

innovations

IN PROCESS CONTROL


EMERSON
Process Management

“We believe it’s
time technology
began serving
people, instead
of the other
way around”

Bob Sharp

President, Emerson Process Management Europe

Read the full story on page 4 and 5

making a difference

“We are now able to spot if there is something wrong with the chlorine content much earlier. This makes it easier for us to meet our legal requirements, which is better for the environment and prevents fines being incurred.”

Eric Engelen, Process Analytical department, DOW Terneuzen.

The DOW Terneuzen site in The Netherlands extracts sea water from the Westerschelde estuary for cooling. The water is dosed with minimal amounts of chlorine to control microbiological activity. The concentration of the chlorine must be precisely controlled before the water is returned to the estuary to ensure compliance with environmental legislation. An existing analyser that relied on the use of a chemical reagent was unreliable, outdated and costly to run. Because of the impurities in the water, the accuracy of the measurement was poor. The analyser also required cleaning or resetting on a daily basis. The analyser was replaced by a Rosemount® Analytical Model TCL sample conditioning system which uses a reagent-based amperometric method to measure total chlorine. This method is ideal for measuring water containing impurities and better suited to the application at DOW. The Model TCL doses air to assist in iodine formation; this creates a self-cleaning effect which means the sensor requires almost no additional cleaning. The greater accuracy and speed of the new system enables easier compliance with environmental regulations. Operational costs are also lower. For further information please visit: www.emersonprocess.com/dow

“We now have online access to real-time data about the compressors’ operation, and can review historical data and trends. Alarms are generated when problems occur, enabling staff to take fast action in an abnormal situation.”

Weldon Araújo, Maintenance Operator, Petrobras Sao Mateus

Emerson’s Smart Wireless IEC62591 (WirelessHART®) network delivers real-time compressor data at Petrobras gas compression facility in Brazil, improving maintenance, saving €145,000 installed cost and overcoming difficult conditions for wired approach. For further information please visit: www.emersonprocess.com/SmartWireless

“The Fisher® Control-Disk valve performance and reliability led to savings and enabled us to improve our customer service.”

Neil Price, Improvement and Performance Coordinator, E.ON

Emerson’s high performance valve improves filter water flow control enabling increased availability at E.ON Northwich, combined heat and power plant. For further information please visit: www.fisher.com/bettercontrol

“This Global Framework Agreement marks a completely new approach within Shell. It is a long-term, competitive, collaborative, performance-based relationship that will facilitate the delivery of considerable value to both parties.”

Nick Curley, Upstream Automation Portfolio Manager, Shell

Emerson will serve as Main Automation Contractor for “Prelude” Floating LNG facility, responsible for strategy, design, and engineering of process control and monitoring technologies. First project awarded as a result of Global Framework Agreement with Shell. For further information please visit: www.emersonprocess.com/shellagreement

“Emerson’s DeltaV™ system provided the advance control and batching features we required, while also helping to minimise process disruption and cost during the migration procedure.”

Jörgen Annell, Engineering Manager, Perstorp

Emerson’s DeltaV system with Electronic Marshalling selected to help minimise plant downtime during control system migration at Perstorp pentaerythritol plant in Sweden. For further information please visit: www.emersonprocess.com/ioondemand

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Welcome to innovations.

Implementing ‘tried and trusted’ technology is a path well trodden in the world of process automation, so when a company introduces something new to the market, even if completely innovative and game changing, there can often be a reluctance to embrace it immediately and gain that important critical advantage over their competitors. Part of the problem is the vendor’s inability to explain what this new technology really is, how it works and, more importantly, the immediate and long term benefits the customer will receive by adopting it. Please pardon the pun, but we will try to be innovative here. Rather than revealing a host of features that a new product or system offers, **innovations** magazine aims to unravel new process automation technology. We explain why an end user should want to consider deploying it in their plant now and not only after the rest of the world has already benefited from it.

On the subject of innovations, we must point out that the word itself actually describes a process that renews something that exists and not, as is commonly assumed, the introduction of something new. With that in mind, describing DeltaV, PlantWeb™, or Smart Wireless merely as innovative perhaps understates the major leap forward these technologies have brought to the process industry. However, be they considered as totally new or just innovative, what is important with all these technologies is the impact they have had when deployed at a process plant. Electronic Marshalling is the latest development from Emerson and promises to have an equally significant impact on contractors’ ability to reduce project execution cycles. Field device wiring design, documentation and installation are tasks that fall on the critical path of an automation project. Electronic Marshalling will remove the complexity of field device wiring and drastically reduces the time to execute projects, Hedwig Leemans, V.P. Process Systems and Solutions Europe, explains how on page 6.



