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Highlights from



A special report from the editors of

CONTROL and **control design**

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SMART MANUFACTURING WILL RISE TO GLOBAL CHALLENGES

Rockwell Automation Has a Plan to Elevate Manufacturing's Performance

By Jim Montague

“The coming decade will be the first in 200 years when emerging-market countries contribute more growth than the developed ones,” began Keith Nosbusch, Rockwell Automation’s chairman and CEO, in his annual address to the trade media in preparation for the company’s Automation Fair event later this week in Philadelphia.

“The emergence of these massive, new middle-class consumer markets is creating significant new demands on resources and, especially, increasing demand for commodities. The U.S. industrial base is showing signs of revitalization, but these macro trends are being tempered by short-term economic uncertainty. Likewise, national debts and unemployment are still high, and much infrastructure is in a poor state of repair. However, even though these factors are creating challenging environments for us and our customers, we remain optimistic.”

Nosbusch stressed that consumers in emerging markets are eating better, driving more cars, and buying more health and beauty products, which is shortening lifecycles and stretching supply chains. This is fueling demand for new manufacturing capabilities, even as a generation of control and automation engineers begins to retire before their successors can get trained. “This is why we need smart manufacturing, which we define as a highly connected, knowledge-enabled industrial enterprise, in which all business and operating actions are optimized to achieve substantially enhanced productivity, sustainability and economic performance.”

Technology, Talent and Infrastructure

Nosbusch explained that smart manufacturing’s three primary enablers are technology, talent and infrastructure. “This all starts with infrastructure—from having a good education system to having good transportation for your supply chain,” said Nosbusch.

“Next, you need safe and secure Ethernet, real-time manufacturing intelligence and increased use of cloud computing, simulation and modeling, energy management for sustainability, and lifecycle-

focused productivity. Naturally, the benefits of smart manufacturing for our customers are faster time to market, lower total costs of ownership, improved asset utilization and optimization and better enterprise risk management.”

Helping Customers Manufacture Smarter

To help its many and varied customers manufacture smarter, Rockwell Automation is enhancing its core Integrated Architecture and Intelligent Motor Control Platforms with more secure Ethernet solutions, improved scale and performance, better ease-of-use, and integrated energy, motion, safety, batch and process information applications. It’s also enhancing its solutions and global services by offering more packaged solutions, remote monitoring services and regional engineering centers. “All of these can help drive higher levels of operational performance and optimization,” added Nosbusch.

Rockwell Automation’s three main smart manufacturing themes include plant-wide optimization, sustainable production and improved machine-builder performance. “All of these are based on our Integrated Architecture and are the building blocks of smart manufacturing,” said Nosbusch.

“Of course, we couldn’t do what we do without the help of others, and that’s why we’re so grateful to have the best partners in the industry, especially Cisco and Microsoft. Together, we’re able to do what none of us could do alone. We believe that smart manufacturing is worth investing in because it will enable faster time to market, drive continuing success for us and our customers, and give us all better returns on our investments.”



“We remain optimistic.” Rockwell Automation’s Keith Nosbusch on the manufacturing industry’s ability to respond to global challenges.

USERS WEIGH RISKS IN MIGRATION DECISION

Are Your Automation Systems Starting to Work Against You?

By Keith Larson

Operational risks array themselves every day against process manufacturers and other industrial facilities. Capital budgets and personnel are stretched tight, yet companies strive to push productivity, efficiency and asset utilization rates to ever high levels—even as they ensure safety and compliance with fast-changing regulatory requirements. Automation has helped make it all possible in the first place. But there comes a time in every control system's life when it becomes part of the problem.

This week at Rockwell Automation's Process Solutions User Group (PSUG) meeting in Philadelphia, end users shared stories of their successful risk-management decision-making in the face of system obsolescence, and Rockwell presenters shared the depth and breadth of tools and services they've developed to help manage that inevitable time when good automation systems begin to go bad.

Past-Their-Prime-Time Players

Many of the control systems in current use were installed in the 1980s—or before—and are well past their envisioned services lives, according to Lonnie Morris, global product manager, Rockwell Automation, in his presentation to PSUG attendees. “The number of products becoming obsolete is huge,” he acknowledged. “Obsolescence risk is a risk that you take—knowingly or unknowingly—by using products that no longer are supported or serviceable,” Morris said.

A number of risk factors begin to escalate as automation products from any manufacturer move from the active production stage through what

Rockwell Automation calls their “silver” stage (12-24 months of remaining production) to discontinued status, when repairs may be made, but replacement parts are not being manufactured. When a product has been discontinued, repair costs can exceed original hardware costs, and

it gets harder to find subject-matter experts familiar with these systems, Morris explained. And it isn't just the advance of technology making products obsolete. Component supply chains are especially fragile, as diminishing demand, supplier mergers and failures, as well as regulatory requirements such as RoHS take a toll on component availability.

If your plant is running on obsolete automation systems—parts-sourcing on eBay is one likely indication—it just might be time to undertake a more formal assessment of the risk that these systems pose. Morris recommends a three-phase process in which you first assess what systems you have; second, quantify and prioritize risks to the operation; and third, develop an appropriate mitigation/migration plan.

Assess then Plan

If you're dealing with manpower limitations or simply don't know where to start, an Installed Base Evaluation (IBE) from Rockwell Automation might be a good first step, according to Morris. “The IBE provides actionable intelligence to help you make data-driven decisions regarding your installed base of automation equipment assets,” Morris said. This extensive analysis results in a red-yellow-green lifecycle coding of your entire automation base.



“The goal is to develop an overall plan that will buy you time to implement your migration strategy.” Rockwell Automation's Lonnie Morris explained the range of tools and services available to help users manage obsolescence risk.

Once the operational risks to continuing operation have been properly identified, it's time to make a plan for moving forward. Rockwell Automation can help develop a mitigation plan designed to support elements deemed sufficiently "non-critical" through preventive maintenance and access to technical support and spares replacement and/or repair of legacy systems. "The goal is to develop an overall plan that will buy you time to implement your migration strategy," Morris said.

Even the decision to eliminate obsolescence risk by migrating off older technology isn't totally risk-free. Considerations then include such factors as necessary downtime, new code development, training, network compatibility, field wiring and disposal of legacy products. Among Rockwell Automation's strategies designed to help manage even these risks are "drop-in" replacement systems and tools for migrating from a range of competitive control systems. "Our phased, StepForward process includes a broad range of conversion enablers," Morris said. "It allows you to step forward without a massive capital outlay."

Tools Help Minimize Migration Risk

"Implementing a single control platform across all plant-floor applications provides our customers with a number of advantages, including reduced spare-parts requirements, more synchronized processes, and lower maintenance and training costs," said Mike Vernak, DCS migrations program manager, Rockwell Automation. "It also improves plant-wide integration by enabling the seamless transfer of real-time data from disparate control systems for improved decision making and increased manufacturing flexibility."

New migration tools released by Rockwell Automation in the past several months include:

- Database conversion, cabling solution and I/O scanner for migrating a Siemens Moore APACS system;
- Cabling solution and improved database-conversion tool for migrating an Invensys Foxboro I/A system;
- I/O scanner for Allen-Bradley SMART I/O for migrating an Emerson Fisher Provox system; and,
- Universal Control Network interface for migrating a Honeywell TDC3000 system.

I/O scanners shadow the existing system and pull data during run-time into the new system's Allen-Bradley ControlLogix controller. This data is used to simulate and test the system to mitigate risk during the conversion. In addition, Rockwell Automation has developed

custom field termination unit cable designs that allow the removal of legacy I/O without the need to remove field wires, significantly reducing installation costs and risks associated with I/O replacement. On one end, the custom cables plug directly into the legacy field termination unit, and on the other end, into the ControlLogix I/O module. Rockwell Automation also leverages database and configuration utilities that convert existing control strategies into information that the PlantPax system can understand, rather than having to rewrite them from scratch. This helps reduce risk, engineering time and overall project time.

From Legacy DCS to PlantPax

At Ripon Cogen's 50-MW cogeneration plant in Ripon, Calif., an aging balance of plant (BOP) control system had "been on its last legs for a number of years," said Jim Groff, plant manager. Elements of the old system, including the historian, had malfunctioned and proved unfixable. "But the deciding factor was when the new CEO of our company visited and saw what we were working with. It took him 30 minutes to decide 'We're putting a new control system in,'" Groff said.

With project justification thus settled, the company engaged Maverick Technologies and its "DCS Next" methodology, ultimately settling on Rockwell Automation's PlantPax platform for a full control system retrofit. Among the key system attributes of the new DCS were state-of-the-art hardware, open control networks, nearby availability of hardware parts and I/O capable of handling smart HART transmitter communications, said John Boyd, technology leader, Maverick Technologies. From a software perspective, Microsoft server and desktop software, a world-class historian and ready availability of local systems integration capabilities were must-haves. And Maverick worked with Rockwell Automation to develop and deploy custom interface cables that would facilitate the system migration without disturbing existing field terminations—plus accommodate the desire to access HART transmitter data.

Work began on the project in February 2012, and cut-over to the new system was actually underway during the PSUG event. Beyond the obvious benefits of a workable, maintainable system, Groff looks forward to reaping the benefits of newly automated start-up sequences, advanced reporting and fewer spurious trips that had plagued the older system—and torpedoed overall plant productivity. "Now if there's a trip, we'll know there's really something wrong," Groff said.

PLANTPAX USERS REAPING VIRTUALIZATION BENEFITS

Rockwell Automation Users Prevent Downtime While Saving Money, Energy and Effort

By Walt Boyes

Virtualization is very real for users of Rockwell Automation's PlantPax process automation systems. And at this week's Process Solutions User Group (PSUG) meeting in Philadelphia, attendees could choose from half a dozen success stories—in applications ranging from pharmaceuticals to power generation—to hear how their peers have used virtualization to reduce systems costs and maintenance efforts.

"The Fortune 500 has uniformly adopted virtualization," said Nancy Youn, director of global alliances for VMWare, Rockwell Automation's virtualization platform partner, in her PSUG keynote address. IT departments are leveraging virtualization technology to boost system performance and availability while reducing costs, energy demands and maintenance requirements, Youn said. "Energy savings and sustainability make virtualization necessary—but security and high availability are compelling as well."

These same benefits realized in the IT space are proving out for users of process automation systems as well. And to help users realize these benefits, the PlantPax process automation system software now is distributed on a USB hard drive as a series of virtual templates that can be easily installed and configured in either a physical server or virtual server environment.

Applications Demonstrate Cost Savings

Amlyn Ohio, a manufacturer of diabetes medications, has virtualized two PlantPax applications on two different Microsoft server platforms. "Both of them worked, and worked well," said Bob Fulop, director of engineering. But because the company manufactures pharmaceuticals, it's subject to the U.S. Food & Drug Administration's validation requirements.

He described the process. "We built a blank stack with templates, just the operating system files and no application files. We used that to build the virtual system. We moved the actual servers

to a workgroup so we could name the virtual servers the same thing, and then we turned off the physical machines, connected the virtual servers to VSphere, added the machines back to the domains, linked FactoryTalk View and Security groups to the domains, migrated the licenses from Rockwell to the virtual machines, and we were done! We converted 11 physical servers to just a few hosts," Fulop said.

