Automation System Modernization
Regain your competitive edge.
With today’s increasing global competition and rapid technological advances, many plants around the world have legacy automation systems that aren’t able to keep up with today’s production demands.

Better plant performance begins with better automation. And, with today’s digital technologies you can expect increased productivity and better communications between your process information and your business systems.

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A legacy of lost opportunities.

When should you consider system modernization?
Yesterday’s systems may have been a good investment, but today’s
technology and expertise provide opportunities and benefits that just
weren’t available when these systems were designed. You should consider
a modernization when:
■ Production & energy costs keep rising
■ Inventories of raw materials and finished product pile up
■ Product quality is inconsistent and customer complaints increase
■ Start up and product grade changes cost more than they should
■ Plant trip and alarm systems are unreliable and/or inadequate
■ Production is inflexible and start-up time is lengthy
■ Recurring emission problems are constraining throughput
■ Business systems lack meaningful plant floor production data
■ Customers are demanding more but your plant cannot deliver:
  ■ more specialized products and packaging
  ■ tighter quality specifications or delivery times
  ■ better service
■ Obsolete system support costs continue to increase.

What are you missing?
You may want to consider how your system (and your current automation
supplier) would respond to:
■ Plant expansion (including bus-based or wireless I/O) for improved
  plant diagnostics and increased plant uptime
■ Reducing variability to establish a foundation for advanced controls
  and process optimization for better throughput and yields
■ Providing field service alerts to operators and/or maintenance,
  improving response times to specific needs
■ Integrating DCS information with your business systems for more
  informed and timely business decision-making
■ Integrating predictive maintenance practices to focus your
  maintenance resources, saving time and money.

See how Emerson’s digital technologies and expertise enable the safest
and most scalable path to on-going capital expense and operational
expense savings.

“Emerson is widely recognized as today’s
leader with respect to
process instruments
and automation
systems. We expect to
benefit greatly from
their experience in
applying these
technologies to the
processing of bitumen,
integrating the
engineering phase of
the project, and
bringing state-of-the-
art efficiency to the
operation of our
upgrader.”

Robert Pearce
President
North West Upgrading Inc.

For more information:
■ EmersonProcess.com/
  Solutions
Why modernize with Emerson?

Take advantage of Emerson’s experience with thousands of process automation projects worldwide.

Automation leaders
The keystone to Emerson’s automation technology leadership is the proven PlantWeb® digital plant architecture, an open standards-based digital solution that networks intelligent field devices, digital systems, and software, controlling processes and managing equipment and other assets. Embedded, advanced control means a more efficient, consistent, available and optimized operation.

Emerson’s commitment to open standards, highlighted by our donation of the HART protocol in the 1980’s, continues today with our work on FOUNDATION fieldbus and wireless standards.

Modernize for measurable results
Highlights of customer measurable results in thousands of PlantWeb installations worldwide include:

- 30% increase in capacity without additional personnel
- 10% increase in throughput
- 20% reduction in raw material usage
- 15% reduction in rework
- 50% reduction in maintenance costs with remote diagnostics
- New high-margin products never before possible
- Control room space requirement reduced as much as 85%
- Automation investment payback in less than 4 months.

Leaders in service
Emerson’s global network of engineers and consultants has the real-world industry and process automation knowledge to help you design, plan and implement your automation concept with:

- Modernization and migration consulting
- Fieldbus consulting
- Process safety management
- Human factors optimization
- Production information management
- Advanced automation & optimization
- Plant system security.

Reduce your risk
With PlantWeb, you can achieve an effective program for managing safety, health, and environmental risks and costs—one that goes beyond abnormal situation management to abnormal situation prevention.

AMS™ Suite: Intelligent Device Manager gives you key online access to your instrument and valve process information, diagnostic status information, and automatic documentation of all field device maintenance information. And DeltaV® SIS, at the heart of Emerson’s smart SIS, works with AMS to continuously diagnose your intelligent field services and safety functions. This helps ensure your process shuts down only when it should.
Better performance.

Operating on the leading edge
Process manufacturers lose millions of dollars each year due to process variability and poor control performance, often unaware that a problem exists. The powerful new DeltaV InSight monitors control performance; identifies and diagnoses problem loops; recommends tuning and maintenance improvements; and continuously adapts to changing process conditions.

Manufacturers have real issues everyday that effective wireless solutions can help solve. Emerson’s Wireless SmartPack™ helps you create a secure network right out of the box, giving you convenient access to information you simply don’t have today.