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Page 2 image: Perstorp selects Emerson for automation system upgrade at pentaerythritol plant in Sweden.

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HUMAN CENTRED DESIGN



There is a demographic paradox facing the process industries. In mature markets, knowledgeable workers are retiring. In emerging markets, finding knowledgeable and skilled workers is difficult. Bob Sharp, President of Emerson Process Management in Europe explains how Emerson is using Human Centred Design to help address this skills shortage.

The skills shortage is a significant problem for process industries around the world. Process control technologies have come a long way in the past 40 years, but the industry has invested almost exclusively on features and technologies, instead of focussing on how people use the technology. By putting increased emphasis on ease-of-use, we can meet this challenge head-on and make it easier to extract value from technology investments.

Emerson is making process control technology easier to use with the introduction of a Human Centred Design Institute that spans all of our brands. This is the result of many years of customer work-practice analysis, new product development re-engineering and organisational training. The goal is simple: make products that are not only reliable and cost-effective, but also ensure that usability and workforce productivity are at the heart of every new product.

Human Centred Design is a multi-disciplined science that uses User Personas, Stakeholder Maps, intensive observational research, usability testing and heuristics analysis. These elements provide the insight to design products which are easier to use.

Understanding users, including how they interface with each other and the technologies, is the foundation of this process. Based on interviews with 100 customers, we developed our own set of Personas and Stakeholder Maps which help define the ecosystem of a processing plant. This includes how users interact with technology, and how product design affects their productivity. The products Emerson will introduce in the future will make a profound difference in how people accomplish their tasks. Simple in theory, but challenging in practice.

We observed that customer project engineering and design processes across the industry put too much emphasis on locking down designs very early in the project, often before the process design was complete. Not only does this increase cost and time, it also exposes the project to increased labour and change order costs during construction. Additionally, the existing wiring processes were time consuming and laborious.

With our new Electronic Marshalling our customers and engineering contractors can be very flexible in I/O

engineering as hard-wiring each device as a unique connection from field to controller is eliminated. This means less engineering up front and fewer change orders later in the project. This could revolutionise I/O and project engineering.

We also turned our attentions to day-to-day operations, focusing on the repetitive tasks users perform and how they interface with field devices. We evaluated device interfaces across the industry and

found that routine steps which users perform frequently were cumbersome, confusing and illogically laid out. It's an endemic problem throughout the industry. Based on user input, we have overhauled Emerson's Device Dashboard designs to improve speed and accuracy while performing these tasks.

At Emerson we believe it's time technology began serving people, instead of the other way around.

For further information please visit: www.emersonprocess.com/HCD



Above image: Emerson's device dashboards have been overhauled to make routine tasks quicker and easier to perform.



Simplified marshalling



To reduce project execution cycles, all tasks that fall on the critical path are under scrutiny. One such task is field device wiring design, documentation and installation. Hedwig Leemans, V.P. Process Systems and Solutions Europe, explains how electronic marshalling removes the complexity of field device wiring and drastically reduces the time to execute.

A typical automation project using conventional wiring techniques requires intensive engineering involvement. This includes listing I/O and controller requirements, designing the power, grounding, fusing, I/O and cabinets, before producing piping and instrumentation, conduit and cable layout diagrams. The next step is the marshalling cabinet and junction box design, specifying termination requirements and producing the wiring diagrams. Field technicians follow these diagrams, physically wiring every device and then “marshal” the wiring in a junction box or marshalling panel. Wires must then be run from the marshalling panel to the correct I/O card and from there to the controller. Every device and its associated wires are aligned to a specific controller, with multiple wiring hops in between.

The introduction of Emerson’s Electronic Marshalling technology has significantly changed the execution of automation projects. The field wires still come in to a marshalling panel, but from there on everything is different. Instead of the cross wiring being used to transmit the signal to the right I/O card, the signal is carried up a backplane to a set of redundant I/O cards, where they are connected to controllers via a high-speed Ethernet connection. The technician no longer needs to match up the wires 3-4 times and be exact about each connection.

The secret to Electronic Marshalling is a device called a CHARacterisation Module (CHARM). This A to D converter allows technicians to dynamically characterise the I/O in a cabinet, regardless of whether it is an analogue or digital connection. The connection to the controllers is accomplished digitally. The technician no longer needs to worry about connecting an I/O point to a specific controller as any I/O can be associated with any controller. The use of Electronic Marshalling significantly cuts the time and cost of cabinet wiring, and also reduces the number of wiring mistakes. Using Electronic Marshalling can result in a 50% reduction in controller cabinets, a 40% reduction in cabinet footprint, and a 90% reduction in intra-cabinet wiring.

