

Smart Remote Automation

An Extension of PlantWeb® Digital Architecture



Improve Your Profitability

Today's oil and gas companies face a formidable array of challenges: Achieve operational excellence. Improve safety and security. Comply with ever-stricter environmental regulations. Increase ROI while competing globally. And do it all with shrinking engineering and maintenance staffs. Grass-roots projects bring their own headaches, with project locations throughout the world where you have little or no existing infra-structure and limited internal resources.

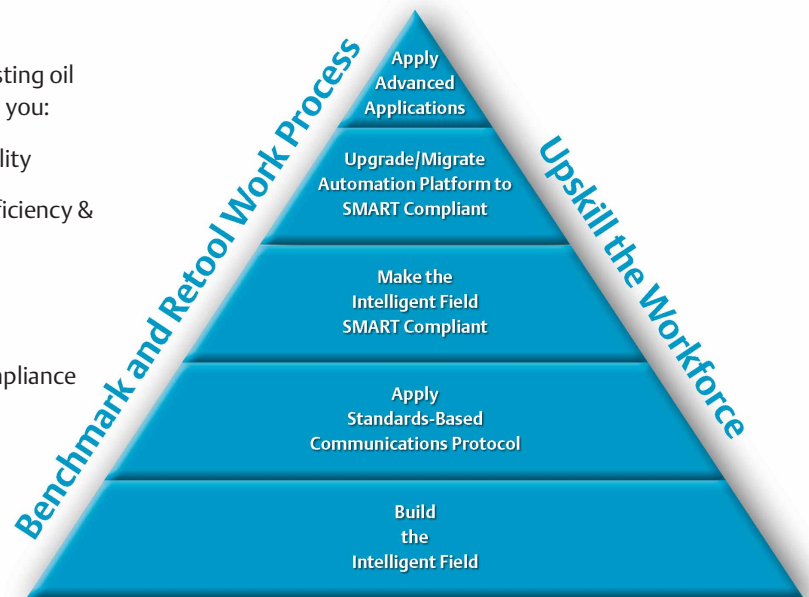
You need solutions that can help your staff make better decisions and better use of their time. With Smart Remote Automation, a PlantWeb® extension, that's what you get. Its predictive intelligence enables personnel throughout your organization to see what's happening not only in your process but also in the equipment running it—and use that insight to identify and correct potential problems before they impact your operation.

Smart Remote Automation is an extension of PlantWeb® digital plant architecture, the breakthrough technology that has proven its value in process plant installations around the world. PlantWeb has helped users realize up to 30% savings in installed costs, with shortened project times. It also helps them operate more efficiently. Our customers are seeing up to 66% improvement in maintenance-staff productivity. Customers have also realized at least 2% improvement in plant efficiency, with specific process efficiency improvements of 20-30%. That means better output and lower operating costs.

Smart Remote Automation takes the power of PlantWeb beyond the walls of the physical plant to remote sites covering hundreds or thousands of square miles. The kind of remote sites found in the Oil and Gas Industry. Smart Remote Automation lets you extend the

profitable life of new or existing oil and gas facilities by helping you:

- Improve Process Availability
- Improve Maintenance Efficiency & Effectiveness
- Reduce Measurement Uncertainty
- Improve Regulatory Compliance
- Improve Throughput and Yield



The SMART Field Pyramid. "\$10K Away from A \$Million"



"My Company's Operations and Engineering Staff reductions have resulted in less preventative maintenance, a "fix it when it breaks" attitude, more downtime, and reduced throughput!"

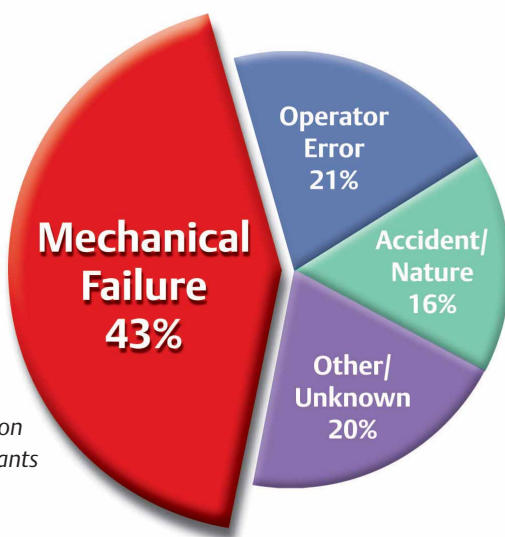
"What Can I do?"