Often, fewer than 10 modules cause 40% or more of alarm activations. So by addressing just a few alarms, you can significantly improve operator alarm loading. DeltaV Analyze makes it easy to find the most frequently occurring alarms.

Emerson Process Management was again voted the best supplier of process management technologies in CONTROL Magazine’s 2007 Readers’ Choice Awards. This is the 14th consecutive year that Emerson has captured the user-voted recognition.

ARC and Control Magazine also placed Emerson as #1 on their Top 50 Automation Companies List.

“We looked for a company that had the right technology and also a strong support network that would be available to us. We selected the PlantWeb digital plant architecture from Emerson Process Management. We also selected Emerson as our main automation contractor because of its proven project management experience and intimate knowledge of the technology we had selected.”

Evelio Hernandez, Process Control Systems Manager

For more information:
- EmersonProcess.com/PlantWeb
- EmersonProcess.com/SmartWireless
- EasyDeltaV.com
How do I get started?

**Emerson experts and technology help you evaluate where you are and plan where you’re going.**

**The challenge**
Selecting the right technology, the right partner, the right implementation plan and the right budget minimizes risk. Emerson offers unparalleled capabilities to help you set the stage for a more profitable plant.

**Building the business case for modernization**
Emerson works with you and your team to help you define and justify a migration path based on your business and production perspectives. This often begins with a review that includes all appropriate plant and corporate groups to establish business goals that could include:
- Increased availability
- Reduced manufacturing costs
- Increased throughput
- Reduced plant emissions
- Improved quality
- Improved ability to introduce new products
- Improved response to customer demands
- Increased safety.

Based on your business objectives, a **site assessment**, tailored to your needs, defines performance criteria:
- Key process measurements
- Process constraints and limitations
- Process disturbances
- Equipment or operational limitations.

**Planning for your specific needs**
The **site assessment** feeds a **process automation feasibility study** used to develop the **process automation modernization plan**.

This study includes a cost/benefit analysis based on both CAPEX and OPEX over the lifetime of the system. This defines the **business case** and helps you answer the question: “Will improving my process automation improve my key performance indicators?”.

This plan may cover:
- Migration to a new automation system
- Process modifications
- Additional instrumentation
- Improved regulatory and/or advanced control strategies
- Safety, environmental and equipment protection
- Information integration
- Asset management.

An Emerson modernization plan will consider a variety of migration types and specific needs, and informs you of viable and profitable options for your system:
- Full system upgrade - controllers, I/O and consoles
- Controller upgrade using I/O bus interface
- Upgrades that work with your existing controllers and I/O
  - Console upgrade
  - Advanced control implementation
  - Historian consolidation.

Your plant: An asset to perform
With a solid business plan.

Front-end engineering and design
Once a process automation modernization plan has been developed, Emerson’s world-class team of automation experts continue to work with your key stakeholders to develop a Front-end engineering and design (FEED) plan.

An Emerson FEED study is the foundation for a controllable and profitable project making certain that your design meets your organization’s overall needs by:

- Ensuring that the design meets your project’s time, budget, ROI and operating cost criteria
- Setting scope boundaries by quantifying and justifying the investment required for a given benefit
- Preventing unnecessary changes through better change management
- Identifying and providing for project risks
- Achieving faster implementation of technology.

The FEED package would typically provide a Project Execution Plan with the following elements:

- Safety and Environment Plan
- Quality Plan
- Master Project Schedule
- Staffing Plan
- Project Controls Plan
- Project Communication Plan
- Hot Cutover Plan
- Turnaround Plan
- Installation Management Plan.

Emerson total value
Emerson’s FEED capabilities are part of a total value proposition to create smart plant solutions with proven benefits:

- Lower capital expenditure to reduce automation costs 20% - 30%
- Faster time to profitability
- Increased profitability
- Superior system manageability.

2007 Frost & Sullivan Company of the Year Award for Industrial Automation and Process Control

“The global footprint of the company and its outstanding engineering capability coupled with a sound business process empowers Emerson to deliver the same benefits at all customer locations.”

Kishnan M. Bhat
Industry Manager
Frost & Sullivan

For more information:
- EmersonProcess.com/Solutions/ProjectServices
Precise control over your project at a time of major change is critical to maintaining plant operations and business objectives.

