

# Smart Wireless Solutions

Intelligent Well Production Starts Here



# Optimize production with better field insight

## Look to Emerson's Proven Oil and Gas Solutions

Emerson's automation of oil and gas fields enables centralized management, avoids danger and time spent on field trips to remote facilities, improves safety and environmental performance, and increases production efficiency. Drawing from our wide range of Smart Wireless solutions, a key extension of Emerson's PlantWeb™ digital architecture, we help customers plan, engineer, and commission oil and gas applications for new fields and modernization of existing facilities.

## Gain Advantages with Emerson's Smart Wireless Technology

The wellheads, flow lines, and separation areas in these fields have typically used wired approaches which involve significant commissioning time, and lengthy installation of wiring, trenching, conduit runs, and cable trays; or proprietary wireless networks which suffer from reliability issues. Emerson's Smart Wireless technology overcomes these issues.

## Smart Wireless is Easy and Quick

Emerson's global brands like Rosemount®, Fisher® and many more are available as wireless devices that typically install and are operating in less than a few hours, transmitting data to Smart Wireless



With courtesy of DARAT field of Brunei Shell Petroleum

Gateways and from there to the central control room and maintenance shop.

Not only are Emerson's Smart Wireless solutions quickly installed and operational, ease-of-use is exceptional as a result of guidance from intense customer research done by our unique Human Centered Design Institute. It profiles customer roles and interaction of disciplines to guide Emerson's development of technology that delivers significant improvement in our customer's work force productivity.

## Save on Total Installed Cost

Cost studies\* have shown that Emerson's Smart Wireless technology provides 30% or more installed cost savings over wired alternatives, whether automating a few wellheads or an entire oil or gas field. Significant savings from using

Smart Wireless enable engineers to make improvements previously out of economic reach.

## Monitor More to Manage Better

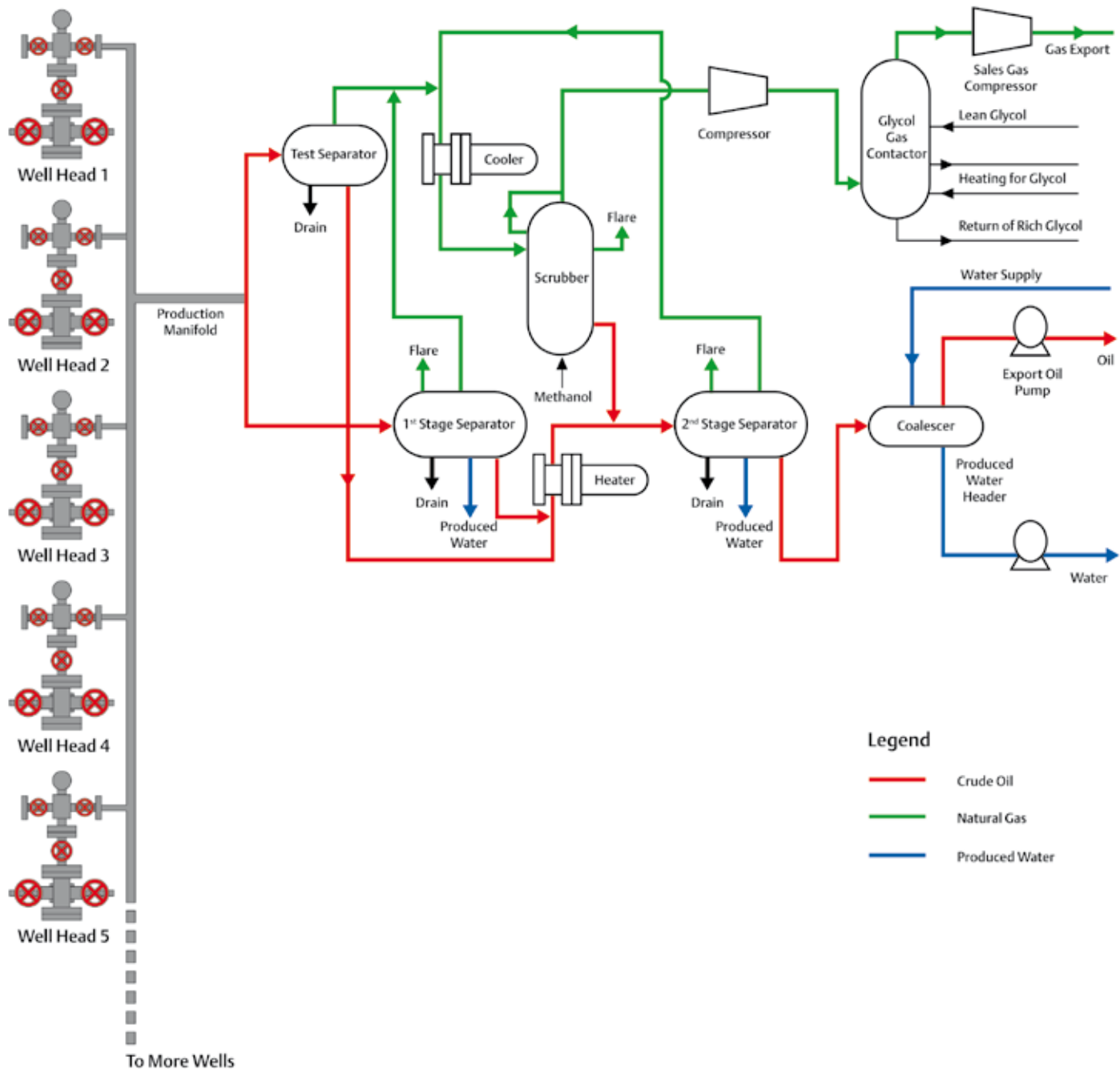
Emerson's Smart Wireless instrumentation family, predictive maintenance software and services expertise deliver comprehensive capabilities for surface wellhead and downstream monitoring. Refer to the adjacent diagram and table for typical flow and description of monitoring applications.