Tom Oberbeck of the Mallinkrodt division of Covidien in Saint Louis told much the same story. "We virtualized our central utility control system when we did the latest project for our new central utility plant," he said. "We reduced our footprint from 22 PCs to two duplicate SANs [storage area networks] and 11 thin clients. We reported to management a \$120,000 cost avoidance initially, and an additional \$100,000 savings for future server upgrades, mostly in reduced hardware costs."

High Availability Protects Production

Jeff Moore, senior electrical engineer from Gallus Biopharmaceuticals of St. Louis, along with Steven Schneebeli, lead systems engineer for Malisko Engineering, also of St. Louis, said that they used virtualization to aid Gallus in changing from a "big pharma" manufacturer to a flexible, nimble contract manufacturing organization (CMO).

Key to the company's transformation was a portable, dual-bio-reactor control station. It replaced the end-of-life Windows NT solutions they'd been running. "It gave us high availability, reduced HMI requirements and even reduced the number of ControlLogix PACs. It is robust enough to be portable," Moore said.

"We used to have one to six days downtime if a server blew," added Covidien's Oberbeck, "and now our worst case downtime is 30 minutes. Virtualization gives us very high availability, at a continuing savings in energy."



"Energy savings and sustainability make virtualization necessary—but security and high availability are compelling as well." VMWare's Nancy Youn on virtualization's appeal for IT and automation applications.



"We used to have one to six days downtime if a server blew. Now our worst case downtime is 30 minutes." Covidien's Tom Oberbeck on the ability of server virtualization to increase production availability

INTELLIGENT MOTOR CONTROL EXPANDS ITS REACH

Latest Rockwell Automation Drives, Starters and Motor Control Centers Are Smarter, Safer and More Flexible

By Joe Feeley

Rockwell Automation's Intelligent Motor Control offering includes a portfolio of PowerFlex drives, Centerline motor control centers and starters for low- and medium-voltage applications. "By adding intelligence, communication capabilities and making it part of the control architecture at the same time, we can give our customers a series of benefits," said Sergio Gama, market development director, Intelligent Motor Control, as he showed off Rockwell Automation's latest extensions of the line on the Automation Fair exhibit floor this week in Philadelphia.

"Customers make an investment once in this architecture, perhaps to solve an immediate issue, but they also get the ability to drive continuous improvement in areas such as energy efficiency, higher availability, safety and productivity," Gama said. "Each year we try to bring enhancements to this offering."

Now Showing at Automation Fair 2012

Specifically this year, the company unveiled new capabilities to its flagship series of PowerFlex 750 AC drives with expanded voltages, capabilities to 2000 hp, new packaging options and dual-port EtherNet/IP. In addition, Rockwell Automation introduced PowerFlex 525 AC drives with a power range of ½-30 hp, modular design and a variety of motor controls with embedded Ethernet, USB programming, energy savings and safety features.

"Variable-speed control is a fundamental element in plant energy savings," Gama explained. "The 525 series fits the needs of stand-alone applications, as well as most of the machine builder industry, while the 750 series fits the higher end of machine builder needs and across the heavy industries in general."

Both drives have in common what Gama called a "very nice integration



"By adding intelligence, communication capabilities and making it part of the control architecture at the same time, we can give our customers a series of benefits." Rockwell Automation's Sergio Gama explained the unique features of the company's Intelligent Motor Control portfolio.

experience” with the Rockwell Automation Logix architecture. Both enhance safety with Safe Torque-Off while Safe Speed Monitor is provided for the 750 series.

Both families of drives provide a wealth of diagnostics about the load they’re driving and have automatic device configuration. “The Logix controller over EtherNet/IP can automatically detect a replaced PowerFlex drive and will download all configuration parameters for the new drive, eliminating the need for manual reconfiguration,” Gama said. “And the Stratix switch on the network automatically reassigns an IP address.”

To meet the needs of the global marketplace, PowerFlex 750 Series drives offer wall-mount and high-power, floor-mount configurations in 400/480/600/690 V power choices.

A third Intelligent Motor Control highlight for this year is expanded features in Rockwell Automation’s IntelliCenter v.4 software, which supports the company’s line of Centerline motor control centers (MCC). Gama defined it as an “intelligent MCC.”

MCC Monitoring Moves to the Control Room

IntelliCenter software provides a window into the MCC with real-time diagnostics and MCC documentation. It provides graphical views of individual MCC units, displays device data and views of any critical status information. Built-in networking captures information that aids predictive maintenance, process monitoring and some advance diagnostics. It reduces installation time with plug-and-play setup and will help minimize downtime by providing intelligent diagnostics and predictive failure information.

“We have a global offering of MCCs, applicable regardless of region or IEC or NEMA preferences,” Gama said. “Safety and integration are big aspects of this for 2012, especially since we have included EtherNet/IP.” In many plants, he said, the maintenance people will track the performance of MCCs, but not from the control room. They try to have an independent monitoring of the electrical system.

“What formerly would require you to get into the electrical control room all the time to see what’s going on, which itself might require special protective wear and special authorizations, now can be monitored from a remote location with IntelliCenter software via EtherNet/IP,” Gama says. “An optional energy module provides an energy report of

consumption of each individual motor starter.” All of the MCC information is available to the plant information layer via the Logix controller and EtherNet/IP.

“There also are safety enhancements available in our MCCs that aren’t brand new, but are important,” Gama added. “The most recent feature we’ve rolled out is SecureConnect. You can disengage your power buses before you open the door of the MCC. This ensures that the starter sequence inside that compartment that been completely disengaged from the electrical bus.”

Arc Flash Safety Measures Enhanced

A second safety feature in the design and construction of the MCCs is ArcShield. “It ensures that if an arc happens, the safety of the personnel around the panel won’t be compromised,” Gama said.

IEC Centerline 2500 MCCs with ArcShield have no front ventilation; the pressure-relief vent system exhausts gases through the top of the enclosure, away from personnel. Arc-resistant latches on all doors provide pressure relief to keep the door to the MCC latched during an arcing fault; insulating covers on horizontal bus closing plates help prevent burn-through from arcing faults in the horizontal bus compartment; and arc-free zones provide areas within the MCC where it is not possible to apply an ignition wire without destroying the insulation.

Arc resistant baffles for NEMA Centerline 2100 MCCs with ArcShield let you have an arc-resistant MCC with a wider range of MCC units—even units that require venting, such as variable-frequency drives (VFDs). Arc-resistant baffles allow airflow to help dissipate the heat and still provide Type 2 accessibility, as defined by IEEE C37.20.7-2007. They help to shield personnel from the effects of an internal arcing fault on the front, rear and sides of the enclosure and also have arc-resistant latches on all doors. There are arc-resistant baffles in the full range of MCC units, and recessed horizontal bus and labyrinth vertical bus support to help prevent arcs from spreading between phases.

“So there are many design and construction factors to mitigate arc flash,” Gama said, “but an important takeaway is that we test low-voltage MCCs to the same high-resistance standards as medium-voltage devices. That provides a very robust product.”

MAKING A BUSINESS CASE FOR SAFETY

Industry Needs Fewer Risk Managers and More Risk Leaders

By Aaron Hand

Safety managers might run into difficulty if they go to capital expenditures with a plan for “risk avoidance.” Make that a “productivity” plan instead, and the dollars will come flowing in. But what those cost managers might not realize is that there’s a direct link between safety and total cost of risk, according to Cal Beyer, vice president and head of manufacturing for Zurich North America Commercial (www.zurichna.com). Safety insurance and risk management can provide a sustainable competitive advantage for manufacturing companies. Within just a few minutes, asking just a few questions, Beyer said, “I can compel a CFO that we should spend time talking with his safety team.”

Beyer is one of seven industry heads for Zurich, which provides commercial business insurance and risk management solutions. As the keynote speaker Tuesday morning at Rockwell Automation’s Safety Automation Forum in Philadelphia, Beyer noted that his vertical industry—manufacturing—is the most dynamic and the most complex.

It’s also inherently hazardous. Though manufacturing has made considerable progress toward safer operations—on a global basis, the frequency rate of injuries has been steadily declining for years—the inherent dangers remain very real. In 2011, there were 324 fatalities in the United States alone.

“We have to make this a safe industry,” Beyer said. “The opportunity for automation to make an impact is enormous.”

Risk ‘Leaders’ Needed

Beyer’s job is to find which customers fit Zurich’s profile for risk and how the insurance company should price them accordingly. “What I look for are companies that are committed to building a sustainable competitive advantage,” he said. “There are many risk managers, but not enough risk leaders. There are very few individuals telling organizations how to embrace risk; how to leverage risk to build competitive advantage.”

To evaluate whether safety is a competitive advantage for your company, Beyer points to a few key indicators:

- How does your company measure safety performance? “Is it the absence of injuries or reduction of risk?” Beyer asks. “Some people think they’re safe because they haven’t had accidents. Nothing could

be further from the truth. Are you practicing risk management or luck management?”

- Are you integrating safety into productivity, quality, risk and sustainability initiatives?
- How do you know if safety is ingrained in the hearts and minds of your employees, and if it is embedded in your culture?

Zurich also reviewed 17,000 workers’ compensation claims over a five-year period, and found that the top five causes accounted for 85% of the frequency and 89% of the severity. Top among those claims were sprains and strains. Beyer suggested evaluating material handling in production, looking at human-factors engineering along with factory automation.

Safety Culture Needed

Safety should be a cultural imperative, Beyer said, but there’s typically a safety performance gap between what is expected and what is accepted by the company’s leadership, supervisors and employees. “It percolates up and it permeates down,” he says. “If we don’t have a method for detecting and changing those at-risk behaviors, we’re prone or vulnerable to safety issues.”

Every 15 seconds somewhere in the world, an employee dies, and 160 others sustain a disabling injury. In the hour it took to write this article, about 240 more workers lost their lives. But if that’s not compelling enough to make safety improvements, consider the risk to brand image and profitability.

A business case for change involves aligning a safety focus with productivity and profitability results. Manufacturers should shift to leading (as opposed to lagging) indicators to focus on prevention-based activities. Consider the total cost of accidents and total cost of risk. “An area still emerging despite being talked about in my world for 25 years is that total cost of risk,” Beyer said. “It’s a fascinating area, and it’s a way for you to demonstrate the ROI impact that safety has in your organizations.”



“The opportunity for automation to make an impact is enormous.” Zurich’s Cal Beyer on the potential for industry to improve a safety record of 324 fatalities last year in the United States alone.

BIG CAPABILITIES FOR SMALLER CONTROLLERS

Scaled Solutions Deliver Powerful Capabilities to Small Machine Builders

By Aaron Hand

Though powerful automation solutions have long been available, they are not always accessible to smaller machine builder customers, who can't necessarily afford—and don't necessarily need—a high level of sophistication. At this year's Automation Fair in Philadelphia, Rockwell Automation is highlighting a number of scaled-down solutions that give even small machine builders access to powerful, previously out-of-reach technologies.

Also in its Integrated Architecture booth, Rockwell Automation is showing off various capabilities through a robotic in-feed module from Aagard (www.aagard.com), a small machine builder in Alexandria, Minn. Aagard's system recently won the Rockwell Automation Midrange System Showcase award and demonstrates the capabilities afforded by a range of Rockwell Automation solutions, including the Allen-Bradley CompactLogix 5370 programmable automation controller, Kinetix 350 servo drive, Stratix 5700 managed switch and ArmorBlock I/O.