Detailed processes and global standards
Emerson integrates global standards and best practices in project management processes. Project deliverables include documentation, support tools, and technical standards that help reduce errors and omissions in budgeting, scheduling, training, and maintenance.

Emerson’s project management work process is built upon the recommended best practices of authorities such as Construction Industry Institute (CII), Project Management Institute (PMI), and Independent Project Analysis (IPA) methodologies.

Global standards in this context refer to standard, modular, pre-tested pieces of automation like control modules, equipment modules, phases, etc.

These standards:
- Incorporate accumulated knowledge and best practices
- Help facilitate communication between team members
- Shorten the learning curve for new project team members
- Include a customer feedback mechanism for continuous improvement.

Our project managers have the training and experience to deliver consistent results:
- Highly effective planning and design
- Excellent change management
- Strong performance to budgets; both time and cost
- Optimized product and technology benefits
- Highly efficient implementation
- Risk containment
- Smooth startups and commissioning
- Faster ramp up to full production.

Expert implementation
Emerson’s engineering teams have strong advanced technology, integration and optimization expertise targeted at modernization.

Conversion Services and utilities
Conversion services for graphics, database, and other configurations are available to help minimize switching costs and reclaim the value of your legacy system investments for use with the DeltaV system.

Focused conversion service engineers are dedicated resources, familiar with common errors and best practices regarding conversions. Their expertise covers all aspects of the automation project including operator interface, batch architecture, continuous control, devices and I/O, and integration with external systems.

Emerson has extensive investments in conversion utilities that make conversion services efficient and accurate without extensive or unnecessary rework.

Scalable automation services
With a wealth of experience.

Platform expertise
Emerson has invested in legacy system domain experts for a variety of platforms, including non-Emerson systems. These experts understand how to address system-specific intricacies for successful migrations.

Connectivity services
Emerson has the services and tools to connect your new automation system to existing advanced applications and production systems. One example is an auto-tag conversion tool that helps migrate existing layered applications over to newer technologies.

Vertical integration
Emerson's family of instrumentation delivers valid, actionable field information to the DeltaV system's suite of operations management, advanced control, and asset management applications. Valid plant information in advance of a plant event or upset is the essence of abnormal situation prevention (ASP). Rather than attempting to manage operational incidents, ASP is focused on preventing the losses associated with facility upsets altogether.

Optimization services
Asset optimization services help with asset prioritization, critical asset reliability improvements, and maintenance work process development. We provide assistance to maximize asset value extraction, performance improvement and optimization, technology deployment improvement, integration of maintenance and performance information-driving key performance indices in the right direction.

Variability management
Process variability eats away at product quality and plant availability and wastes raw materials and energy.

Variability management consulting services provide a comprehensive holistic approach to minimizing process variability for optimal control performance.

Client engagements are performed by senior professionals who have an in-depth understanding of process dynamics, control equipment, and control strategies. They use systematic and scientific methods of control design, loop tuning, and process troubleshooting.

“Emerson’s goal is to design a reliable, advanced instrument and control system to assure safe, stable, and long-term quality operations while maximizing the profitability of the company. Emerson has proven technologies and a proven track record in China. Emerson’s local resources and the support of its global resources help to mitigate and minimize risks for owners.”

Hongye Hu
MICC Manager
Fujian Refinery
August, 2007

For more information:
EmersonProcess.com/Solutions/Consulting/VariabilityManagement
Emerson’s solutions and experience give you choices for implementing your modernization.

Options for modernization
Whether you’re migrating to a new automation system during a turnaround (cold cutover) or while the process is up and running (hot cutover), Emerson project personnel work with your operations team to carefully plan and safely implement your modernization plan while saving valuable production time.

In one example, three key PlantWeb technologies were used in the process to help perform a hot cutover from pneumatic control to FOUNDATION™ fieldbus. The FIELDVUE® DVC6000f, with its unique pressure control functionality, allows a fieldbus connection to the DeltaV system while also sending a pressure signal to the existing actuator or pneumatic positioner. Once pressures are balanced within the system, control is transferred to the digital valve controller.

During this phase, AMS Suite: Intelligent Device Manager, helps reduce the risk in finalizing the hot cutover by enabling local communication with the valve to monitor exactly what is happening during the process of mounting, adjusting, stroking, and calibrating the valve.