\* Customer references in Emerson's Putman Media Supplement "Wireless Now" February 2010

## TYPICAL WELLHEADS AND SEPARATOR

### WELLHEAD AREA

### SEPARATION PROCESS



# Expand automation and safety of oil and gas fields while saving up to 30% with Smart Wireless

## EMERSON'S SMART WIRELESS INSTRUMENTS MONITOR THE FULL RANGE OF WELLHEAD AND SEPARATOR FUNCTIONS

### WELLHEAD MONITORING

#### WELLHEAD PRESSURE AND TEMPERATURE

Indicates health of well and composition of fluids

#### OIL PRODUCTION VALVE POSITION

Monitors open/close status and position of choke valves, manifold valves, manual valves and shutdown valves

#### GROSS OIL PRODUCTION

Gauge pressure measured at headers is sent to historian to capture production information

#### WELL ANNULUS PRESSURE

Indicates casing pressure – an increase indicates fluid leakage and need to relieve pressure or kill well

#### OIL PRODUCTION TOTALIZED FLOW

Multivariable transmitters efficiently calculate and provide totalized flow output

#### INJECTION WELLHEAD MONITORING

Pressure, temperature and DP flow measurements provide better visibility of injection process

#### WELLHEAD FLOW

Measures temperature for use as an indirect indication of flow

#### STEAM INJECTION HEAT EXCHANGER MANAGEMENT

Measures pressure and differential pressure across heat exchangers to monitor performance

#### WELLHEAD FLOW LINE VALVE DIAGNOSTICS

Wireless THUM Adapter transmits predictive diagnostics to aid maintenance

#### WATER INJECTION FLOW

Measures and transmits water flow data and predictive diagnostics

#### FLOW & NET OIL/WATER MEASUREMENT AT WELL

THUM Adapter transmits diagnostics for maintenance use and multiple process variables for monitoring

#### STEAM OR GAS INJECTION FLOW

Measures and transmits steam or gas injection flow data and predictive diagnostics

### SEPARATOR MONITORING

#### FLOW & NET OIL/WATER MEASUREMENT IN TEST SEPARATOR

THUM™ Adapter transmits diagnostics for maintenance and multiple variables for monitoring