Time is also saved during the design phase of the project. Since a CHARM can characterise any signal, cabinet I/O and fusing designs are no longer required. Cabinet design is eliminated as these are now based on a standard design. However, the benefits of Electronic

Marshalling go way beyond just cabinet design. Using a conventional approach, system designers like to wait until the process design is 99% complete. This is because every wire to every card and controller needs to be designed and documented. The ripple effect of any changes to the design is huge with any delay causing disruptions through the whole project. For example, a common event in an automation project is the addition of a new process unit. This requires a complete redesign of the controllers, I/O and cabinets for that area. This means change orders and new drawings, incurring costs and delaying the Factory Acceptance Test and shipment.



Using Electronic Marshalling to execute a project reduces this complexity. Because control system design only needs to be based on the total I/O count and whether the marshalling is placed in a rack room or in the field, only around 90% completion of process design is required before starting system design. The standard design of the field cabinets means they can be shipped at any time, ready for placement. Should a new process unit be added, that’s easy to handle too. As soon as the total I/O count is known the correct number of CHARMS junction boxes can be shipped. The control configuration can be incorporated with no delay and the only cost will be the extra equipment.

Electronic Marshalling is expected to become a pre-eminent choice of customers seeking to eliminate confusion, extra work and scheduling headaches. End users will be able to choose the exact type of field device protocol that is demanded by project circumstances without needing to worry about difficult engineering and installation issues.

For further information please visit: www.emersonprocess.com/foandemand

Above: Electronic marshalling is available in the new DeltaV 5 series platform.

Left: The secret to Electronic Marshalling is a device called a CHARacterisation Module (CHARM).

Where do innovations come from?



Nick Denbow, editor of the Industrial Automation Insider provides an insight into the emerging innovations affecting the process industry and the source of new industrial technologies.

The recent innovations that have affected the process automation industry have been triggered by a change in availability of new technology caused by consumer product innovation. Worldwide consumer demand precipitates a significant price reduction of new components and devices. This makes them available to development engineers designing for lower volume industrial products – which also must be competitively priced. So the ubiquitous mobile phone created low-cost microwave components. That led to practical short range industrial radar liquid level measurement systems – which we now see in the Rosemount Guided Wave and free-space radar level products from Emerson, and other suppliers.

Similar microwave components have led to the development of wireless interfaces and mesh network systems for communicating with plant sensors, such as the Emerson Smart Wireless products. Now we have a new capability layer for information communication across a plant, in a fully intrinsically safe wireless infrastructure, field proven in a very short time since launch. By installing this infrastructure now, plants are actually enabling access to the many add-on products and features that are becoming available, and that will bring better performance options relatively quickly.

One of the areas likely to see major growth is optical imaging and video systems. Here, modern digital cameras have led to the development of low priced high quality imaging devices. When coupled with the amazing

computing power now available, this has allowed automatic pattern recognition to make a real impact in automation, with machined component inspection systems and even vegetable product quality control and sorting systems. More sophisticated fingerprint or vehicle number-plate recognition is in wide use, but has had a small impact in the process industry currently. Current applications exist in creating automatic loading reports and even invoices at tanker or bulk haulage lorry terminals. In the future, these approaches, plus face recognition and access control systems, will be added as just one of the many optional features on plant video systems.



. Mainly used for perimeter security and intrusion detection, video cameras are now available as intrinsically safe remotely controllable units. These are no longer reliant on special coaxial cables and dedicated monitors, instead using a direct radio link or integrated into the wireless infrastructures. The video images then become an essential part of the data presented to the operator when he is viewing the control data for the relevant part of the plant. Such immediate information can perhaps more easily warn of a spillage or accident than might be obvious from instrument data on screen. Plus the images are stored as records in the plant historian, so the operator can even scroll back in time to see any actions or events that might have produced the current plant condition.

Laptops, Blackberries, iPads, virtual servers and cloud computing are enabling information to be accessed from anywhere, given the right access codes. The video

systems allow the plant manager to see what the plant cameras are seeing, what they have recorded, and even offer the opportunity to control the camera. The plant manager probably already has mobile phone access to regular plant management information, to check on production rates etc, but what about the action of his operators in the control room?