The Aagard machine on display at Automation Fair is one in a line of seven modules that Aagard provides to its customers and serves as an example of the kinds of scalable solutions that are needed from machine builders. Solutions are geared toward making machine design easier, for one, but also providing scaled-down hardware for smaller systems.

"They need an approach where they can use the same programming language for everything—for motion, discrete, batch, process, safety," said John Pritchard, global market development manager, integrated architecture for Rockwell Automation. "And they don't want to overpay for hardware. This scales, so it's just what they need and not more."

The CompactLogix 5370 programmable automation controller—announced last year at Automation Fair in Chicago and available now—is an example of a high-performance solution in an affordable package. It uses a single development environment for both standard and motion control and provides seamless integration into a plant-wide control system via an EtherNet/IP network. "It coordinates everything on the machine," Pritchard said.



"This scales so it's just what they need and not more." Rockwell Automation's John Pritchard discussed a range of scalable new solutions designed to bring big PLC functionality to builders of small machines.

Coordinated Control for Multiple Machines

The Stratix 5700 managed switch provides automation control that was previously out of reach for smaller machine builders. "It's an industrial-rated managed switch, but at an appropriate price point," Pritchard explained. "Aagard has seven machines that work together, and they connect and communicate easily. The Stratix 5700 provides synchronization of all the functions over the network."

Through coordinated behavior, if a palletizer on the line stops, for example, the cartoner and case packer further up the line slow down and stop as well. Processors in each machine make production more seamless through each step as opposed to the stop-and-release functionality machine builders previously relied on.

“Footprint is also becoming a big issue,” Pritchard noted, adding that smaller control panels have become essential. Instead of the traditional walls filled with wardrobe-style control panels, machine builders are moving to smaller panels that can be tucked away on the machine. In Aagard’s case, the panel is small enough to sit atop the machine, providing a very clean design inside the machine itself.

At first that was a bit of an emotional adaptation, Pritchard recalled, as engineers worried that it wouldn’t be as convenient to access the panel. “But then they worked out the amount of time they actually have to be in there and realized it made sense to get the control panel up and out of the way.” It also makes it easier to create a machine environment suitable for food safety and washdown situations.

Conserving Panel Space

To help create smaller panels, machine builders are also looking to move more functions out of the panel and onto the machine. The Allen-Bradley IP67 Slim ArmorBlock I/O is an example of this capability. Aagard’s machine shows two on-machine ArmorBlock I/O units connected through EtherNet/IP.

“Taking the I/O out of the panel and putting it on the machine is not particularly new, but there used to be a trade-off,” Pritchard explained. “If it was on the network, the I/O was not as accurate as on the rack. You’d like to check status every millisecond, but that would create too much traffic on the network. You could check every 5 to 10 ms instead, but then you lose accuracy.”

ArmorBlock contains a highly accurate clock with nanosecond accuracy, Pritchard continued. That means that even if status is checked less frequently to relieve network traffic, status is still recorded at finer levels. “You might not know about it for 5 ms, but you will know when it did happen within a nanosecond.” In the case of the robotic in-feed module, the I/O checks as product comes through on the belt, enabling the picker robot to grab it as it comes by. “It provides a tenth of a millimeter in accuracy,” Pritchard said.

Helping to preserve panel space are two different solutions from Rockwell Automation for servo drives. One solution moves the servo drives from the panel directly to the machine, integrated with the motors.

Rather than an eight-axis solution requiring eight drives in the panel connected with 16 wires, the new solution uses a single daisy-chained wire. “This is a dramatic reduction in panel space,” Pritchard said, adding, “It provides a significant savings in cable and wiring.”

Though Pritchard calls the on-machine servo solution a “pretty compelling technology,” there are times when machine builders will want to stick with in-panel servo drives. This could be because a machine design requires very small or very large motors (which the new solution does not accommodate), or the machine builder wants to use linear actuators rather than rotary motors, or simply because of a preference for tradition. Regardless of the reason, Rockwell Automation is coming out with an in-panel servo drive that is significantly smaller than previous drives. The Allen-Bradley Kinetix 5500 servo drive—expected to be released in December—is about half the size of previous solutions, Pritchard said.

Pritchard credits the reduction in size largely to newer transistor technologies (Insulated Gate Bipolar Transistors, IGBTs). “They have lower switching losses and produce less heat, so we can pack them a lot tighter in the drive,” he explained.

Software Tools Ease Design, Collaboration

Pulling it all together to help machine builders design, build and test their systems, Motion Analyzer is a free, downloadable software tool that integrates with SolidWorks to simulate the physics of a moving system, calculate torque and inertia, and generate digital prototypes. Rockwell Automation is introducing its latest version, Motion Analyzer 7, which integrates support for the latest Rockwell Automation products.

Machine designers will find design and collaboration eased by Studio 5000 Logix Designer, which provides a single design environment rather than single pieces of software. “It’s the beginning of an evolution,” Pritchard said, explaining that previously the separate software packages worked well together, but Studio 5000 takes that to a new level. “The application modules work in a single environment. You have a single instance of all those design decisions you’ve made.” Studio 5000 will make it easier for everybody on a team—regardless of location—to collaborate on a document, akin to the track changes function in a Word document.

The first element of Studio 5000 will be logic design, scheduled for release next month, Pritchard said. Though it’s just one element to start with, “it’s the beginning of something big,” he added. A panel view designer will be added about a year from now. Topology will be added next, then motion, and so on.

ENERGY MANAGEMENT IMPROVES WITH BETTER VANTAGE POINT

Manufacturers Need Usage Data From All Areas of the Facility to Better Track Their Plants' Operations

By Joe Feeley

Manufacturing plants consume more than one-third of the global energy used annually. Many companies, however, do not have information on the day-to-day energy consumption within their plants. To be able to identify opportunities for improvement, manufacturers need usage data from all areas of the facility to set baselines and better track variations for their entire operation, whether a single plant or a global production infrastructure.

Energy-intelligence strategies leveraging Rockwell Automation's FactoryTalk software enable companies to report and visualize their consumption in a way that can reduce the time and effort associated with regulatory compliance, while cutting operating costs and maximizing profit.

The Information Software portfolio offered by Rockwell Automation now includes new energy intelligence capabilities in software applications, as demonstrated during this week at the 2012 Automation Fair in Philadelphia.

FactoryTalk VantagePoint Energy bundle and FactoryTalk EnergyMetric software help plant and operations managers view resource consumption in relation to specific units, lines and machines, so they can make more informed energy decisions. Energy intelligence is an extension of the manufacturing intelligence capability, turning data into information for informed decision-making, by leveraging power and energy equipment as data sources.

"Rockwell Automation's Enterprise Manufacturing Intelligence is the process of gathering data from multiple sources and putting it in context," explained Keith McPherson, director, market development, Rockwell Software. "So the whole idea behind Energy Intelligence is that the source of the data would be power meters, drives, any of our power products, even energy-related data from the business system, and we can put together an energy dashboard."

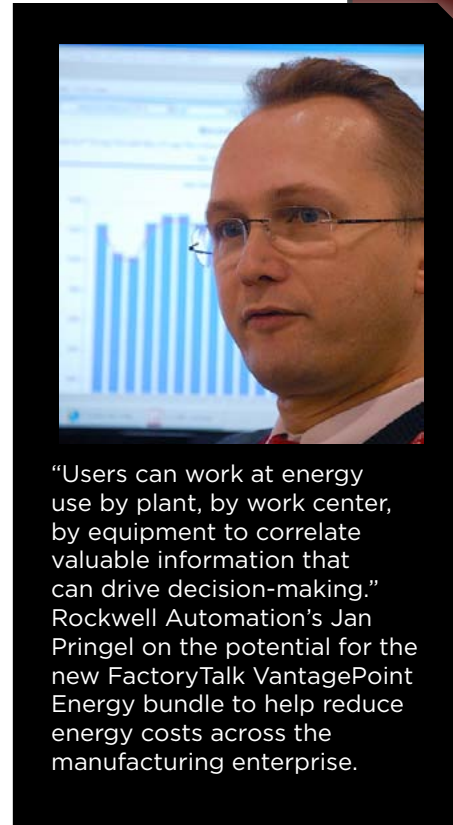
This is an update to the RSEnergyMetric product that's been around for several years. "We moved that over into the software business and did

a connector for VantagePoint Energy that talks to EnergyMetric and its data sources as we can combine the energy data with the things that VantagePoint does," McPherson explained.

Traditionally, when facilities talked about energy management, they would take energy data from a power meter and look at it only from a facilities perspective. Beyond monthly utility bills, many companies lack insightful data into their consumption of water, air, gas, electricity and steam.

Jan Pingel, product manager, industry solutions, information software, outlined the value proposition of VantagePoint Energy, explaining that "If you have an energy event, you can figure out what happened. With VantagePointEnergy management, we can drive the energy down in the asset model. Users can work at energy use by plant, by work center, by equipment, to try to take data from disparate sources to correlate valuable information that can drive decision-making."

Pingel said that by doing this you can develop KPIs such as energy cost per unit of production. "Or you can investigate why one shift is using more energy than another shift and correlate that with OEE measures. When you used to see this from a top-down view, you couldn't see this unless you went to ask what happened. Now you integrate this data into your production system to the point where operators can see energy per unit usage



"Users can work at energy use by plant, by work center, by equipment to correlate valuable information that can drive decision-making." Rockwell Automation's Jan Pringel on the potential for the new FactoryTalk VantagePoint Energy bundle to help reduce energy costs across the manufacturing enterprise.

based on the options in front of them.”

The FactoryTalk VantagePoint Energy bundle, which includes FactoryTalk VantagePoint EMI software, plus energy-specific models, charts, trends, dashboards and analysis tools, provides access to more energy data. For current FactoryTalk VantagePoint users, an energy add-on can be purchased separately. With this application, users can aggregate metered energy-consumption data with production assets throughout the organization to start monitoring energy use.