Each piece of instrumentation has a special cutover procedure, based on years of experience in implementing cutovers. AMS Device Manager is used by the team to help coordinate these programs, reducing project risk by:

- Verifying device:
  - configurations match specifications
  - connection and ranging
  - construction materials
- Ensuring that devices function as a system, whether checking interlocks, stroking valves, or verifying alarm points on field devices
- Minimizing device configuration and implementation times.

How do I minimize operational impact?

Flexible automation solutions
Any way you need to.

Flexible solutions
A number of other Emerson solutions help to save time and prevent disruption while giving you flexibility during a system upgrade. These technologies allow DeltaV Operator Stations to be added to a variety of legacy systems with the process online and used side-by-side with existing consoles while the process continues to run.

You can also add DeltaV controllers at any time and these can co-exist with your legacy system while allowing you to take advantage of technologies such as predictive field device intelligence, embedded advance control, and integrated asset management.

With these flexible solutions, FOUNDATION fieldbus and other digital busses such as HART, Proflight DP, DeviceNet and AS-i bus can be easily integrated with your existing legacy equipment.

Switchover savings
As you replace and upgrade your legacy controllers and I/O with DeltaV components, get fast switchover while retaining your termination panel and wiring investments.

Our solutions use existing legacy field wiring terminations for the DeltaV system without lifting or removing wires. These solutions can:
- Save your existing wiring investment
- Speed startup by not disturbing field connections
- Reduce process downtime by 75% or more compared to rewiring.

Reduce risk with DeltaV Simulate
With DeltaV Simulate, you can develop and fully test control strategies in an offline laptop or desktop PC environment. You can verify all your DeltaV configurations before you migrate control. With add-on software such as MiMic® I/O simulation, you can also checkout I/O before connecting live.

“Emerson’s experience really made a difference in the planning and implementation of the hot cutover to our new control system. Their digital technology was also critical as they worked with us to install and commission 1100 new instruments. This project was under budget with no OSHA or environment incidents. You cannot get much better than that!”

Bob Sherven
Project Manager
Shell Deer Park Refinery

For more information:
- FIELDVUE.com
- EasyDeltaV.com
- EmersonProcess.com/AMS/index.htm
- EmersonProcess.com/Solutions/Migration
Emerson’s training solutions deliver skilled operators and operational excellence anywhere in the world.

Start with the basics
PlantWeb University facilitates your understanding and evaluation of new ways to improve project, process, and plant performance. PlantWeb University provides practical, real-world information about how to improve process and business performance to over 20,000 industry users around the world.

Get more from your automation investment
To remain competitive, companies need a highly skilled workforce, equipped with the knowledge, skills, and ability to take action and be proactive. Emerson’s Educational Services team has been training industry professionals around the world for over 65 years with:
- 44 fully manned and equipped training centers
- 120 full-time and 45 part-time professional staff
- Over 20,000 students trained annually.

Hundreds of courses and training solutions are available for every level of your organization from front-line technicians, to operations, engineering and management. Our diverse learning methods range from general classroom offerings to in-plant customized training.

Recent eLearning courses to consider are DeltaV Operator Interface for Continuous Control and Fisher Valve Fundamentals. These new on-line courses allow you the opportunity to learn about these products at just the right time for you.

New equipment and technologies mean you need to recalibrate your operations and maintenance program; we can show you how. Training to consider during a modernization can include:
- Simulation-based operator training
- Control engineer training
- Process operations training
- Digital bus training
- Safety Instrumented Systems training
- Smart wireless training
- Advanced control and optimization training.

How do I maximize return on investment?
DeltaV OTS Training
A key concern when modernizing a plant automation system is that your operators are skilled in making the most of this new technology.

With the new DeltaV Operator Training Solution (OTS) program, our Educational Services team can help ensure that your personnel are primed to capitalize on these technologies and unlock the true potential of your operation. Benefits include:

- Operators are trained before actual commissioning takes place
- Faster, smoother start-ups
- More confident and experienced operators
- Reduced incident reporting
- Product quality improved faster
- A better understanding of possible failure scenarios

Transfer knowledge and best practices
Actual key process events that occur on one shift can be recreated with different operators and crews. Simulations can be designed to capture the experiences and actions of senior operators so that new operators can learn them.

Real experience without risk
Operators will learn DeltaV operating concepts while experiencing a breadth of process scenarios. This new training offers the benefits of exposing operators to a training environment identical to what they will experience in the actual control room. Benefits to simulation-based operator training are:

- Real experience with no risk
- Actual plant configuration graphics and database
- Realistic dynamic process simulation and scenarios
- On-site, 24/7 learning
- Custom curriculum and courseware
- Professional instruction and support
- Affordable tiered solutions.