Improve Process Availability



It's a simple truth. If you aren't producing, transporting, or distributing oil and gas, then you aren't making money. Yet the root cause of an outage isn't always obvious. What if you could take the biggest source of unplanned outages and eliminate them before they happen?

PlantWeb's online monitoring, diagnostics, and notification of potential problems lets you detect and correct conditions that can lead to equipment failure or process upset—before they result in unplanned downtime. It also helps you improve control and maintenance, for shorter, less-frequent planned downtime and faster startups after shutdowns.



Source:
M&M
Protection
Consultants

In an independent study, it was determined that mechanical failure is the single greatest cause of process interruption. Most often, it is preventable.

PlantWeb's predictive intelligence can help reduce and prevent downtime in instruments, pumps, motors, compressors, valves, analyzers, and other process equipment.

- **Predict future problems through equipment profiling.** Using the on-board diagnostics of intelligent field devices, PlantWeb monitors process health and that of associated equipment. By alerting you to early signs of process problems and equipment wear that can lead to failure, you take corrective action before your process goes down.
- **Profile process output with age to determine condition.** You can compare the output of your process with test data to determine when depletion is beginning and chart a future course of action.
- **Extend the profitable life of the process.** Change control strategies to increase production as processes age, adding only the equipment needed to control costs and maintenance problems.
- **Reduce unplanned outages due to equipment problems.** Online monitoring, diagnostics and notification of potential problems let you detect and avoid the causes of equipment failures that can lead to unplanned downtime. In effect, you are stopping problems before they become problems.

Manage Fields More Profitably with Predictive Intelligence



- Add new recovery equipment without increasing maintenance problems.



- Asset optimization lets you target maintenance personnel to the highest value equipment.



- Eliminate unnecessary field trips for data retrieval, configuration changes, or asset identification. Less windshield time means lower cost.

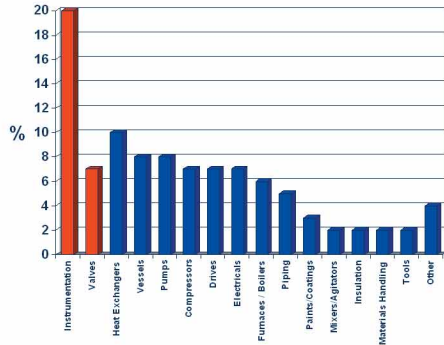


- Increase gas volume and quality over the life of the well through improved availability and better maintenance.



- Predict failures and other problems that could damage the environment, endanger personnel and result in fines.

Maintenance Cost

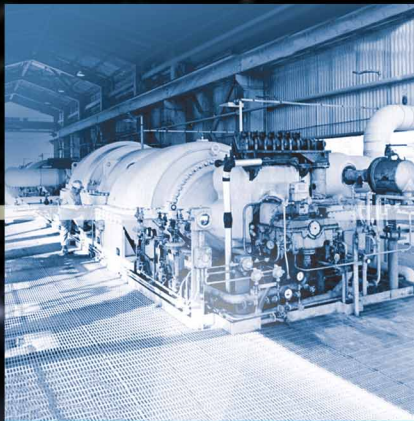


Source: IPI Market Data 2001 Gulf Publishing Company

Traditional Instrumentation represents a significant maintenance cost. Lower this cost with Emerson Smart Instrumentation and Asset Management Software.



- Reduce lost and accounted gas with more accurate measurement and better control of setpoints.



- Know what the problem is and what's required to correct it before personnel travel to the site. They "know before they go."



- Produce the right data, in the right format, on demand, with less cost and effort.