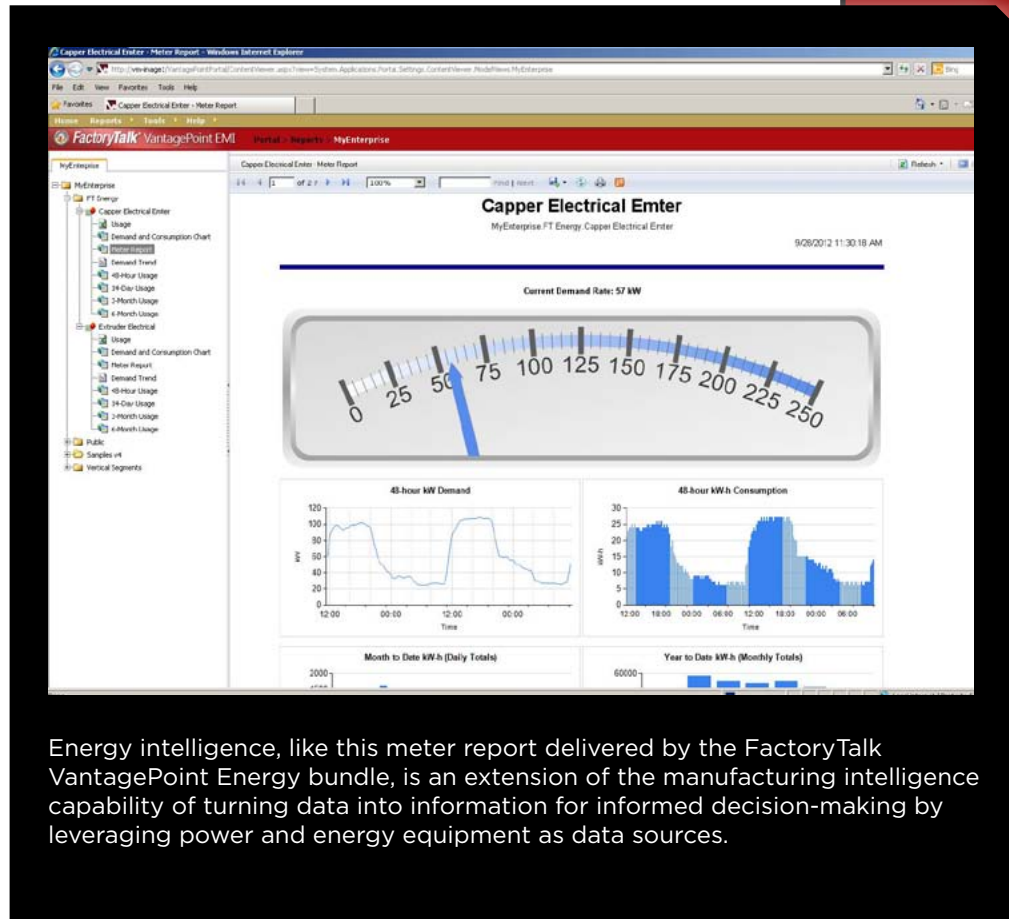
Plant managers and business leaders easily can access energy data, such as historical energy-cost trends or energy costs over time for a specific machine, line, plant or the entire enterprise via a web browser. FactoryTalk VantagePoint software users can now add energy intelligence to their manufacturing intelligence strategy to access the data necessary to optimize energy consumption, correlate energy usage, determine cost to production, negotiate energy rates and improve efficiency.

FactoryTalk EnergyMetrix software collects, records and stores energy data from Allen-Bradley or third-party power meters. The software can also capture information on energy usage, flow, temperature and pressure from controllers, third-party devices or manual entries. With FactoryTalk EnergyMetrix software, users can set parameters that create alarms and send human-machine interface and email alerts when energy-usage levels reach a user-specified level. This function can be crucial for manufacturers that receive energy bills based on peak kilowatt demand per day.

FactoryTalk EnergyMetrix software also trends historical data dynamically or within custom reports and charts. The application can compare alternative rate schedules to analyze potential cost savings, create energy budgets and forecasts, and track progress toward energy-saving goals against live data. Power-quality analysis capabilities allow users to better understand power quality and how it is affecting a specific line or facility.

VantagePoint also supports SharePoint integration via SharePoint Web Parts to display solution content in a SharePoint Portal. The examples of those applications include real-time executive dashboards, automated production reporting, KPI monitoring and alerting, downtime and OEE analysis, process verification and process optimization.

Andrew Ellis, manager commercial engineering information software, notes that one of the big features is the addition of SQL CLR as a layer on top of VantagePoint, since many automation engineers understand SQL in their reporting.”



Energy intelligence, like this meter report delivered by the FactoryTalk VantagePoint Energy bundle, is an extension of the manufacturing intelligence capability of turning data into information for informed decision-making by leveraging power and energy equipment as data sources.

Event-driven notifications also have been added. “I can create an event based on the streaming of a tag and say when did that event trigger happen, and send an email that embeds event data that’s associated information that might help deal with it.” It takes the information safely outside the firewall for someone who might be traveling or away. Ellis says all of these notifications, which are configured in the model, can run on iPhones and iPads as well.

“The one thing I caution people about, is that these aren’t alarms,” said Ellis. “This is near real-time notification, where time is not a critical element.”

PLANTPAX CAPABILITIES QUICKLY MATURING

Process Automation System Features Improved Performance and Scalability

By Walt Boyes

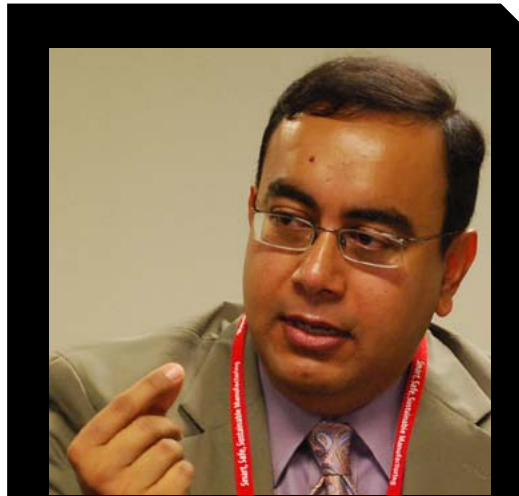
“The reason we expect to be able to double the process industry initiative business by 2017,” said Steve Pulsifer, director of process market development, Rockwell Automation, “is because we already have delivered. I think that’s why our CEO thinks we can do it. If you really look at it, we’ve concentrated on customer-focused innovation. And if you make customers happy and give them a world-class experience as they deal with you as a corporation, you’re going to grow.”

Pulsifer, along with Ben Mansfield, PlantPAX marketing manager, and Som Chakraborti, global director of Rockwell Automation’s process business, discussed the status and future of the PlantPAX process automation system initiative.

“It’s as simple as that, right?” Pulsifer added. “Customer satisfaction is the number one thing you have to supply. And that’s the whole experience from technology to solutions and services and even the way we have selected some phenomenal partners has been extremely positive for the customers, and that builds the annuity stream.”

“I think the path we have been on is testimony to the fact that doubling the business is possible,” said Som Chakraborti. “Doubling is still a feat, and there’s a combination of market factors and additional investments

that the company is committed to making. We’re focusing on certain industry groups where we expect the investment levels to continue as high as they are now.”



“We have discovered a critical mass of our customers who are ready to embrace virtualization and those are going to be our bellwether customers.” Rockwell Automation’s Som Chakraborti cited virtualization as one of the key PlantPAX process automation platform capabilities paving the way for the company’s continued growth in process applications.

Continued Enhancements Planned

“Adding to that,” Chakraborti said, “while there are factors we can’t control, the focus will be on the products we will be launching in the next fiscal year for us and into the next operating cycle. These include the general architecture areas that have an impact on all of our control products and then further enhancements to our DCS architecture. You already saw elements of what we have been achieving in the past twelve months, and that’s going to continue, so I think you’re going to see an unprecedented level of new product introductions that are going to take our architecture to completely new levels.”

“There are areas of the process systems business that everybody has to do, common expectations of our customers, like high availability, redundancy, fault tolerance across the architecture, engineering efficiency,” Chakraborti said. “There is also something that is truly disruptive, as a technology, but that can be embraced by the plant floor and that has a dramatic impact in the years to come. At that point it becomes a ‘table stake’ for the company. We

believe that virtualization is one of those technology anchor points. It is a proven technology well-embraced by enterprise segments of our customers' businesses, but yet to be embraced on the plant floor. We have discovered a critical mass of our customers who are ready to embrace virtualization, and those are going to be our bellwether customers."

"Wall Street runs on virtualization," Steve Pulsifer added, "and if you consider the number of transactions that entails as opposed to the number that take place in a process plant application, there's just no comparison."

Responding to a comment that higher availability and security from having physical servers on the premises is actually a myth, Ben Mansfield noted, "All of these issues that disrupt operations, all the things that IT doesn't like or want to deal with, you can put into a virtual server. I think it is just a natural progression. More and more customers are embracing it as the future, and the industry is maturing. As a company we have been talking about convergence for a long time, and at the end of the day 'IT as a partner to automation' is the future."

Pulsifer added, "But it is when customers can look at an economic benefit, as well as a technology benefit that things really move forward."

Chakraborti agreed. "Based on our success with EtherNet/IP, I suspect that virtualization will also become a mainstay of the automation space."

Migration More than Replacement

Segueing into a discussion of DCS migration, Mansfield said, "If I tell you I can migrate your iPad from iPad2 to iPad4, you could work with me. And if you decided that you wanted to migrate to a Google device, you'd still likely work with me because we already have a relationship. I understand your process and your intellectual property."

"What we find is that when we talk about migration to our customers, they tend to want to take the opportunity to not just change like for like, but to take their own technology and apply modern automation thinking to it," Mansfield said. "It's more than a DCS. You don't just plug and play."

This can become a virtuous cycle, so that after finishing a cycle of migration, end users will be ready to migrate to new systems yet

again. And the other thing that a good and coherent migration strategy brings to customers is front-end thinking that can be applied to greenfield projects.

Mansfield said, "It's not just old code to new code. It's the customer's intellectual property. There's more money in the IP than in the technology from the customer's point of view. And we're providing tools like alarm management and the new automated sequencer that's based on the emerging ISA106 Modular Procedural Automation standard to help customers get over the knowledge drain that is endemic in the process industries."

The Measure of Success

"The real measure of success of our migration strategy is users really applying PlantPax across an entire plant," Chakraborti said, citing several recent projects in India. "We recently did an entire greenfield blast furnace project for a company that until recently would only have used us as a PLC vendor; there would be another DCS company in the project also. This is a huge change in the way Rockwell Automation participates in projects. Now we are supplying the entire plant-wide automation system."

"We truly displaced an incumbent in a core market who had enjoyed that relationship for over a decade. And we broke that. And in the last 12 months, we have rounded out our DCS migration solutions in terms of I/O interfaces, cables and conversion utilities for targeted platforms that we believe are the most opportune for the industries we serve," Chakraborti said.

"Finally," Chakraborti said, "our Pavilion8 multivariable process control (MPC) projects are showing paybacks of less than three months. Even when combined with capital retrofit projects, we are looking at less than a year. So we've taken the step forward to launch a suite of five new apps for Pavilion8 focused on NGL (natural gas liquids). This is a Rockwell Automation sweet spot, and we're seeing interest in many places in the world, especially in North America."

"One last word. We partner like nobody else with the integrator community. We have over 175 companies in our solution partner program," Pulsifer said, "and that's a lot of expertise we can bring to both the design and commissioning and ongoing service of our customers' systems."

NEW TOOLS EASE MACHINE SAFETY DESIGN

Rockwell Automation Releases Safety Automation Builder

By Aaron Hand

A hot topic at Rockwell Automation's Automation Fair in Philadelphia this week and leading up to it has been safety—not only the need to build safer machines to protect workers and machinery, but also the value proposition that safety brings.

Though more can be done to make safety a higher priority everywhere around the world, the industry has come a long way with regard to making safety less of an afterthought. “Probably one of the most prolific trends we’ve seen is the move from putting a wrapper around the machine to integrating safety right into the machine,” said Christopher Zei, vice president of Rockwell Automation's global industry group, today during a morning forum for global machine and equipment builders.

New tools for OEMs can ease the design and layout of safety systems, helping machine builders reduce engineering design times by more than 50%, according to Chris Brogli, global business development manager for safety at Rockwell Automation. Brogli showed off some of Rockwell Automation's latest safety offerings in the Safety Solutions booth at Automation Fair, including solutions for machine safety, process safety and electrical safety.

Consider Safety Early in Design

In large part, the booth was geared toward helping machine builders and users gain a better understanding of the importance of integrating safety early in the process. “Traditionally, machine builders do a risk assessment, select safety products and throw them on the machine,” Brogli said. “But designers need to spend more time writing functional safety requirements.”