#### SEPARATION PROCESS VALVE POSITION

Monitors open/closed status and position of manual valves, relief valves, tank inlet and outlet valves, and shutdown valves

#### VIBRATION IN INJECTION PUMPS

Monitors vibration of bases and bearings, providing data for predictive maintenance to improve availability

#### SEPARATOR LEVEL MEASUREMENT

Monitors separator interface level

#### SEPARATOR LEVEL ALARMS

High/Low alarm detection of separator



# Enable the intelligent field

## Automate Hundreds of Wells or a Few –Emerson’s Smart Wireless is Scalable, Expandable

Start your Smart Wireless experience with a large greenfield project to automate hundreds of wells, or with upgrade of a few wellheads – it’s easy to expand later. Easily plan your wireless network to best design practices using the AMS Wireless SNAP-ON™ application.

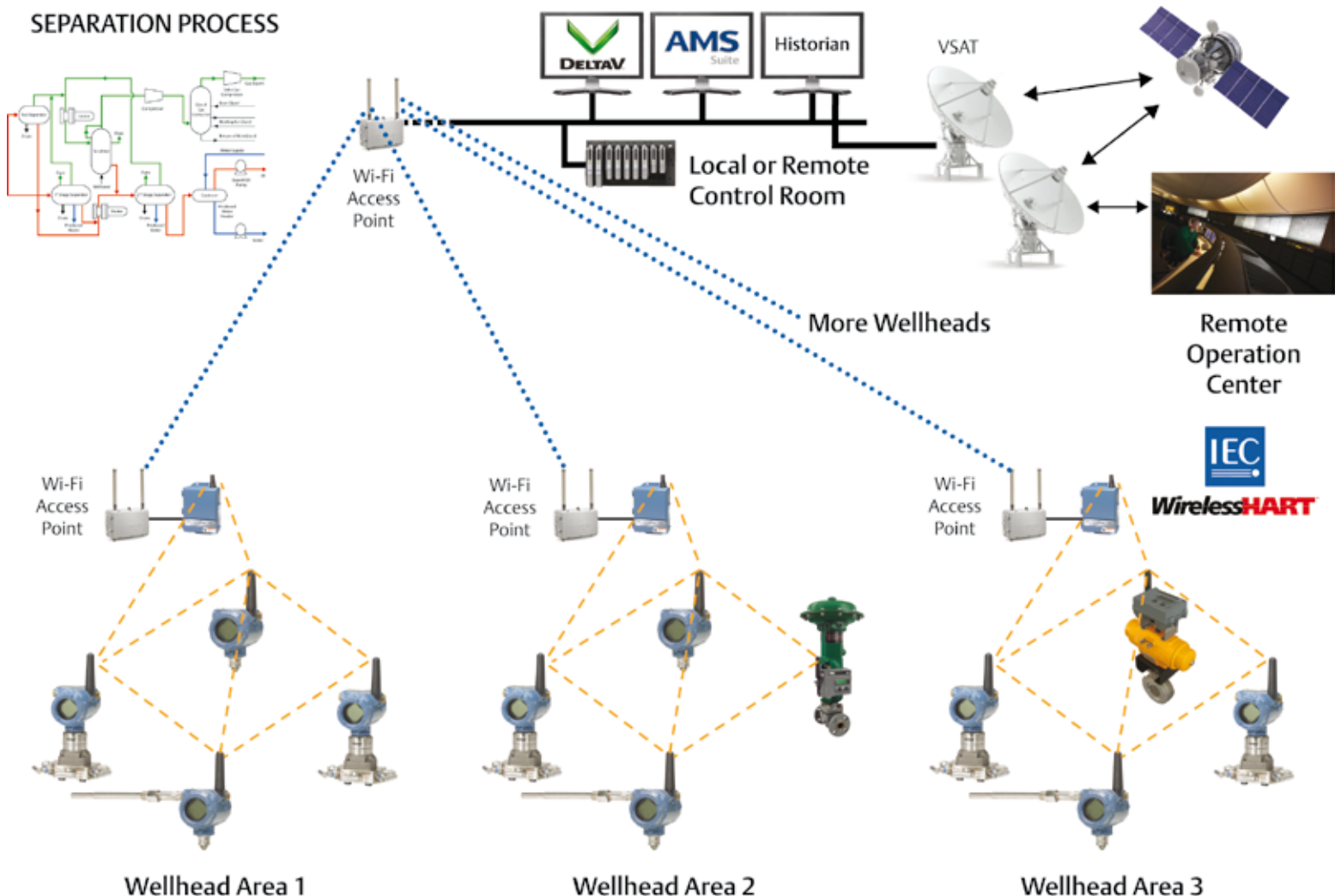
## Leverage Smart Wireless Flexibility for Easy Project Deployment