Improve Maintenance Efficiency and Effectiveness



Performance Diagnostics
Travel Deviation
Cycle Counter
Valve Signature
Step Response
Dynamic Error Band
Drive Signal
Output Signal



Electronic Failure
Sensor Failure
Process Condition
Configuration Warning
Plugged Impulse Lines



Electronics Failure
Density Out of Limits
Temperature Out of Range
Slug Flow
Frequency Output Saturated
Security Breach



Electronics Failure
Sensor Failure
Process Condition
Configuration Warning
RTD Drift
RTD Life Estimation



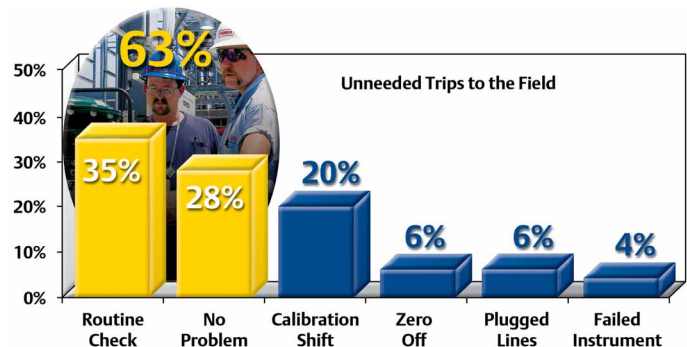
Electronics Failure
Sensor Failure
Reverse Flow
Low Cut Off
Primary Value Degraded
Simulation Active
Sensor Out Of Range

Smart Instruments are a Rich Source of Diagnostics

Whether you are trying to make the most of an ever-dwindling staff and budget, or looking for even more ways to trim operations and maintenance costs, PlantWeb can help. Its predictive intelligence increases maintenance productivity by detecting and diagnosing potential equipment problems before they grow, thereby reducing the frequency, severity, and cost of repairs while enabling your team to avoid unnecessary and unproductive tasks. Its information integration and easy-to-use control and optimization capabilities also increase productivity by enabling operators to run your operations more economically.

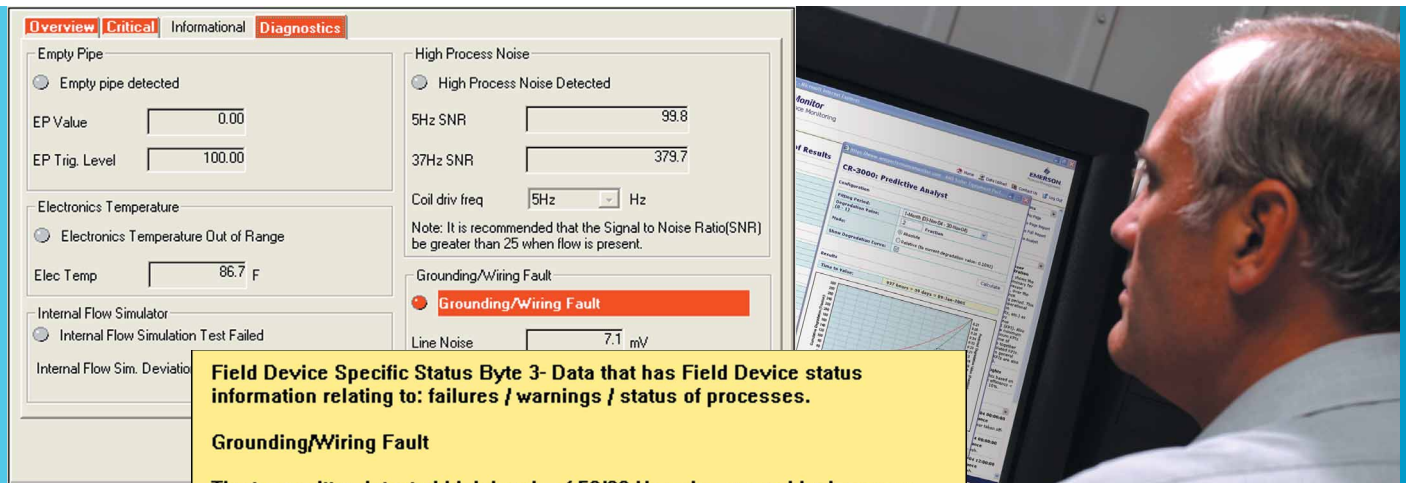
- **Send maintenance personnel to the highest value targets.** Don't waste dollars sending maintenance personnel to "check out" problems. Send them to the sites that you know need attention and avoid the "no problems found" scenarios.
- **Optimize each maintenance trip.** Having the right parts the first time to fix the problem saves wasted trips. PlantWeb gives you detailed diagnostic information you need so that maintenance personnel "know before they go." Configurations can be easily retrieved from your asset database and downloaded into replacement devices before maintenance personnel ever leave the plant.

