Improve Productivity and Safety with Emerson Wireless Networks and Services
Start Anywhere, Go Everywhere

Emerson Wireless solutions use the most proven, reliable technology that’s right for the application. All Emerson Wireless devices, gateways, access points and software use wireless communication standards and have gone through rigorous coexistence testing to insure seamless integration.

Emerson Wireless solutions for field instrumentation delivers:

- Low installation costs over wired
- Unparalleled ease-of-use
- Greater than 99% data reliability
- Seamless integration
- Control-ready wireless network

Wireless applications fall into two distinct categories, based on their unique technical requirements: wireless field applications and wireless plant applications.

**Wireless field applications**

Include field devices that enable asset or process monitoring or control in harsh, dense, or remote areas. Wireless field devices can be installed for less cost than wired technologies, so your investment return is almost immediate. You can quickly and easily eliminate “blind spots” where it was previously too difficult or expensive to install wired instruments.

**Requirements**

- Low Bandwidth
- Quality of Service - High priority communications
- Security - Robust, multi-tiered security through advanced encryption, authentication, verification, key management, and anti-jamming
- Reliability - Self-organizing mesh network that does not require line of sight and achieves greater than 99% data reliability
- Power - Batteries must last at least 5-10 years in harsh environments
- Standards-based - WirelessHART (driven by process community)
Wireless plant applications

Include business and operation applications, such as mobile worker, safety mustering, and video monitoring. Wireless plant solutions seamlessly integrate with the wireless field network.

Requirements

- High Bandwidth
- Quality of Service - Multiple applications must share the available bandwidth
- Security - Multiple layers of protection, including admission control, intrusion prevention, encryption, authentication, authorization, and rogue device detection
- Reliability - Controller-based, centrally managed Wi-Fi mesh network that performs load balancing, real-time radio resource management, device fail-over, and prioritization of all communications on the network
- Power - Devices are either line powered or re-charged daily
- Standards-based - IEEE 802.11 Wi-Fi (driven by IT community because it applies to many industries)
See Your Plant in a Whole New Way

Emerson Wireless solutions for field instrumentation helps you cost-effectively touch more of your plant with predictive intelligence than ever before...with an installed cost savings over wired technologies. You can eliminate “blind spots” in your plant where it was previously too difficult or expensive to install wired instruments.

The Emerson Wireless approach gives you the freedom to have as much or as little wireless as you want. You can begin with process monitoring or control applications, and start achieving the same improved operations that so many others are experiencing today.

**Extend the Life of Assets**
“(Insight) from predictive wireless filter plugging alerts prevented a shutdown. Operators were able to shut down the pump, clean the filter and get it back on line in a matter of hours.”
– Refining Project Manager

**Optimize Process Unit Efficiency**
“Four days after the order was placed we could see minute-by-minute mid-zone temperatures trending on the control system... Overall, we have improved operation of the lime kiln, and increased throughput by 5%.”
– Pulp Mill Leader

**Minimize Maintenance**
“Our need to monitor these points cost effectively eliminated traditional wired vibration monitoring solutions. Now we can have information about these pumps without getting suited up to go in and collect vibration data.”
– Plant Vibration Analyst

**Meet Safety & Environmental Goals**
“There are savings of $14,600 per year in reduced operation and maintenance costs, but the incalculable savings were in safety.”
– Chemical I&E Designer
Imagine the possibilities with Emerson Wireless solutions for field instrumentation.
Emerson Wireless solutions for plant-wide operations leverage industrial Wi-Fi technologies and applications to enable greater workforce productivity and safety, as well as improved business and plant management. Wireless technologies can provide benefits that were previously not available because it was too expensive or simply not possible, to implement. With Emerson Smart Wireless solutions, the possibilities are truly limitless.

Emerson follows the concept of engineered solutions for wireless applications which are designed for plant operations. The solutions are designed based on Emerson expertise to address operation technology challenges, and best-of-breed products which are totally standards based to address the information technology policies and regulations.

Each application is set to enable worker productivity, reduce implementation costs, and help customers address safety issues, and yet, being able to share the same wireless infrastructure properly designed and delivered as a project. The projects include the initial survey activity entitled Radio Frequency Front End Engineering Design study (RF FEED Study), implementation and after project support services.
Wireless Field Data Backhaul  Field devices are often remotely distributed throughout a plant – across roads, or on mobile platforms like railcars, barges or trucks. Wireless field data backhaul solutions integrate field instrument data with the process control system at significantly lower cost and implementation time over wired solutions.

Wireless Mobile Workforce  Mobile workforce solutions can dramatically improve productivity by using cutting-edge wireless technology to provide instant access to process control data, maintenance information, and operation procedures. Eliminate the paper trail and transcription errors by wirelessly connecting the field operator to the process.