Establish field networks by simply installing Smart Wireless Gateways, then mounting up to 100 Smart Wireless instruments per gateway. You can easily accommodate the wireless transmitters for a number of wellheads in one gateway. Devices configured with the same network and join keys will connect to their IEC 62591 WirelessHART field network.

## Facilitate Late Design Changes

The unified Smart Wireless architecture uses multiple field networks to connect up to thousands of devices. Late design changes are eased with Smart Wireless since measurements can be added or moved without the major impact that wiring presents for engineering, documentation and installation.

## EMERSON’S SMART WIRELESS TECHNOLOGY USES FLEXIBLE NETWORKS TO COVER THE FULL EXPANSE OF THE INTELLIGENT FIELD





**Achieve the Reliability of Wired Networks, if not Better**

The IEC 62591 WirelessHART self-organizing mesh networks allow devices to serve as alternate communication paths, providing greater than 99 percent communications reliability. Signals easily find their way around obstacles, fixed or moveable. Emerson's AMS Wireless SNAP-ON application enables optimizing the network by viewing communication paths

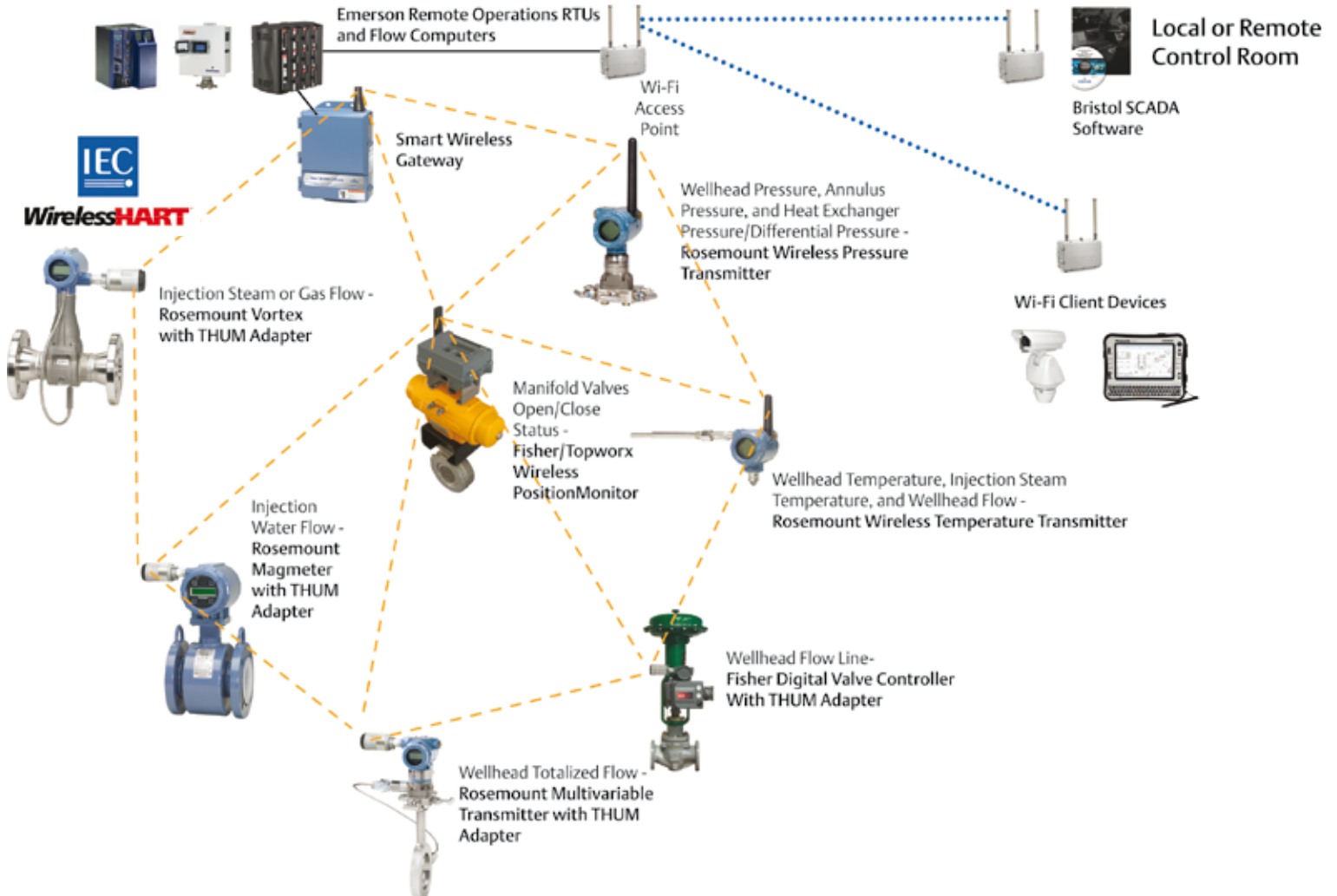
and observing key diagnostic and performance parameters.