Brogli showed a safety lifecycle chart on which risk assessment is the first step, followed by functional safety system requirements. Too often, people will skip step 2, however, moving directly on to design, Brogli said.



“Designers need to spend more time writing functional safety requirements.” Rockwell Automation's Chris Brogli on the need for safety requirements to be considered early in the design process.

“We do No. 1 and 2 almost simultaneously,” said Dan Pienta, president of machine builder Automatic Handling International (<http://www.automatichandling.com/>), who was visiting the Safety Solutions booth. Pienta spoke on Tuesday at the Safety Automation Forum about his company’s move to integrated safety with Rockwell Automation. “We see what we need for what function; then we decide how we want to react when an operator goes in.”

Step 3 is design and verification, step 4 is installation and validation, step 5 is maintain and improve—and then it cycles back around to step 1 any time changes are made to the machine. “A lot of people don’t do the validation and verification, but it’s just as important as the design,” Brogli said.

“Validation is the most important thing from a liability standpoint,” Pienta added. “Just because it’s a red device doesn’t mean it’s safe.”

Tools Streamline Safety Engineering Tasks

To help users and machine builders through the necessary steps—bringing safety knowledge together to ease design and reduce engineering times—Rockwell Automation has developed a new piece of software that it showcased in its Safety Solutions booth. Safety Automation Builder (SAB) is a free software tool due for release in February 2013. It helps designers verify that a safety system meets all requirements, and also generates a bill of materials.

Users import a machinery drawing, at which point the software begins asking questions about risk assessment, functions, desired performance levels and more. Users can create their safety zones, pictorially showing pinch points, hazards, fixed and movable guards, etc., on the drawing, Brogli explained. They can select input, output and logic devices, dragging product images right onto the screen, he added. SAB will export the file to SISTEMA to show progress on how required safety levels compare with achieved safety levels. When everything is in order, the software can generate a bill of materials, including pricing.

Noting about 100 OEMs that came through the booth on Wednesday, Brogli said they can’t wait to get their hands on the new software. Dan Pienta was in the Safety Solutions booth today, getting his first

look at SAB. For him, the bill of materials functionality seemed to be particularly useful. There’s so much variation in the types of devices available, he noted.

“It’s very time-consuming to do all the research,” he said, pointing out how easy the software would make it to pull together needed components and know exactly how much everything

“A lot of people don’t do the validation and verification, but it’s just as important as the design.”

would cost. Pienta described machine engineering as a funnel, where there are ways to speed up production, but little that can be done to speed engineering time. “Anything we can do to open up that funnel is good.”

SAB is particularly targeted at the OEMs, which are building machines every day and every week, Brogli said. He mentioned one customer, who spent seven days pulling together the safety components for his machine—printing out a drawing of the machine; marking hazards, guards, etc., on the drawing; designing the necessary safety; getting quotes for components; and more. Rockwell Automation put SAB to the task, and completed the job in 2.5 hours instead.

Supplementing SAB are pre-engineered complete safety solutions called Safety Functions. The first six are available from Rockwell Automation now, and 24 are planned in all, with the last of them released by mid-2013. The Safety Functions are designed to help users build a complete machinery safety system by providing detailed information for each safeguarding method. “There are 155 TUV safety experts within Rockwell Automation—more than any other automation company—and they’re all chipping in,” Brogli said.

THE ENTERPRISE AND THE MACHINE BUILDER

Ethernet Capabilities Unify, Enable Manufacturing Stakeholders

By Joe Feeley

Manufacturers today demand innovative machines that easily integrate into their plant-wide infrastructure. They need flexible and efficient equipment that increases business agility, optimizes productivity and helps achieve sustainability objectives—all while lowering their total cost of ownership.

Industrial machine and equipment builders are responding with increasingly smart machines that more easily connect the plant floor with the enterprise. They are realizing the benefits of using a single control and information platform to demonstrate a high level of intelligence with the ability to consume and generate information automatically, adapt to new situations and give machine builders the remote access and insight they need.

“There are three messages we’ve been focused on for three years now,” remarked Christopher Zei, vice president of Rockwell Automation’s global industry group. “One has to do with end users’ goal of plant-wide optimization as they seek lower total cost of ownership (TCO). Another is machine builder performance: how building better machines can help users achieve their TCO objectives, and how machine builders can better partner with those users.” The third message involves sustainability initiatives that support manufacturing organizations’ efforts, Zei said.



“Manufacturers that embrace Ethernet technology exceed their planned margins by 26%.” Cisco’s Chet Namboodri on the potential for networks that are standard, secure and open to improve machine builder and end-user performance.

ate information at the machine and make it reliably and securely available. In addition, builders and end users both now view access to machine-generated information as important requirements for improved service through local and remote systems. Builders also see access to operating data as a way to build better machines.

End-User Demands

The focus at today’s Global Machine Builder and Equipment Industry Forum at Automation Fair looked at the machine builder performance aspect of those three messages. Zei summarized some of the trends by saying, “It almost goes without saying that in a manufacturing factory everything revolves around machines. More of the automation decisions and even characteristics of the system are being decided by machine builders. These days more manufacturers, many of which no longer have big engineering departments, are simply telling the machine builders what performance they need with regard to throughput, efficiency, flexibility and downtime.”

Two key drivers for builders, said Zei, are the demands to improve both machine throughput and machine flexibility. “It’s not that easy to do,” he said, “and it puts a lot of demands on the control system.”

The last two trends Zei noted are somewhat tied together. It’s becoming a standard requirement that machines be able to generate information at the machine and make it reliably and securely available. In addition, builders and end users both now view access to machine-generated information as important requirements for improved service through local and remote systems. Builders also see access to operating data as a way to build better machines.

So as part of the march toward building ever-smarter machines, information-gathering and the ability to act upon that information are key elements helping that cause. Zei noted several points in that regard. “Convergence of manufacturing and enterprise systems is happening because of a common thread now, which is Ethernet. It was there on the business side, but you saw a lot of proprietary networks on the manufacturing side. Now there’s a lot of information moving back and forth.”

“Convergence of manufacturing and enterprise systems is happening because of a common thread now, which is Ethernet.”

Zei noted that stand-alone machines really aren’t disappearing. “People still buy stand-alone machines, but they’re not islands of information anymore. They can be integrated in like any other machine.”

Remote access to perform troubleshooting and diagnostics is a pent up demand that many machine builders would like to see become more accepted so they can provide services to customers. “There’s still a security concern, but we see more [manufacturing companies] being ready to give it a try.”

The Risks Involved

These are very effective tools that can benefit builder and user alike, but as companies open their systems, everyone has to be aware of the risks involved and implement the many security tools that are available today. Chet Namboodri, Cisco’s global industry director for manufacturing, provided a few examples intended to help convince companies that the benefits can far outweigh the risks.

“I did bit of research about whether we’re at a real inflection point with this technology and found this great quote, which reads, ‘If we had computers that knew everything there was to know about things, using data that they gathered without any help from us, we would be able to track and count everything and greatly reduce waste, costs and loss. We

would know when things needed replacing and repairing, or recalling, and whether they were fresh or past their best.’” The quote, said Namboodri, is from Kevin Ashton, who coined the phrase “Internet of Things” back in 1999.

But the Internet of things in industry is defined by automation and has been evolving for decades, believes Namboodri. Users are gaining value from adoption of practices involving the convergence of networks and the use of Ethernet on the floor, according to a study by the Aberdeen Group, which Namboodri referenced. “Best-in-Class manufacturers, those that embrace this technology, exceed their planned margins by 26%,” he reported.

Ethernet Enabling Machine Builders Too

So is there some evidence to encourage machine builders as well, since many of them express concern at exposing their own intellectual property? Namboodri noted that large OEM Comau Robotics (<http://www.robotics.comau.com/>), one of the leading suppliers of assembly lines for the automotive industry, is now about 80% EtherNet/IP in its operations communications. At the most recent ODVA annual meeting, Namboodri said, Comau reported that it found installation, commissioning, and debugging of a project that involved 10 control stations and 12-15 robots now takes two days instead of a week and a half.

Considerations remain, as Namboodri noted. “If you think about the integration of the enterprise into the factory down to the device layer, there still are two worlds.” He said that the policies and priorities of the IT side still are rated differently. For the factory side, uptime is everything, while first on the list for IT is protection and confidentiality. “The implications of a device failure to IT would be to find a workaround or stop and wait. For the factory it means critical lost production revenue.”

So, said Namboodri, there need to be guidelines for optimizing the factory integration with Ethernet, referencing ODVA initiatives.

“It has to be comprehensive across the entire industrial ecosystem,” said Namboodri. “It has to be scalable, so that it works for big or small machines and factory floors.”

In addition, the network must be proven secure, with particular emphasis on access control, including third-party service providers. “The plan must also be inclusive, making provision for heterogeneous networks and openness to multiple component providers.”

PLANTPAX ROADMAP RESPONDING TO USER NEEDS

Scalability, User Productivity Top List of Development Priorities

By Walt Boyes

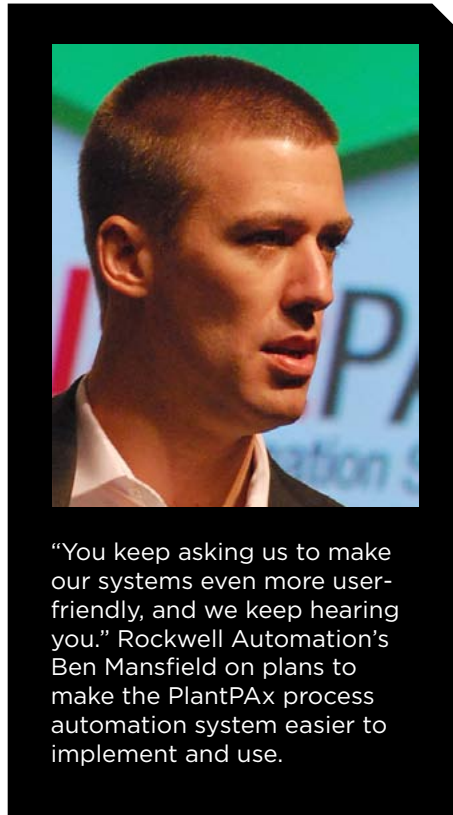
By definition, the typical user-group roadmap presentation is a forward look into planned product developments. But Ben Mansfield, PlantPax marketing manager for Rockwell Automation, first offered attendees at this week's Process Solutions User Group (PSUG) meeting in Philadelphia a look back at promises made one year in Chicago.

"Last year," Mansfield said, "We told you we were going to 64-bit operating systems on all our products. We defined the virtualized architecture and told you about expanded OEM offerings. We told you that we were going to expand our device connectivity options with a new Foundation Fieldbus device coupler, EtherNet/IP and a complete plant-wide wireless strategy.

"We said we were going to give you more power and control integration tools. We said we were going to give you more system design tools and a complete DCS migration strategy. We said we would have a version compatibility tool that you can use to determine what parts of your systems need upgrading.

"We said we were going to spend a large amount on R&D for advanced process control, and that we were expanding our services options for system support, lifecycle management, a new training curriculum and consultancy services."

"We did."



"You keep asking us to make our systems even more user-friendly, and we keep hearing you." Rockwell Automation's Ben Mansfield on plans to make the PlantPax process automation system easier to implement and use.

