous communication through open, industrial Wi-Fi technologies. From the plant-at-large to the worker himself, Emerson Smart Wireless looks out for what's important to you.

WirelessHART Discover your plant's limitless potential at www.EmersonSmartWireless.com

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