Wireless Remote Video Monitoring  Wireless video solutions provide a quick and cost effective approach for security and process monitoring. Real time video feeds greatly help to improve security and safety. Video tracking of certain process emissions enables better environmental compliance.

Wireless Control Network Bridging  Often times the control room is remote from a controller, or separated by an obstruction like a road or body of water. Installing fiber-optic cable is expensive. Wireless technology can easily connect control system units securely and cost-effectively.
You don’t have to start with an extensive wireless infrastructure. You can start small, and continue to add applications. Emerson’s Wireless solutions are completely scalable, allowing you to start anywhere and grow, with full confidence that you can easily expand the scope of your wireless implementation.
You can start with a remote wireless field application, such as tank farm monitoring, and use Wi-Fi to bring data to the control room.

Later, you can expand the network to add a small-scale wireless mobile workforce application.

When the time is right, expand the wireless plant network coverage and utilize RFID tags for location tracking and add wireless video capabilities.

Over time, add more devices and continue to expand wireless network coverage for more applications.
Process units can be widely and remotely distributed across areas including obstructions such as roads, bodies of water, difficult terrain, or on mobile platforms like railcars, barges or trucks. Such situations can make it very difficult and expensive to automatically collect and integrate process data.

Now, with Emerson Wireless solutions, process measurements that were physically or economically out of reach can be easily installed for far less money than wired instrumentation.

Emerson Wireless solutions easily close the information gap. Wireless field devices collect process data and Wi-Fi provides backhaul to integrate the remote measurements with the process control system.

Increased Process Visibility
Emerson Wireless solutions enable you to cost-effectively collect additional process measurements. You can eliminate clipboard rounds and enable increased process visibility for applications such as, remote tank farm monitoring, well-head monitoring, rotating or moving equipment, and areas that are otherwise out of reach.

Reduced Cost
Wireless technology can dramatically reduce installation costs over wired data integration by eliminating most of the cabling, conduit, labor, and engineering costs associated with trenching fiber-optic cabling across distances that can stretch many miles.

The Emerson Wireless Gateway 1552WU
Enables a full featured wireless solution that combines plant and field networks into a seamlessly integrated architecture enabling pervasive sensing solutions in a simpler and economical manner.
Remote or obstructed field data can be integrated with your control system easily and cost-effectively.

**Reduced Implementation Time**

Wireless technology reduces the time required to engineer and install new field instruments by eliminating the need for wiring design and cable installation. Wireless process measurements can be easily added in the time it takes to join the wireless device to the network, install it into the process, and commission the device into the control system.

**Scalable Solution**

At any point you can grow your access point network coverage to build a Wi-Fi mesh backhaul adding multiple wireless field networks throughout your facility.
Operators can leave the control room and still have a live view of the process and monitor for alarms and events from anywhere within the plant.

Field operators and maintenance personnel can use rugged laptops or tablets suitable for hazardous locations to wirelessly access process data and business applications. Field personnel can follow real-time work instructions to perform operations, use process data or asset data for troubleshooting, document work status, or collect information with integrated barcode technology.

Improved Productivity
With real-time information from control and asset management systems, field workers can resolve operational problems much faster. Mobile worker applications allow them to report observations, perform procedures, communicate with the central control room, and initiate or execute work orders.

Improved Equipment Maintenance
Wireless tools such as rugged laptops or tablets allow field workers to access maintenance histories, instructions, and other diagnostic information on the spot. This data help maintenance personnel debug equipment problems much more efficiently. The Mobile workers can immediately track or report inspections, tests, and repairs.

Improved Operation Accuracy
Task lists, work procedures, and operation guidelines can be electronically accessed. This functionality helps field workers to finish process operations more accurately. The work completed by the operators is recorded, transferred and synchronized with control or maintenance systems in real time, helping to reduce errors.
Typical Use Cases

Either during commissioning activities or turnaround schedules, Mobile Workforce enables cost savings by reducing the amount of hours or the number of involved personnel to perform the tasks. This is simply achieved when the field worker is empowered with live data which was only available at the control room before.

The rugged laptops and tablets are wirelessly connected to the system and can be used to track workers or even share data from local sensors in order to help providing personal safety.

Field operation can be more efficient based on real-time live information available through HMI graphics at the hands of the field worker. Checking equipment status, or manipulating control loops, or even entering field trip’s logs via electronic means are all available with Mobile Workforce.

The Mobile Workforce solution also enables worker productivity enhancements on a progressive manner by simplifying the worker tasks. Field workers are now able to access more information and be more independent to complete work orders.