Another US-based specialist company, Longwatch, has created a “Console Recorder” system that records what was being viewed by operators on the multiple HMI, SCADA and DCS displays in a control room, as well as showing data on mouse clicks and actions. So when tracing the causes of a plant upset, or when wanting to know why the latest plant start-up was so efficient, the operator screens and actions are visible, and can be played back and compared against plant historian data, and recorded video. But more interesting, the recordings can be used to train other operators, benefiting from the expertise and thought processes of experienced operators even after they have retired.

In the future when plant performance goes “off”, the company expert, who might work in a different country, can simply log in to the plant system over the internet, walk the plant using the cameras, and even direct someone around with a mobile camera. He can also view the historian, and the previous operator actions, to do his trouble-shooting remotely.

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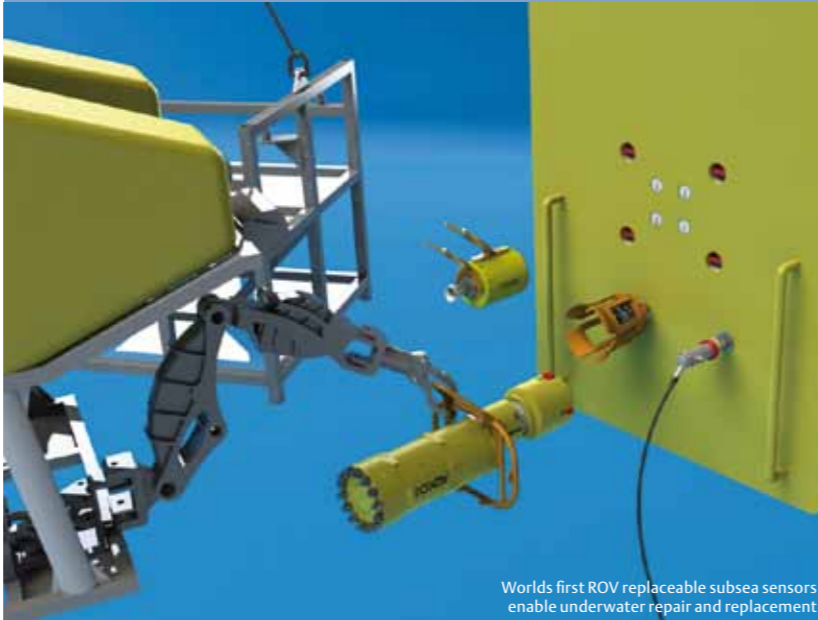


Below: Video images will become an essential part of the data presented to the operator.



First integrated system for ROV replacement of subsea sensors

With traditionally mounted subsea instrumentation, offshore operators are periodically required to lift an asset like a tree or manifold to the surface for repair. This requires shutting off production associated with those assets, plus the significant cost of hauling the asset to the surface and replacing failed or compromised instrumentation... potentially a million dollars a day or more.



World's first ROV replaceable subsea sensors enable underwater repair and replacement

Emerson's new subsea ROV (remote operating vehicle) retrieval system, will provide first-of-its-kind underwater maintenance and repair capabilities. It is able to perform retrieval and replacement in just 2 hours for a fraction of the cost of traditional methods...without sacrificing production.

"As is often the case, the idea for this new system came from our intimate collaboration with our customers," said Steve Sonnenberg, president, Emerson Process Management. "By better understanding their challenges and goals, we were able to design and engineer an industry-changing solution that not only solves one customer's problem, but solves a challenge commonly faced by everyone in the deepwater offshore production industry."

The Roxar subsea ROV retrieval system extends the lifetime of operating sensors and transmitters through regular maintenance and no production impact, resulting in improved availability and reliability, continuous subsea information, and increased production

and reservoir performance. Maintenance costs are reduced as the Roxar retrieval system eliminates the need for manually retrieving the entire production asset. Only the sensor needing replacement or repair is involved, with no loss of production during the replacement.

Added to this, the whole retrieval process takes place within a controlled, leak-proof environment, leading to increased environmental protection compared to current subsea maintenance methods. The light, compact structure also leads to safe and easy retrieval.

"The staggering complexity of offshore production not only drives the demand for better subsea intelligence, it brings the challenge of keeping operating and maintenance costs down," continued Sonnenberg. "This new Roxar ROV Sensor Retrieval System can literally save customers millions of dollars by reducing the cost and time required to maintain subsea assets."

For further information please visit: www.emersonprocess.com/Roxar-ROV

Industry's first WirelessHART point level switch makes installation of high or low alarms simple and cost effective

Many plant operators find that there is an increasing need for additional high or low level alarms on their process and storage tanks. However, if there is no cabling infrastructure in place the costs can be prohibitive.