But Rockwell Automation is far from being through with its plans to grow its process business aggressively by meeting the demands of process manufacturers. Rockwell Automation is working to make PlantPax implementations easier using virtualization and other tools. Improved operator effectiveness is another key PlantPax deliverable, as are systems that are easily scalable from "one machine on a skid to a complete plant-wide control system," Mansfield said.

A Look Forward

"In 2013, we're going to introduce our Quick Start templates. PlantPax will have basic system setups, allowing you to focus on your application specifics and your own intellectual property."

"We said last year," Mansfield continued, "that we would have a detailed DCS migration strategy. Now we have the tools to easily migrate from Siemens/Moore APACs, Foxboro I/A and Fisher Provox systems to PlantPax."

In 2013, Mansfield continued, "we will have an Excel-based PAX library configurator, and a PlantPax Alarm Builder tool that will allow you to easily design system and process

alarms. We are also providing a powerful Automated Sequencer tool and bringing our alarming systems into alignment with the ISA18.2 Alarm Management standard. This includes adding the 'shelve' ca-

pability and automatic timeout on operator suppressed alarms. All the suppression and disable capabilities are going to be aligned to the standard.”

Mansfield added, “PlantPAX is a performance-based system, so we’ve provided a PAX Sizing Tool that allows you to model the performance of the system and do what-if analysis on numbers of controllers, size of networks and the overall architecture of the system.

“You keep asking us to make our systems even more user-friendly, and we keep hearing you. In 2013, we’re introducing new quick faceplates, simpler navigation, improved trending and, for those of you who still like photorealistic displays, we’re improving our graphical rendering engine.”

Scalability, Connectivity

“For 2013, we are also improving the scalability of PlantPAX,” Mansfield said. “Because many plants are now being composed of skids, we’ve made it possible for end users to request a common DCS design, regardless of size of the skid, and we now support up to two-and-a-half times more servers, with up to fifty percent more operator clients. We’ll be introducing a stand-alone client station that will be completely integrated with the system historian and security. This will permit a small remote part of the plant to have all the benefits of the complete DCS, while operating in a stand-alone fashion.”

“Beyond just connectivity,” Mansfield said, “we are providing a consistent experience for fieldbus networks, whether they are Foundation Fieldbus or Profibus, and our implementation of the HART protocol has undergone an expansion. With our partner, Endress+Hauser, we have improved our support for EtherNet/IP directly to the device, and our use of EtherNet/IP in power control. In partnership with Schweitzer (SEL), we have implemented IEC61850 connectivity in our power control systems.

“We also are pleased to announce that our Foundation Fieldbus linking device has received the registration and check-mark from the Field-

bus Foundation as a Class 61b integrated control system device.

“And we are distributing PlantPAX with virtual image templates on a USB hard drive complete with images in a hardware independent fashion. We’re permitting consolidated activations, and the templates are in Open Virtualization Format (OVF), which is an open standard for designing virtual templates, similar to XML.

“Why virtual solutions?” Mansfield asked. “It allows you to pretest patches and upgrades without accidentally crashing your operating sys-

“PlantPAX systems are scalable from one machine on a skid to a complete plant-wide control system.”

tem, and it gives you a ‘roll back to last good state’ function. You can clone systems for remote support to produce a test bed environment for operator training and simulation, and importantly, backup and restore. Virtualization enables thin client solutions that are low-cost, from traditional Wyse desktops to iPads. It enables remote and mobile operations, and it allows you to deploy corporate standards.”

“Virtualization even allows you to centralize development,” Mansfield said. “One of our system integrator partners found that they could keep their far-flung engineering staff using the most current software versions by hosting applications in a private cloud. The engineer logs into the cloud, does his development, and the work is available for everyone with access.

“Yesterday,” Mansfield noted, “you saw a three-way video and VoIP call with our service and support center in Cleveland and a demo room at the Endress+Hauser representative in Chalfont, Pa. This capability is designed into PlantPAX.”

ROCKWELL AUTOMATION UPS ANTE IN SERVICES BUSINESS

“Virtual Support Engineer” Program to Allow Rockwell Automation and Partners to Provide More Seamless Customer Support

By Walt Boyes

“Last year at Automation Fair we introduced a concept we call Assurance Integrated Support,” began John Lohman, director of market development for services and solutions for Rockwell Automation. “We’re back at this year’s Automation Fair to tell you that it worked, and that we are working on ways to expand the program.”

Assurance Integrated Support is made up of four basic bundled services, including an assessment phase, an asset management and risk mitigation phase, a preventive maintenance and support implementation phase, and a measurement phase.

“We are trying to help the guy inside the fence be more successful,” added Jon Furniss, remote support global product manager for customer support and maintenance. “Lack of support, smaller budgets, fewer people – all those pressures are the same whether the company is one of the Fortune 100 or a lot smaller. The operations and maintenance people want support, they want it predictable, and they don’t want high cost surprises.”

“Assurance Integrated Support is simple, flexible and worry-free,” said Rob Nugent, director of contract for customer support and maintenance, “And we do it for a flat rate. That’s what enables us to give our customers budget predictability.”

Data-Sharing to Enable Seamless Service

“Now, we have all this data we’ve collected working with our customers,” Furniss said. “Our distributors and our solution partners and integrators also have data from their service records when they service the same customers we do. What we’d like to do is to enable the use of all this data in a common way so that our partners and distributors and integrators can have access to the data they need to do their service at our customers.”

“What we have done is to put together a program where our distributors, partners and integrators can access our data on their customers and put it to use,” Furniss continued. “We call it Virtual Support Engineer. This lets our partners and integrators and distributors use our common

support platform as readily as our own internal service engineers can. They have access to our 24/7 support center, our database and all of our support information.”

“We’d like to be the coordinator of these service projects,” Nugent said, to make sure that the closest and most appropriate service organization or individual is dispatched to handle the customer’s problems. “But the first step is to be sure we can marshal all our support. Then we may be able to add the third parties.”

“There are some confidentiality and security issues we would need to work through,” agreed Furniss, “before we can do anything like that. It is clearly the logical end point, though.”

Premium Support for Customers of All Sizes

“We are working to build a sustainable support structure,” Lohman added. “Our customers really need the support, from small companies to the largest. Our goal is to bring the premiere service experience to small and medium-sized companies, just as well as we do it for our large customers.”

“This is why we start with the site audit,” Lohman continued. “This lets us plan with the customer what levels of service they really need and can afford. We want to increase availability of our service capability.”

“As far as making it cost-effective for smaller customers is concerned,” Nugent said, “we are truly motivated to make it cost-effective because we want to extend the reach of our entire service capability to all our customers, whether they usually see a distributor or a solution partner, and only occasionally see a Rockwell Automation service person. We are really sitting on the customer’s side of the table.”



“That’s what enables us to give our customers budget predictability.” Rockwell Automation’s Rob Nugent on the company’s simply, flat-rate Assurance Integrated Support offering.



“What we have done is to put together a program where our distributors, partners and integrators can access our data on their customers and put it to use.” Rockwell Automation’s Jon Furniss on the company’s Virtual Support Engineer program.

OEMS LEVERAGE INFORMATION FOR POSITION, PRICE

Open Networks Enable Remote Support, Enterprise Integration

By Aaron Hand

There was a time when industrial manufacturers had large engineering departments that made all the decisions on how their machines would look and operate. But more and more, that breadth and depth of expertise is leaving the building, and manufacturers are instead handing their specs to machine builders and leaving it to them to figure out how to get the job done.

The OEMs, meanwhile, look to their automation suppliers to get the tools they need to ease machine design and development. Much of that is geared toward building smarter machines—more integrated, more sustainable, safer machines that provide the information and diagnostics machine builders and users need. And it needs to be done easier and cheaper in the long run.

“We hear a lot about total cost of ownership, but that’s not the right message for machine builders,” said Christopher Zei, vice president of the global industry group at Rockwell Automation. “Instead, we need to talk about total cost to design, develop and deliver.”

Zei led a discussion among machine builders and users this afternoon at the Global Machine & Equipment Builders Industry Forum as part of Rockwell Automation’s Automation Fair in Philadelphia. Panel members discussed the new requirements they face in building smart machines and the way they are tackling those demands.

Diagnostics and Data

The discussion focused primarily on the information and diagnostics capabilities of smart machines—how the OEMs are leveraging the wealth of information that’s available on machines today to build competitive advantage or reduce costs.

“Cost is a big deal,” said Matt Wicks, vice president of systems engineering for Intelligrated, which provides automated material handling systems. “We’re leveraging the technology and integrated architecture to reduce not only the hardware cost, but the engineering cost, and also the cost of servicing the equipment.”



Panelists Sweet, Feicht and Wicks (left to right) discussed how global machine builders are leveraging networking technology to better serve their customers’ needs.

Intelligrated not only accesses the data on its machines, but is able to take action to keep those systems running more smoothly. The company gets data out of its high-speed sorters, for example, to recognize problems early. “We monitor the amount of chain sag that we have over time and determine what maintenance needs to happen,” Wicks said, explaining that they are able to react to the data and do some tensioning of the chains. “We use this as a competitive advantage.”

Focke uses machine data to get a better view of the bigger picture, according to Heino Fecht, automation and design development manager for

Focke. The German packaging machine supplier began using PackML, which defines a common language for automated machines. “We have the latest 500 stop codes, so if there’s a problem we can see why a machine has stopped,” Fecht said, noting that the open standard makes it easier to access codes and correct issues. “We usually can track and sort the most common fault codes and get better performance.”

Ethernet Everywhere

Like most, if not all of the panel members, Focke uses EtherNet/IP for machine communications. “We started seven years ago to eliminate other networks, and now we use only EtherNet/IP,” Fecht reported. Although it was a bit of a struggle to get employees used to the switch, the move has been good, he added. “Now we’re looking to eliminate Sercos.”

Spoolex, a French company that makes converting equipment for web-formed products, has replaced DeviceNet and ControlNet with EtherNet/IP and is gradually replacing Sercos with CIP Motion, according to Sebastian LeGris, automation and engineering manager for Spoolex.

Michael Sweet, director of MES at First Solar, agreed that it was difficult to get everybody on board at first, but the move to EtherNet/IP has been a good one. “We’ve seen a lot of advantages,” said Sweet, who brought a user’s perspective to the discussion. First Solar makes photovoltaic modules for the solar energy industry and has been able to make use of the integrated logic, Sweet said. In the past, First Solar had to interlock machines to pass the product from one to another. “Now we’ve created an electronic interlock through EtherNet/IP. All of it is pre-packaged now, very plug and play.”

Speaking to the plug-and-play aspects, Lorenzo Razo, engineering manager for Hybernya Industrial in Irapuato, Mexico, noted that the commonality of cables and connectors makes repairs or replacements easy. “EtherNet/IP is so easy for us, we are now bidding all machines with EtherNet/IP only,” he said.

Data Feeding Analytics

“We see big data coming,” Wicks noted. “Being able to take that data, being able to parse it out and serve it up to customers...is going to be very, very critical. EtherNet/IP is the platform. Connectivity to these solutions becomes so much simpler.”

Having data is one thing. Making good use of that data is something more. “It’s just data until you turn it into useful information,” Sweet said. “Business intelligence is really lagging behind the curve. The data is not being effectively used.”