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**Wireless Remote Video Monitoring**

Video monitoring in manufacturing facilities has traditionally been used as a security function for the benefit of viewing events in the past – if used at all. This is still very useful, but thanks to advanced network technologies, wireless video can serve as a more vital component. More and more plants are actively incorporating video into their risk management and operations programs to improve plant security, personnel safety, process operations, and environmental compliance. With the right implementation, plants can realize significant benefits and improve the bottom line.

Emerson Wireless solutions for video monitoring uses industrial grade wireless cameras to communicate data to a central recording system that allows for live viewing, playback, and historical archiving.

Emerson offers best-in-class discreet camera and positioning systems including explosion-proof and pressurized camera enclosures, high-security housings, video matrix systems, and advanced digital video recorders and thermal imaging systems.

**Security**

Security requirements by federal, state, and local officials can be met quickly and cost-effectively with a wireless video deployment that monitors the area perimeter, entry points, and remote locations at a much lower cost than a wired video solution. Advanced video analytics software can be used to automatically detect suspicious events or behavior without having to continuously monitor dozens of screens.

**Safety**

In hazardous areas of your plant, having an electronic eye on potential problem areas can help reduce personnel exposure to areas of risk and can quickly alert you of spills or emergency situations.

Real-time video monitoring can also enable an additional “all clear” visual before the execution of a process start-up, shutdown, or turnaround.

**Process Efficiency**

Wireless video cameras in remote locations or in the field can enable more effective communications between remote sites and control rooms for improved troubleshooting. Mobile wireless video conferencing technology can quickly connect people with remote sites on demand and in real time.

Thermal imaging enables monitoring of high-temperature applications and assets that are subject to overheating to provide early warning for prevention of abnormal situations.

**Emissions Monitoring**

With video monitoring for plant emissions, fines can be kept to the minimum through accurate demonstration of exact start and stop times to regulatory officials should an emissions excursion occur.
Often times the control room is remote from a controller, or separated by an obstruction like a road or body of water. Wired communication links can be cost prohibitive or impractical. Wireless technology can easily connect control system units securely at lower costs. Control network wireless bridging is a stand-alone solution to allow fully redundant wireless communications.

**Wireless Control Network Bridge**

**Eliminate Islands of Automation**
A wireless bridge between two DeltaV or Ovation automation system units is a seamless solution that can integrate these islands of automation to enable plant-wide data integration.

**Reduce Cost**
Wireless technology significantly reduces the cost of bridging remote unit connections by eliminating the cost of the cabling, conduit, labor, as well as the engineering costs of laying cable across large distances, difficult terrains, or public property. Wireless bridging solutions also allow you to shorten deployment time, so you can quickly enable new applications that are not available in the remote area.

**Expand Control**
Wireless solutions allow you to expand an existing control system to manage new process areas that could be operated and controlled over a redundant wireless communication link from a new remote control room separated from the existing control room. The wireless bridge saves the cost of trenching and installing fiber optic cables. It also eliminates any risk inherent with trenching within a live process area.

**Control System Bridging Expertise**
Emerson experts will work with you to determine the needed requirements for your specific process application to ensure that you can maintain control – even during process upsets when high bursts of communication occur. Emerson provides applications and guidance for monitoring the wireless network proactively to provide early warning of potential communication outages. Emerson will also work with you to create appropriate control strategies and best practices for operating the remote unit of your process wirelessly from the control system.
Wireless solutions for plant operation applications include key components that all work together to deliver a secure, consistent and reliable wireless infrastructure. Choose a solution that delivers secure, consistent, and reliable wireless communications.

**Network Infrastructure**

**Key Components**

**Mesh Access Points**
Outdoor wireless mesh access points provide a universal standard network infrastructure for easy integration of all the wireless applications in your plant. They allow client devices to connect to the network and communicate. Mesh access points are class I, Div 2 certified and support dual band radios compliant with IEEE 802.11 standards.

**Root Access Points**
These are exactly the same piece of hardware as the mesh access points, but they join the wireless to the wired network. They communicate wirelessly with the mesh access points that are strategically located where you need wireless.

**Cisco Prime Infrastructure**
The Cisco Prime Infrastructure allows network managers to design, control, and monitor enterprise wireless networks from a single location. This software provides network management including diagnostics and troubleshooting tools to keep the network running smoothly.

**Wireless LAN Controller**
The wireless LAN controller manages access points. It provides real-time communication between wireless access points to manage mobility issues and deliver centralized security policies to ensure only authorized users and devices are able to access the network.

**Backhaul Mesh Network**
The backhaul mesh ties all of the access points together into one wireless network, replacing the cable that would normally join the devices together in a wired solution. The mesh access points “self organize”, find each other, and create a robust mesh network.

**Client Devices**
Any client devices that are certified for Wi-Fi 802.11b/g radio communications will be able to utilize the wireless plant network infrastructure. These include rugged laptops and tablets – whatever is appropriate for your wireless solution needs.
The industrial mesh access points are designed for industrial Wi-Fi deployments.