The introduction of the new WirelessHART point level switch enables level detection to be made in locations previously inaccessible or considered too costly for wired devices, helping operators to further optimise plant performance and reduce risk.

The Rosemount 2160 vibrating fork liquid level switch combines Emerson's wireless expertise with the Rosemount vibrating short fork technology. It has all the same features as the wired level switches in the Rosemount 2100 series, but without the complication and cost of wiring.

For further information please visit: www.emersonprocess.com/2160

Improved plant availability enabled by detecting transmitter electrical problems earlier

Changing electrical conditions, such as water in the terminal housing, ground loop issues, corrosion of terminals, or an unstable power supply can affect the accuracy and reliability of process instrumentation. To help ensure the integrity of the electrical loop, the Rosemount 3051S Series of Instrumentation for pressure, flow and level measurement now features an expanded Advanced HART[®] Diagnostics Suite. In addition, the Advanced HART Diagnostics Suite also includes Statistical Process Monitoring technology, to measure and analyse previously unseen process noise, providing intelligent process insight.

The expansion of diagnostics beyond transmitter electronics brings greater insight into process measurement, enabling operators to optimise the availability, efficiency and reliability of their plants.

For further information please visit: www.rosemount.com/3051Sdiagnostics

Hard-to-reach bearings can be monitored wirelessly increasing plant up-time

Equipment that is in remote or hard-to-reach locations has always been difficult to monitor, increasing the risk of unexpected machinery failures and lost production. Now those hard-to-reach bearings can be monitored wirelessly using Emerson's new CSI 9420 Wireless Vibration Transmitter.

The CSI 9420 connects quickly, easily, and economically to any machine and uses Emerson's reliable Smart Wireless network to send high resolution spectra to vibration experts for detailed diagnosis of machinery issues.

For further information please visit: www.emersonprocess.com/9420

Maximise the efficiency of your electrical power plant

As regulatory agencies increase renewable fuels standards and governments consider renewable energy and carbon management legislation, Emerson's technologies and services are helping companies and municipalities convert low-cost waste and biomass into renewable energy more efficiently and reliably, with lower carbon emissions.

Emerson's energy solution includes biomass and waste fuel combustion optimisation technology, that provides automatic, real-time process adjustments based on changing quality and availability of alternative fuels, costs of alternate and fossil fuels, emissions, and process constraints. Emerson also provides energy monitoring and controls to spot unusual energy usage, identify opportunities to improve energy efficiency, and manage operations based on real-time energy costs.

Emerson also takes advantage of its wireless measurement technologies in its energy management programmes to reduce the installed cost of monitoring instruments and to allow more measurements in tougher places. In fact, wireless measurements are being installed at approximately a third of the cost of traditional hard-wired implementations.

For further information please visit: www.emersonprocess.com/biomass

Further information

Emerson Process Management is always looking for new and innovative ways to enable customers to connect with them. These include local country websites, the award winning Emerson Process Experts blog – which includes an automatic translation tool, social media pages and those who “twitter”.

Websites

Please visit www.EmersonProcess.eu and select your country from the dropdown menu on the left.

Blogs

Emerson Process Experts

Connecting with the people behind the technologies and expertise. Site equipped with automatic translation.

www.emersonprocessxperts.com

DeltaV News

DeltaV - Emerson's digital automation system for process control.

news.easydeltav.com

Modelling and Control

The dynamic world of process control, site equipped with automatic translation.

www.modelingandcontrol.com

The Emerson Global Life Sciences Blog

Timely, targeted and relevant information for professionals in the life sciences industry.

www.emersonlifesciences.blogspot.com

Analytic Expert

Discussing the application of liquid and gas analysers.

www.analyticexpert.com

Micro Motion Online Community

Online resource for Coriolis flow & density measurement. Contains a blog and forums.

community.micromotion.com/home.php

LinkedIn

Enter the following group names into the search bar in LinkedIn

DeltaV Digital Automation System

DeltaV SIS Process Safety System

Emerson Global User Exchange

Syncade suite

Micro Motion

facebook

Emerson Process Experts

www.facebook.com/EmersonProcessXperts

Micro Motion

www.facebook.com/micromotion

DeltaV

www.emersonprocess.com/DeltaVFacebook

Emerson Process Management

www.facebook.com/EmersonProcessManagement

You Tube

www.youtube.com/user/EmersonPlantWeb

www.youtube.com/user/DeltaVsystem

www.youtube.com/MicroMotionVideos

twitter

Emerson People

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People Active in Process Automation

twitter.com/#!/JimCahill/pauto