**Improve Safety, Centralize Operations**

The limitless reach of Emerson's Smart Wireless technology improves personnel safety by minimizing trips to and time spent at remote sites. A single Smart Wireless network is wide ranging, with up to 200 meters device separation via long

range antenna, and as much as 800 meters when using an extended range antenna. More distant well pads connect data to centralized networks using IEEE 802.11 Wi-Fi access points. The access points also allow network applications including data backhaul, control network bridging, mobile worker access, people and asset tracking, safety mustering, and video monitoring.

**SMART WIRELESS NETWORKS DELIVER DATA FROM REMOTE WELLHEAD AREA**



# Apply Smart Wireless from wellhead to the operations center

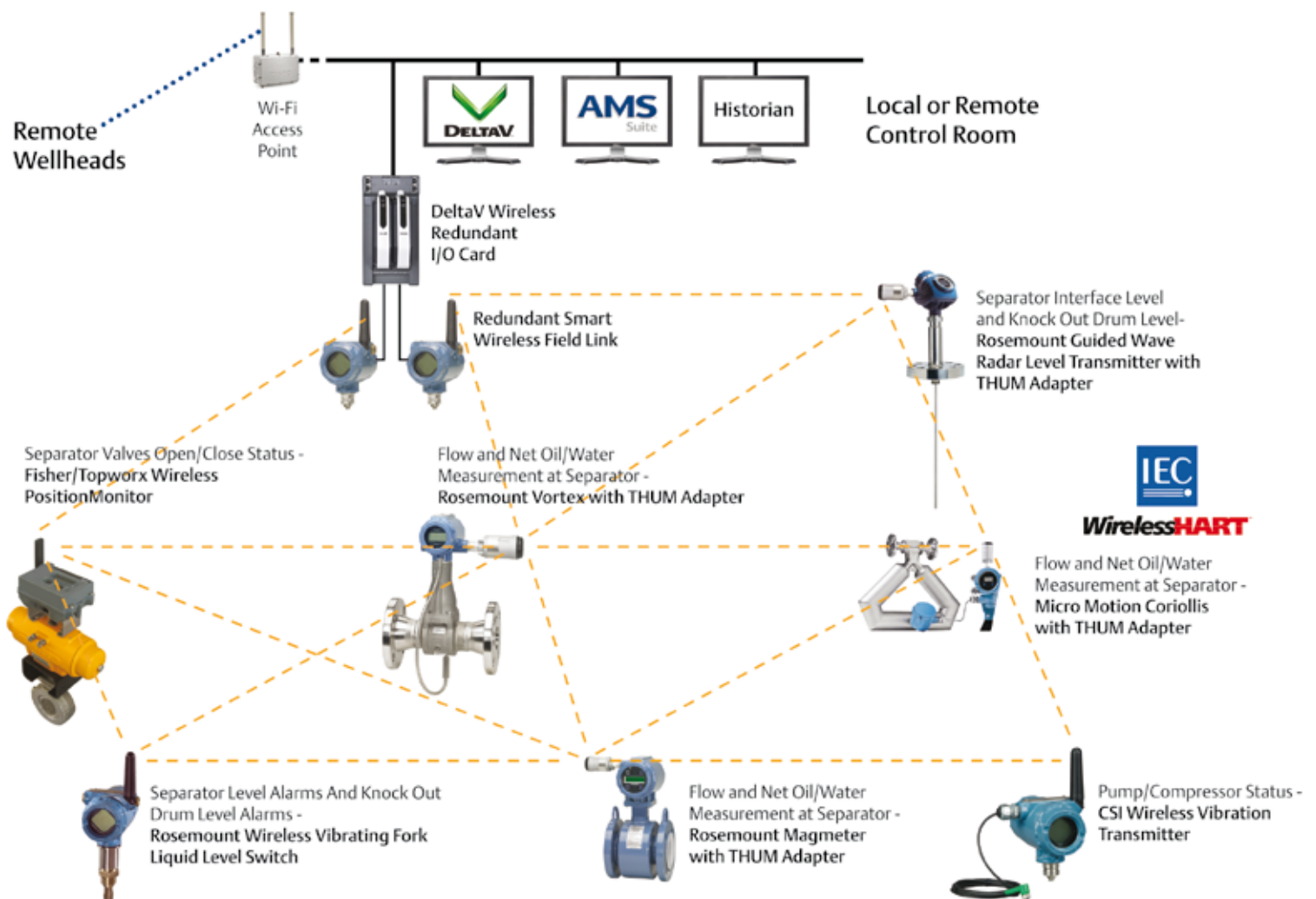
## Use Real Time and Accurate Data to Improve Field Production Strategy

Rich data from Emerson's Smart Wireless networks can improve well performance, lengthen well lifetime and enhance efficiency. The Smart Wireless instruments continuously monitor their own health and send diagnostic data with wellhead data to ROC and ControlWave® RTUs, FloBoss™

computers and remote control rooms for use in monitoring and production optimization solutions. Emerson's highly flexible Bristol® OpenEnterprise SCADA and HMI package provides telemetry capable of full integration with MIS, internet and other open systems. The control rooms include Emerson's DeltaV™ digital system or other hosts along with an historian and AMS Suite

predictive maintenance software to oversee the intelligent field and send guidance and instructions to field management.

## SMART WIRELESS NETWORKS DELIVER SEPARATION FACILITY DATA WITH WELLHEAD DATA TO SUPPORT INTELLIGENT PRODUCTION MANAGEMENT





# Achieve more advantages

## Unleash More Field Intelligence with the Smart Wireless THUM Adapter

New wellhead installations of multivariable devices like Coriolis meters, Magmeters, and Vortex flow meters require wired connections for flow totalization applications. Emerson's Smart Wireless THUM Adapter adds value for these instruments by communicating predictive diagnostics generated by the devices.

For existing installations that generate but do not communicate HART® diagnostic data, the Smart Wireless THUM Adapter provides wireless access to the intelligence. The THUM Adapter easily attaches to installed instruments, enabling them to send complete data to central stations.

## Choose Open Standard Wireless Technology

Further extending the reach of wireless technology, the open standard design of Emerson's Smart Wireless offering enables easy integration of other suppliers IEC 62591 WirelessHART based instruments.