- Standard mesh network is certified for hazardous environment (Class 1, Division 2 / Zone 2, Group B, C, D)
- Standards based (IEEE 802.11 ab/b/g/n)
- Has multiple power options (Power Over Ethernet, etc.)
- Compliant with Wi-Fi Protected Access 2 (WPA2), which employs hardware-based Advanced Encryption Standard (AES) encryption between wireless nodes to provide end-to-end, enterprise-class security

### Reliable Communications

The Wi-Fi network uses mesh technologies which is not only self-organizing, but also self-healing. The intelligent mesh protocol dynamically optimizes the best route to the wired network within the mesh, mitigates interference and ensures high network capacity. If interference occurs, the network automatically re-routes to a better communication path.

In the event of an access point failure or blockage, there is a coverage hole in the system. When the system detects such a hole, wireless LAN controllers automatically adjust power on adjacent access points to cover the area where the failed access point provided service. It also supports quality of service (QoS) for all data applications.

### Robust, Embedded Security

Emerson offers powerful and comprehensive secure solutions to enable confidential communications, policy controls, and threat defense capabilities to protect information and systems from wireless attacks. All wireless communications – from the client device to the mesh access points and between mesh access points back to the wired network – are encrypted using the WPA2 and AES standards. Additionally, the wireless network utilizes 802.11i/ WPA2, 802.1x, and EAP standards to ensure only authorized users have access. Emerson can additionally deploy a Wireless Intrusion Prevention System to provide “defense in depth” for your wireless network.
Design and Installation Services

Solution Design and Planning
To help you achieve exceptional business results, Emerson services are available to ensure appropriate wireless technology selection, standards compliance, and optimum wireless network design to meet best engineering practices and operational performance requirements.

Site Assessment...
While not required for wireless solutions for field instrumentation, a professional site assessment is critical to the successful implementation of wireless plant applications. Emerson wireless engineers offer a comprehensive site assessment where they conduct an RF analysis, determine wireless component locations, and assess security and application performance requirements.

...or, No Site Assessment
Site assessments are not required for wireless solutions for field networks. To help you easily plan and incorporate best practices, Emerson’s AMS® Wireless SNAP-ON application enables efficient wireless field network planning. This tool allows you to customize your wireless field network by using an image of your plant in the application to help plan your network according to best practices.

Network System Design
Emerson’s wireless engineers design the overall system architecture, the detailed network infrastructure, and Wireless solutions to meet your specific needs.

Field Solution Installation
Wireless applications in the field can be commissioned by your technicians, or you can work with Emerson’s certified field service technicians. Emerson’s Smart Start service ensures your wireless devices and networks are correctly installed and commissioned. Our experienced technicians will ensure devices are properly configured and communicating with the Smart Wireless Gateway. They will assign network addresses and verify that your wireless field network is fully operable as a self-organizing network.

Plant Solution Installation
Wireless solutions for plant operations are delivered with Emerson project management services and supported by structured project management processes. Emerson procures the equipment, configures system software, stages the system, manages network system installation and commissioning, and performs application implementation and integration.
Emerson’s offers wireless Life Cycle Services to help you maintain system uptime, apply wireless technology for better results, and preserve your intellectual and capital investment. You can select the service level and response time that’s right for your plant.

Emerson’s after-project wireless support services include:

**Technical Support**
Emerson’s Global Service Center will be your single point of contact for technical support for any wireless support needs.

**On-Site Emergency Response**
This service will commit availability of a wireless specialist for on-site support within an agreed-upon time period as specified in the service agreement.

**Spares Access**
There are multiple options available to you to accommodate your wireless network spares support needs.

**Preventive and Reliability Maintenance**
This service provides a certified Emerson wireless specialist on-site to assess the wireless plant network performance through various diagnostics and preventive maintenance routines in order to establish the health of the wireless network and make recommendation to maintain and improve its operational reliability.

**Application Enrichment**
Application enrichment services deliver project-specific solutions by phone or on-site. This may include wireless network access point hardware changes, additions, network performance evaluation, security assessment, or network application changes or additions.

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![Emerson Wireless Services](image)

**Reduced Risk**
Emerson Wireless services ensures your success with a comprehensive portfolio of wireless services, experienced engineering teams, and proven project management processes.

**Best-in-class Expertise**
Emerson offers integrated wireless solutions with cutting edge wireless technology. You benefit from Emerson’s extensive process industry knowledge and wireless technology expertise.

**Best Wireless Engineering Practices**
Emerson engineering teams developed best practices for wireless system design and implementation based on years of proven experience.

**Single Point of Contact**
Emerson experts are always within reach through state-of-the-art support systems by phone, e-mail and website. Local on-site support can be available for fast response.