- **Spend more time on targeted predictive maintenance.** Equipment failures result in costly repairs and unplanned downtime. You can reduce both by knowing when and where equipment maintenance is required so that you can schedule it in advance.
- **Reduce repair dollars.** Unplanned repairs are costly due to unexpected downtime and potential overtime for employees. Avoid the unexpected expense by planning for repairs when the economic impact is lowest.



Work Order Analysis: Wasted Maintenance can be avoided through remote diagnostics

Reduce Measurement Uncertainty



Field Device Specific Status Byte 3- Data that has Field Device status information relating to: failures / warnings / status of processes.

Grounding/Wiring Fault

The transmitter detected high levels of 50/60 Hz noise caused by improper wiring or poor process grounding.

1. Verify that the transmitter is earth grounded.
2. Connect ground rings, grounding electrode, lining protector, or grounding straps. Grounding diagrams are included in the flowtube product manual.
3. Verify flowtube is full.
4. Verify wiring between flowtube and transmitter is prepared properly. Shielding should be stripped back less than 2.5 cm [1 in].
5. Use separate shielded twisted pairs for wiring between flowtube and transmitter.
6. Properly connect the wiring between the flowtube and the transmitter on the flowtube. Corresponding terminal block numbers in the flowtube and transmitter must be connected.

To turn off grounding/wiring diagnostic, go to the diagnostic tab on the configuration screen.

PlantWeb provides you with information that lets you take simple action today to avoid quality, availability, and safety problems tomorrow.

The single biggest source of data quality problems in the oil and gas industry is data variability. And while typical causes of variability are normal aspects of any operation, they often go undiagnosed.

Variability can originate anywhere; from out of calibration sensors, plugged tubing, worn orifice plates, broken turbine meter blades, to sticking control valves. Individually, these variations may be minor. Together, they can result in significant measurement uncertainty and a major source of lost revenue.

Imagine if your assets could tell you when they were operating out of range, so that you could take action before data quality is compromised? PlantWeb's predictive intelligence helps you detect and correct potential problems before they can increase variability. As a result, you can keep instruments and other equipment performing at their best, improve control, and sustain the resulting gains—so you can reduce variability and shift setpoints for higher-quality output.

- **Reduce measurement uncertainty.** The better the measurement accuracy and consistency, the better the cost accounting and billing you can achieve. Decrease process variability and you'll reduce measurement uncertainty.
- **Know when to calibrate equipment.** Equipment that is out of calibration isn't measuring accurately. Know which equipment needs calibration and where it is located before data is compromised.
- **Monitor the health of key equipment.** Diagnostics provide insight into the quality of data and accuracy of control provided by your equipment. Know when data is good or suspect.
- **Know when process changes are made.** Avoid compromised data due to unintentional or undocumented process changes. You'll have a log of changes made to equipment and its potential impact on measurement.

Improve Regulatory Compliance and Reporting

Safety, health, and the environment are top priorities in every operation. PlantWeb helps reduce these costs by enabling you to *predict and prevent* abnormal situations instead of simply reacting to them. With PlantWeb's predictive intelligence and information integration, you can maintain the mechanical integrity of equipment, improve operational procedures for dealing with potential problems, and streamline regulatory compliance.

Operators and other personnel gain confidence to respond correctly to **timely, accurate information**...information that pinpoints precisely where a problem is...with no time wasted. You gain the power to change work practices and procedures to gain efficiency and improve safety.

- **Produce the right data, in the right format, with less effort.** Avoid time consuming and costly data searching to produce required reports. PlantWeb automatically collects the right data, archives it, and reports it in the format you need when you need it.