## Leverage Proven Field Performance

Emerson has combined its global automation experience with its Smart Wireless family to implement thousands of installations across industries around the world. These include small projects to those automating several hundred wells. They are using wireless in many ways, including to meet newly mandated safety and environmental regulations, and to achieve savings in loops that are traditionally wired. Customer successes in onshore oil production include the following:

- Emerson's wireless technology helps Chevron San Ardo improve oil field personnel safety and increase production

*Smart Wireless networks reduce wastewater discharge during steam injection and deliver better down-hole pressure data. Operator safety has been improved and maintenance and travel costs reduced at the oil field because of the wireless technology.*

"It only took three hours to install a wireless instrument, configure and establish the network IP address, and make the Ethernet connection to the control room. We have eliminated the excess steam usage and now have a reliable steam injection measurement at eight stations."

Paul Kinne, Chevron head operator

- Emerson's Smart Wireless solutions improve wellhead monitoring at BP Wytch Farm

*The self-organizing Smart Wireless network has proven easy to install and highly reliable in the crowded metal wellhead environment of the onshore oil field.*

"Manual reading of pressure gauges on the wellhead was identified as one area we could improve, but we found that wired transmitters were simply too expensive due to the wiring infrastructure needed, so wireless is the perfect technology for this application."

Chris Geen, BP Manager



# Start with Emerson and Smart Wireless today

## EMERSON'S SMART WIRELESS FIELD STARTER KIT



### Getting started is Smart Wireless Easy

For an exploratory beginning, contact and collaborate with our experts to define an upgrade or a greenfield oil and gas production project. Request a demo of wireless field network performance with instruments and controls tailored to your field application.

Or, if you have the perfect application in mind, request a quote of Emerson's Smart Wireless Field Starter Kit ([www.EmersonSmartWireless.com/FieldKit](http://www.EmersonSmartWireless.com/FieldKit)). It is complete with native wireless devices and enabling devices, including:

- **Field Instruments:**  
Choose from wireless pressure, temperature, level, flow, vibration, discrete switches, pH instruments, or valve position monitors.
- **Wireless Adapters:**  
The Smart Wireless THUM Adapter can help to free up stranded diagnostics from your wired devices.

- **Gateway:**  
The Smart Wireless Gateway connects wireless field instruments with host systems and data applications using industry leading security, scalability, and data reliability.
- **Configuration and Asset Health:**  
AMS Device Manager software provides access to predictive diagnostics from your wireless devices. Easily manage your wired and wireless networks from a single application.
- **Services:**  
SmartStart™ Services to help you with your first startup, including a full network health assessment to ensure robust communications plus verification of device functionality through your chosen output (Modbus, TCP/IP, Ethernet, etc.). SmartStart Services include the startup and commissioning of wireless industrial process control systems, technical support services, troubleshooting services and software installation.

*Note: The number of wireless devices is flexible. You may order more than 5 units and adjust the mix of devices.*

FOR A LIST OF LOCAL LOCATIONS IN  
THE EMERSON GLOBAL NETWORK, VISIT  
[EMERSONPROCESS.COM](http://EMERSONPROCESS.COM)

## OTHER RESOURCES

### Brochures

Smart Wireless Field Network Solutions  
Smart Wireless Solutions for Plant Operations  
Smart Wireless THUM Adapter  
Smart Wireless Field Starter Kit  
The Virtual Wireless Plant Tour

### Articles

Wireless Now Series 1, 2, 3, 4

### Videos: [www.EmersonProcess.com/Videos](http://www.EmersonProcess.com/Videos)

Smart Wireless Gateway Successful Host Integration  
Easy Wireless Network Configuration with the AMS Wireless SNAP-ON  
...and many more

**Smart Wireless internet: [www.EmersonProcess.com/SmartWireless](http://www.EmersonProcess.com/SmartWireless)**

### PlantWeb University: [www.EmersonProcess.com/University](http://www.EmersonProcess.com/University)

Free on-line courses for process automation engineering and business, including training on Smart Wireless technology

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