“ The courses are very helpful and provide loads of knowledge. I actually enjoy the courses and look forward for new topics.”

“ Very good technical overview of the process digital world.”

“ Definitely worth the time spent. A lot of good practical tips and suggestions.”

“I think everyone who is involved in the field or engineering should review the courses....”

For more information:
- EmersonProcess.com/education
- Plantweb.EmersonProcess.com/University
How do I sustain these improvements?

Emerson’s SureService portfolio contains all the right elements to tailor a program to fit your specific support needs.

To this end, Emerson has developed:
- A global service organization
- Service quality processes
- Our global Service Management System
- Our comprehensive portfolio of automation system lifecycle support products.

We meet the expectations of our customers worldwide by consistently delivering competent, efficient and reliable services of the highest possible customer service. This global consistency of service and support from certified professionals—both centrally-located and local to you—is what separates Emerson from all others. To you, this difference means prompt, professional response, no matter where on the globe you operate.

Comprehensive portfolio of support services
We recognize that automation system support needs vary from one customer to another, and that our customers make investments over the system life cycle for three important reasons:
- Availability Services to keep your system running
- Application Services to apply the best PlantWeb technologies
- Sustainability Services to protect your investment in capital and intellectual property.

Emerson’s portfolio of services can be combined in various ways to address your unique needs in each of these three areas through a combination of factory and field resources and local service agreements.

The base element for Emerson system service agreements is Guardian Support, a prognostic service designed to optimize the availability, sustainability and performance of your DeltaV digital automation system.

The SureService program consists of service modules, each designed to address specific support requirements. These modules can be combined to customize a support program for your plant that is tailored to fit just right, meeting your support needs while providing value and peace of mind.

Guardian Support
The core element of our SureService support program will help you improve staff productivity while reducing operations and maintenance costs.
SureService℠

Availability Services
These are the basic, essential day-to-day system maintenance services designed to help you achieve the desired level of certainty for system uptime, taking your process, system design, and in-house resources into account (see table).

Application Services
These services help you achieve expected results from the application of technology and related work processes, while keeping up with evolving business conditions.

Application services can help ensure the effective application of PlantWeb technology with a focus on prevention of system issues and overall improvement of plant operation.

Sustainability Services
Sustaining your automation system such that it can be routinely supported and serviced is essential to maximizing the return on your system investment. Sustainability services can include identifying, assessing, planning, and implementing technology updates and upgrades to minimize system down time, prevent system offsets, and minimize total cost of ownership.

For more information:
SureService.com

Jim Norcross
Canadian Forest Products

...we’ve seen upwards of 90% reduction in variability on the operation of the kiln, which will immediately give us a positive payback.”

SureService Portfolio

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ATTENTION: NEWS EDITOR: FOR IMMEDIATE RELEASE

Emerson to digitally automate China’s largest integrated refining/petrochemical facility
Company to install its PlantWeb® architecture at $3.5 billion project in Fujian Province

ATTENTION: NEWS EDITOR: FOR IMMEDIATE RELEASE

Emerson completes commissioning phase of project to digitally automate FPSO for BP Angola
Leading-edge technologies, including Emerson’s PlantWeb® architecture, help BP Angola speed startup and minimize production cost

ATTENTION: NEWS EDITOR: FOR IMMEDIATE RELEASE

Emerson completes digital automation of U.S. refinery producing 10 million gallons of gasoline daily
Motiva Norco refinery deployed Emerson’s PlantWeb architecture, improving production reliability, plant utilization, and safety and environmental performances

ATTENTION: NEWS EDITOR: FOR IMMEDIATE RELEASE

Emerson wins major contract to digitally automate India’s largest life sciences plant
Emerson’s leadership in life sciences industry key to new contract

ATTENTION: NEWS EDITOR: FOR IMMEDIATE RELEASE

Emerson’s PlantWeb® Digital Plant Architecture Contributes to Operation of New Generating Unit Nine Months Ahead of Schedule
PlantWeb with Ovation® expert control system supports record-setting timeframe for construction and commissioning of one of China’s first 1,000-MW Ultra-Supercritical Power Generating Units

If you found this brochure valuable, we also recommend the following brochure:

Emerson Automation Contracting brochure for your project planning, design and implementation needs.
Visit: EmersonProcess.com/solutions

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