- **Receive immediate notification of critical conditions.** Near real-time reporting of alarm conditions is a reality. You'll get the information you need to make the most time and cost effective decision possible to deal with the situation. You'll also be advised of a course of action to correct the problem.
- **Avoid fines by avoiding non-compliance conditions.** You'll be informed of potential safety and environmental issues, such as leaks, before they become major problems.
- **Predict and Prevent Equipment failures.** Equipment damage most often occurs as a specific random event, not normal wear. Thus, preventable maintenance rarely helps. As a consequence, maintenance is either too late or too early. With PlantWeb's predictive intelligence, you anticipate problems before they occur and take the right action, at the right time. You can prevent small problems from becoming big safety issues.

Improve Throughput and Yield

ValveLink VL2000 - I/P and Relay Integrity - 2_IN_LV

Tag Network Instrument Setup Calibration Diagnostics Spec Sheet Tools Customize ValveLink Help

Datasets: 02 Apr 2003 15:30:35

Inputs | Configuration | Graph | Event Log | Data Points | Notes

| Type | Time On (hr:mi...) | Time Off (hr:mi...) | Event |
|-------------|--------------------|---------------------|---------------------------|
| Warning | 00:00:15 | | High I/P drive signal |
| Information | 00:00:00 | | Data collection started |
| Information | 00:00:00 | | Supply pressure OK |
| Information | 00:00:00 | | No active alarms detected |

Description

The I/P drive signal is outside its normal operating range. The drive signal should be between 55% and 85%.

| Possible Cause | Recommended Action |
|--|---|
| I/P primary starting to plug or I/P... blocked by grit | Remove the I/P. Check the screen filter and I/P primary restriction for debris or material buildup. Clean if necessary. If the problem persists, replace the I/P. |

Additional Information

| | |
|------------------|---------|
| Travel | 50.07 % |
| Travel Set Point | 52.28 % |

PlantWeb provides meaningful and actionable information regarding the cause of problems and the recommended course of action

Improving throughput positions any organization for greater return and competitiveness, regardless of market condition. When capacity constrained, you can produce more with existing assets. When market-limited, you can achieve your target output with fewer operating units.

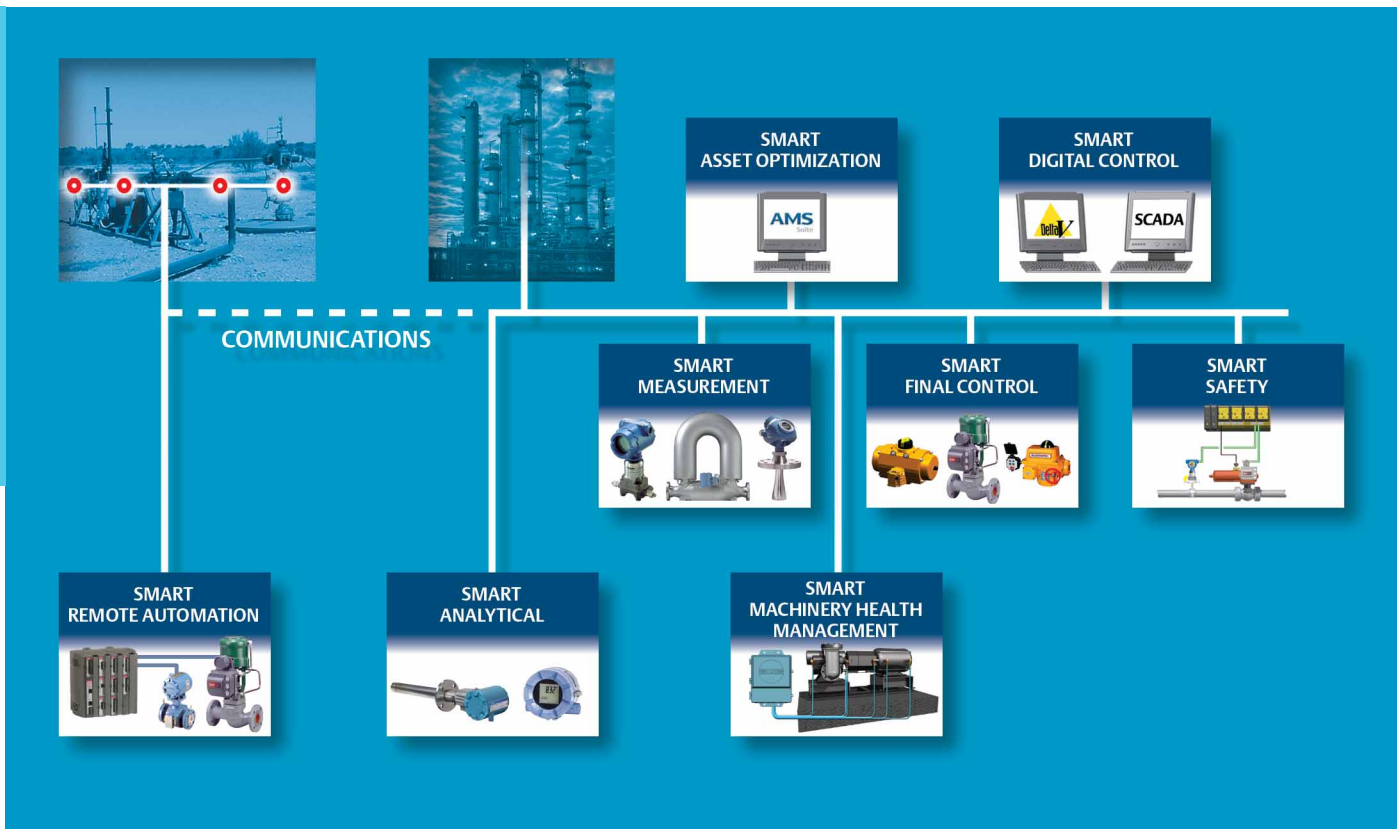
However, most operations are not running at optimum throughput. Actual setpoints are set conservatively, compensating for process variability and unexpected disturbances. The predictive capabilities of PlantWeb can eliminate this variability and warn you of unexpected disturbances. This gives you the **confidence to set loop setpoints closer to constraints**, improving throughput.