Sweet spoke of the need to take data, make sure it’s being collected in

the right format and put it through analytical systems. “That will be the real payoff,” he said. “When the user base is able to use the multivariate analytics, then you’ll see the real value.”

Remote Access Addressing Skills Gap

Chet Namboodri, global industry director for Cisco, gave a presentation earlier in the forum and also joined in the panel discussion. He said that besides the analytics, machine builders needed to provide more expertise for their customers as well. “In addition to the megatrend about information access, there’s also a megatrend of limited expertise,” he said. “There are fewer and fewer experts in community, and they need the equipment provider to provide the expertise.”

Providing remote access has become a requirement, Namboodri added. “In addition to the data set and analytics, there’s a need for more context in real time,” he said. “More and more users are making use of other services, like video and voice. They can help troubleshoot with a remote expert back at the equipment provider working with a technician.”

Spoolex uses a VPN connection to provide remote diagnostics for its customers, LeGris said. Focke does as well. “Some companies don’t allow remote access, but other companies do,” Fecht said, who pointed to advantages such as reduced flight costs for engineers to travel to the customer site and reduced downtime for the customer. “We’d like to do more.”

Security is often a concern at customer sites, and sometimes it can be difficult to convince IT departments that connections will be secure. “We’ve got our own dedicated servers that we use to connect to our customers. They work through all of their specific details to work out the requirements,” Wicks said. “We provide a level of security that customers are demanding.”

With budget-constrained environments that the entire industry faces, remote access is a must-have, Sweet said. But there are also personnel safety issues to consider if a machine builder has capabilities in place to operate a tool remotely. “We need some pretty rigid policies in place,” he said.

And a VPN tunnel doesn’t guarantee that mistakes won’t be made, Sweet added. “Even in spite of our best efforts, we’ve had issues with machine builders accidentally remotely accessing the wrong tool. They’ve made software changes to the wrong tool,” he recalled. Despite the challenges, however, placing more measures to keep those mistakes from happening would only hamper support efforts. “You have to weigh the risk that they’ll do something wrong. You have to make a workable, easy way that doesn’t restrain the support effort.”

FLEXIBILITY DRIVING THE FUTURE OF AUTOMATION

Flexible Production, Cloud Computing Pave the Way to Future for Rockwell Automation and Users

By Jim Montague

To help their users and customers survive in the present and thrive in the future, a trio of Rockwell Automation's technical experts and partners delivered a series of presentations this week at the Manufacturing Perspectives press event leading up to Automation Fair 2012 in Philadelphia.

One of the cornerstones enabling the flexibility of manufacturing so crucial to the operations of many of Rockwell Automation's manufacturing customers is the company's long and fruitful partnership with Cisco Systems. Maciej Kranz, vice president and general manager of the Connected Industries Group at Cisco, and Sujcet Chand, senior vice president and CTO at Rockwell Automation, jointly reported how they're striving to make flexible production and cloud-computing services more mobile and secure.

"Research shows about 63% of companies are allowing staffers to bring smart phones and other mobile devices onto their plant floors to allow access to information and aid in collaboration, but at the same time about \$60 billion is being spent on cybersecurity," said Kranz. "So as connected apps drive enterprise convergence, there's more need for security too."

Chand explained, "The sheer volume of production data is so great that many users are drowning in it, and this isn't helped by all the proprietary formats they have to deal with. What they need is to bring actionable information out of all that data. Fortunately, enhanced connectivity is continuing to evolve, and the key enabler is open, standard Ethernet. In fact, together we've been using our joint Reference Architecture to develop and produce the switches and access points to bring more Ethernet to the plant floor, and then securely connect it to the enterprise level, back-end business networks and supply chains."

Chand added that Rockwell Automation and Cisco's efforts on improving Ethernet networking have inevitably brought it to cloud computing. "The cloud is allowing users to move legacy information and data

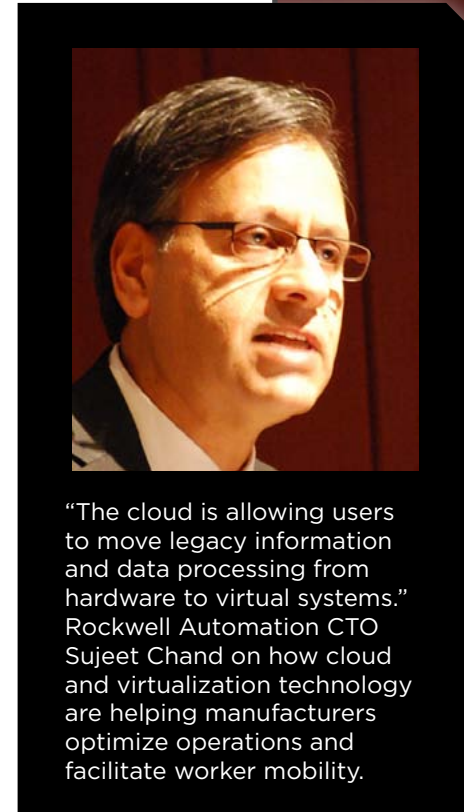
processing from hardware to virtual systems, which allows greater mobility, improves analytics and optimization, and enables the factory of the future. However, these must be assisted by perimeter security, VPNs and firewalls, threat identification and cloud-based security infrastructures, which can give users the converged, secure networks they need for successful and safe collaboration."

In fact, Rockwell Automation and Cisco have just launched the Stratix 5900 secure Ethernet router and have been helping the ODVA organization develop the CIP Energy protocol to help users actively manage energy use and build more energy-aware machines. "Energy is becoming another loop that can be managed in controllers and control systems, and CIP Energy can help them identify and take advantage of times when their equipment can run in lower-power modes, and find many other opportunities for greater productivity and sustainability."

Amplifying Flexible Production

For example, Ford Motor Co. is using several strategies—including Rockwell Automation solutions—to complete its "One Ford" program, which is transforming it from many regional divisions into one team with one plan and one goal. It's accomplishing this ambitious project by implementing common, consistent standards in the Ford Production System (FPS) at many of its 70 plants worldwide in order to give its customers the vehicles they want most.

"Rather than a one-size-fits-all approach, Ford's plan is to offer its



"The cloud is allowing users to move legacy information and data processing from hardware to virtual systems." Rockwell Automation CTO Sujcet Chand on how cloud and virtualization technology are helping manufacturers optimize operations and facilitate worker mobility.

models with a host of propulsion options, including high-efficiency gas and diesel, hybrid, plug-in hybrid and pure electric,” said Peter Daenen, chief body construction engineer (BCE) in the Vehicle Operations Management (VOM) division at Ford South America. “This allows significant flexibility in the face of changing market demands.”

Daenen described flexible production initiatives in its body shops, paint shops, final assembly lines, and sometimes in its power train facilities. Besides implementing flexible production at its 35 assembly plants, One Ford is also going into the nine new plants it’s building in Asia. These global standards include manufacturing design specifications, common bills of design and bills of process, which dictate equipment such as standard production cells. “These will give us global production flexibility and lighter, more capable tooling systems, which can be as much as 80% non-product-specific, but still easily programmable,” explained Daenen. “For example, where we used to produce three models on one line, we’ll be able to manufacture six or seven models on that line, and have lower-cost, higher-quality model changeovers. Last year, 55% of our global body shops had this flexibility, and that will increase to 65% by the end of this year.”

Ford has used Rockwell Automation products, such as its ControlLogix and earlier PLCs and EtherNet/IP and DeviceNet networking protocols, for many years. As a result, it was a natural extension for Rockwell Automation to help with the One Ford initiative. In fact, Daenen added that One Ford’s flexible manufacturing program is also using virtual tools and simulations to research better ways to install seats and other components, as well as methods for improving safety and reducing injuries. So far, he reported these virtual tools have helped Ford cut its per-vehicle production costs by 8% per year or about 20% since 2009. “In the future, we’ll even be able to better compare the efficiencies, downtime and quality of different plants,” said Daenen.

Frank Kulaszewicz, Rockwell Automation senior vice president for architecture and software, reported that Rockwell Automation’s role in assisting with One Ford also included helping its plants deal with different requirements in different regions. “Our plant-wide optimization capabilities are enabling convergence between Ford’s enterprise, plants, suppliers and customers,” said Kulaszewicz. “This allows unprecedented levels of visibility, flexibility to change quickly with the market, and simplification of functionality and systems. Automation can be a huge amplifier for production. We introduced our Integrated Architecture about 10 years ago, and we recently reinvested in it with new technologies, platforms and products, as well as new controls, drives, services and software, and deliver them via secure, standardized and open Ethernet networking and switches.”

A Cloud in Your Forecast

Beyond allowing more flexible manufacturing, Rockwell Automation is also helping users move into cloud-based computing. For instance, “The Implications of the Cloud on Manufacturing,” was delivered by Fran Dougherty, CTO of the Worldwide Incubation Enterprise and Partner Group at Microsoft. He reported that Microsoft’s users, including those in industry, want to drive innovation, scale up their operating environments and grow their businesses. Some run on private, on-premises cloud-computing systems, while others do data processing on publicly located services.

“We think using a hybrid cloud strategy is the best because it puts its analyses where users need it, so they can employ whichever combination is the best for them,” says Dougherty. “This also gives them the right IT for their business, makes more of their existing investments and delights their customers with the best experiences.”

For instance, Microsoft’s new Azure platform is being used by Toyota’s next-generation Telematics service that it’s incorporating in its electric vehicles (EV) and plug-in vehicles (PHV) in 2012. This service will give drivers seamless connectivity from their cars to email, office networks, remote diagnostics, and third-party services, such as music, movies and smart grid updates for the EVs and PHVs.

On a more industrial note, M.G. Bryan Equipment Co. is implementing Azure on its fracking trucks. The platform will provide generic Internet connections for tablet PCs and smart phones, so users can secure production data from the trucks and their drill sites. Azure will serve up Rockwell Automation’s own cloud platform and JSON web service extensions for security via a Sierra 3G wireless GX400 radio. For instance, the trucks will be able to alert operators when their air filters need to be changed, which can be as often as every eight hours.

“These \$1.1 million trucks work in harsh environments from -30 °F to 120 °F, so it’s important to know when each of their four \$40 air filters are sucking sand and dirt,” says Matthew Bryan, M.G. Bryan’s president. “It’s a priority for us to be notified ahead of time, and Azure is allowing us to collect this data, other KPIs and fleet management information on our smart phones. All this data is stored in the cloud, and lets us manage our equipment and serve our own customers better.”



“In the future, we’ll even be able to better compare the efficiencies, downtime and quality of different plants.” Ford Motor Co.’s Peter Daenen on the potential of the company’s “One Ford” initiative to improve global performance.