With its unique predictive intelligence and top-to-bottom integration, PlantWeb enables you to increase throughput not only by reducing downtime, but also by improving both basic and

advanced control so you can push setpoints closer to optimum operating levels.

- **Increase volume and quality of oil and gas.** You can optimize well production remotely, maintaining setpoints closer to the well test values without overproducing and risking well damage or penalties.
- **Optimize processes based on changing conditions.** You can control throughput closer to the demand, thereby avoiding over or underproduction issues.
- **Reduce process variability for high quality product and yield.** A tightly monitored well, gathering point, or custody transfer site means gas quality can be better maintained and the potential for lost or unaccounted gas is greatly reduced.

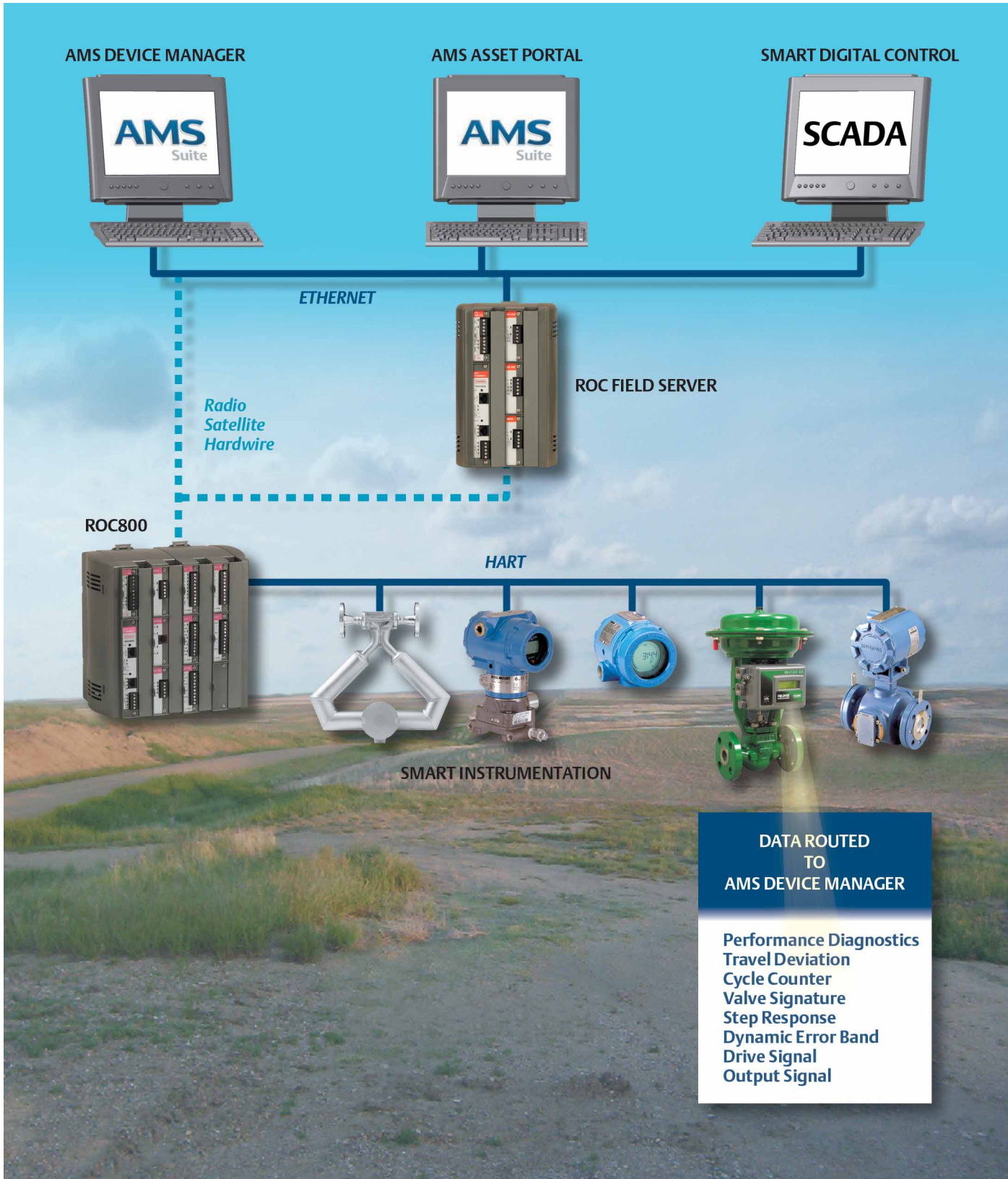
PlantWeb Architecture and Smart Remote Automation



PlantWeb Architecture

The key components of PlantWeb architecture and its Smart Remote Automation extension are:

- Smart Digital Control**—A SCADA or DCS system monitors I/O and issues commands accordingly. These systems may also be capable of polling history data over the communications link. This can be an Emerson system such as Delta V or a third-party system.
- Smart Asset Optimization**—AMS (Asset Management Software) Suite is the heart of predictive intelligence. It provides configuration features and the interface for the advanced diagnostics used with HART instrumentation. It also houses all of your remote asset data such as tag numbers, names, locations, calibration status, and configurations. AMS Suite includes AMS Device Manager and AMS Asset Portal software for managing all of your HART instrumentation.
- ROC Polling Service**—This software resides in the AMS Device Manager and provides the interface between AMS Suite and the ROC800. It has database capabilities for configuration of the ROC800 and ROC Field Server, and it supports data communications between the ROC800 and AMS Suite Intelligent Device Manager.
- ROC Field Server**—The ROC Field Server is used where a low bandwidth field communications network interfaces to a high bandwidth Ethernet control network. It provides 5 serial communication ports.
- ROC800**—The ROC800 Remote Operations Controller is located at the remote site and passes AMS data between smart instrumentation and the AMS software. It also provides its own diagnostic information, data archival, and measurement and control functions as required.
- Smart Instrumentation**—Smart instrumentation is any digital instrument connected to the ROC800 that uses HART protocol and is capable of communicating health information in addition to the process variable.



Smart Remote Automation

Learn More

We want you to start realizing the many benefits of PlantWeb today. To help make that happen, contact the Emerson Local Business Partner (LBP) or sales office in your area. If you don't know who they are, visit our website at www.EmersonProcess.com/Flow and click on Support. You can also learn more about PlantWeb at the same web address with our on-line resources.

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Flow Computer Division

Phone (641)754-3449

Toll Free (800) 807-0730 (US & Canada only)

FAX (641) 754-3630

www.EmersonProcess.com/flow