OIL & GAS PRODUCERS INNOVATE TO TAP HARD-TO-REACH RESOURCES

Stories of Enhanced Recovery from China, Ecuador and Texas

By Jim Montague

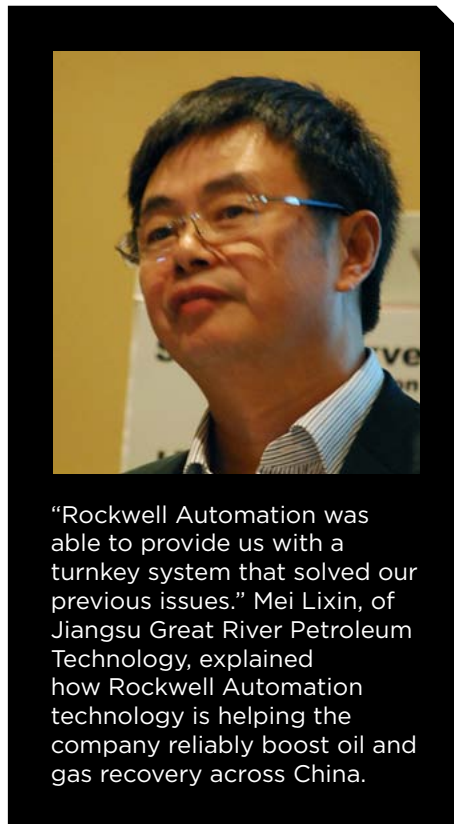
Despite sustainability advances, the world is ever thirstier for oil and natural gas, especially in developing regions with a growing middle-class. To supply this ravenous and accelerating demand, producers are forced to explore more widely and deeply than ever before and cope with far higher capital operating costs, yawning skill and experience gaps, and increasing regulations.

“Operators are overwhelmed with data, and enterprise-level managers are also struggling with all the ‘big data’ in their organizations,” said Elizabeth Parkinson, market development manager for Rockwell Automation’s oil and gas division, at this morning’s Oil & Gas Industry Forum at the Automation Fair in Philadelphia.

“At the same time, subject-matter expert pools are shrinking, so resources need to be shared,” Parkinson continued. “However, remote visibility empowered with live data is challenging, so decision-makers aren’t equipped to do it and often focus on incorrect priorities. The actions that drive better capabilities include applied automation via improved network and controller loading, avoiding bottlenecks, designing systems with process subsystem dynamics in mind and optimizing system performance. It’s also vital to present data on dashboards and use better reporting and data strategies, but also maintain firewalls and leverage other services, such as cloud computing.”

Rockwell Automation, its system integrators and end users are coming up with some stunning innovations to help increase the efficiency and produc-

tivity of their production applications. For example, the Oil & Gas Industry Forum showcased three creative process control and automation projects. Perhaps alerted to these innovations, about 250 visitors to the fair stopped by and turned the forum into a standing-room-only event.



“Rockwell Automation was able to provide us with a turnkey system that solved our previous issues.” Mei Lixin, of Jiangsu Great River Petroleum Technology, explained how Rockwell Automation technology is helping the company reliably boost oil and gas recovery across China.

trogen, steam and chemicals—are injected into wells that are typically 300 to 3000 meters deep. “The three main ingredients in our CHC greatly

“Rocket Engine” Extraction

First up, Mei Lixin, CEO of Jiangsu Great River Petroleum Technology in Jiangyin, China, reported that his eight-year-old company has developed a new method—Composite Heat Carrier Generator (CHCG)—to greatly increase oil and gas yields, and has even designed an explosion-proof version for offshore platforms. The firm provides technical and support services to increase production yields for China’s largest oil and gas companies, including CNPC, CNOOC and SinoPec.

“There have been three traditional ways of enhanced oil recovery—thermal recovery, gas injection and chemical injection. We think there is a fourth way by combining the original three,” said Lixin. “It’s based on the working principle of combining fuel, air and water in a sealing room, and then injecting them at extremely high temperature and pressure—almost like a rocket engine—into the target reservoirs, which are mostly in light oilfields, heavy oilfields and low-permeability.”

Hot, pressurized gases—including CO₂, nitrogen, steam and chemicals—are injected into wells that are typically 300 to 3000 meters deep. “The three main ingredients in our CHC greatly

thins the crude in the reservoirs, makes it much easier to extract, and has zero carbon emissions to the environment,” explained Lixin. “And our process has less than 2% residual oxygen, which makes it safer to operate.”

To reliably control and maintain its innovative CHCG system, Lixin added that Jiangsu Great River chose to employ a variety of Rockwell Automation’s ControlLogix controllers, software and other components, and even implemented them in an explosion-proof cabinet for use on offshore oil rigs. “CHCG requires a highly reliable control system, good maintenance, remote access and global support, and Rockwell Automation was able to provide us with a turnkey system that solved our previous issues.”

So far, Lixin reported that CHCG is allowing the oil companies that Jiangsu Great River serves to extract significantly more oil and gas. “In heavy oilfields, compared to regular steam injection, the oil recovery ratio has increased 10% to 15% after CHC injection,” said Lixin. “As a result, the production rate of oil from each well is 6.6 times that of original production rates. Also, the Nanbao heavy oilfield was the first application of CHCG offshore, and it met the explosion-proof requirements, ran stably and increased daily production rates by a factor of six.”

Fracking Trucks in the Cloud

To continue improving control engineers’ access to production data via tablet PCs and smart phones, Ted Hill, director of global business development for Rockwell Automation, reported that it’s helping move many process monitoring and other capabilities onto cloud-based computing services. “Everyone expects to have all-access, wireless Internet these days, so we’re helping our customers and industries do the same thing,” said Hill.

For example, M.G. Bryan Equipment Co. (<http://www.mgbryan.com/>) in Grand Prairie, Texas, is leveraging Microsoft’s Azure platform with its fracking trucks. The platform provides generic Internet connections for tablet PCs and smart phones, so users can secure production data from the trucks and their drill sites. Azure will serve up Rockwell Automation’s own cloud platform and JSON web service extensions for security via a Sierra 3G wireless GX400 radio. For instance, the trucks will be able to alert operators when their air filters need to be changed, which can be as often as every eight hours.

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phones. All this data is stored in the cloud, and lets us manage our equipment and serve our own customers better.”

Beyond monitoring the trucks’ operating and maintenance conditions, Josh Rabadeux, M.G. Bryan’s controls engineer, added that the company may soon be using Azure to collect and access process control data from its wells too.

Jungle Heavy-Oil Optimization

Similarly, to improve operations and uptime at two of the seven blocks in central Ecuador from which it extracts about 148,000 barrels per day (BPD) of heavy oil, Petroamazonas in Quito, Ecuador, recently upgraded from Rockwell Automation’s RSView32 to its FactoryTalk platform, and also upgraded from PLC5 controllers to its ControlLogix platform. The first block, Eden Yuturi field, produces 53,000 BPD, and the second block, Indillana field, produces about 39,000 BPD.

“The former RSView32 infrastructure was transferred to our IT and automation teams as black boxes, which was a potential risk for operations of both fields,” explained Gonzalo Maldonado, IT infrastructure supervisor at Petroamazonas. “Some of the issues we had were that the physical servers were out of warranty; operating systems were no longer supported; and there were missing licenses and/or duplicate serial keys.”

Besides upgrading to FactoryTalk and ControlLogix, Maldonado reported that Petroamazonas also implemented Rockwell Automation’s redundant and reliable HMI system and installed the same solution at both fields. “We implemented an audit tool to keep track of changes at the PLC programming level and applied active directory authentication into the HMI log-in process to increase security levels in the application,” he said. “We also made sure our system is compatible with new PAM EP standards for coordinating Cisco, Hewlett-Packard and Microsoft components. And we’ve virtualized out servers using VMWare, migrated to a Cisco Metro Ethernet infrastructure and moved from a Microsoft SQL database to a FTK Historian.

“We now have very reliable applications at both sites, and VMWare means we can add a new server in 10 to 15 minutes, instead of the 30 to 45 days it used to take to order a physical box. In addition, real-time and historical trending connectivity to FTK Historian improves global performance trending, which is now faster and avoids overload of the HMI application and network delays with SQL configuration. Overall, using ControlLogix is easier and has been very successful for us. Also, our data management tools, such as online controller tags and data server distribution, work better with Factory Talk Studio.”

COLLABORATION KEY TO GLOBAL STANDARDS HARMONIZATION

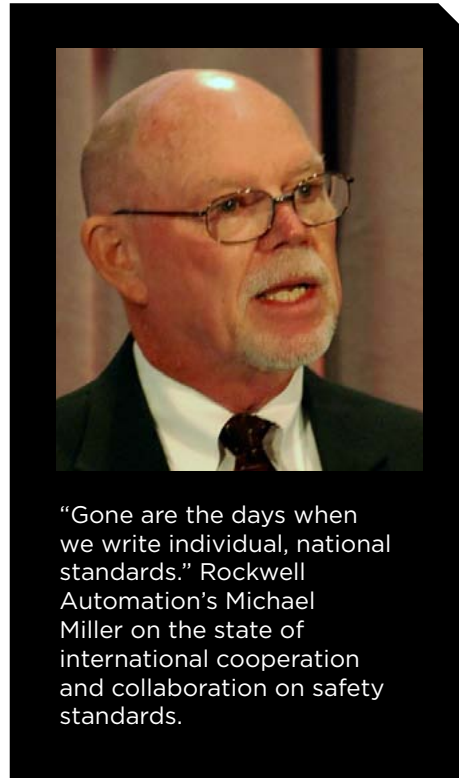
U.S., European Standards Bodies Working Toward Common Goals

By Joe Feeley

The overall goal of safety standards organizations across the globe is to harmonize national standards toward more global unity. A Tuesday presentation entitled “The Future of Global Machine Safety Standards and How ANSI and IFA Collaborate,” at this week’s Rockwell Automation Safety Automation Forum outlined how organizations, such as ANSI and Germany’s Institute for Occupational Safety and Health of the German Social Accident Insurance, better known in the United States as IFA, the creators of the SISTEMA safety integrity software tool for machinery, work to achieve common goals.

Michael Miller of Rockwell Automation, who in this venue spoke in his role as vice-chairman of the U.S. National Committee TAG TC-199, explained what that those acronyms stand for. “The USNC is a mirror committee to ISO/TC 199 Machine Safety. ISO and IEC are international organizations comprised of national standards bodies such as ANSI, ISA, BSI,” Miller explained. “They each have technical advisory groups or TAGs, made up of technical experts in their nations, and form working groups that focus on various elements of machine safety.”

These groups work both individually and collectively to write global standards. The U.S. TAG is administered by ANSI. At present, there are



“Gone are the days when we write individual, national standards.” Rockwell Automation’s Michael Miller on the state of international cooperation and collaboration on safety standards.

roughly 26 active participating countries and 23 observer countries.

Global Markets, Global Standards

Miller said the scope of TC-199 (Technical Committee 199) fundamentally is concerned with machine safety. “Gone are the days when we write individual, national standards,” he explained. “Look at the global economy we live in. We want to build a machine one way and sell it all over the world because that’s where the market is.”

Miller mentioned a more recent joint working group, JWG1, with members of an ISO TC group and an IEC TC, aiming at a merger of the ISO 13849 and IEC 62061. He added that TC-199 has revised or added 42 standards during the past 18 months. As the state of the art changes, technology changes, and the committees and working groups are charged with seeing that the standards remain relevant. “We have allowed present technology to be used, but often have to try to anticipate where technology will take us and not put limits around that technology’s use, Miller said.”

Miller added that around the world most standards are voluntary, but more are being adopted by regulatory bodies and becoming law, as the case with OSHA and with the Machinery Directive in Europe. “You certainly can build a machine without standards,” Miller stated. “You’ll have

a very difficult time demonstrating that it meets the health, safety and environmental requirements that are spelled out in the standards as practical interpretations of how to build a safe machine.”

Miller offered an invitation for participation in national TAGs and TCs to the audience and industry overall. “Participation is always voluntary, and we’re always looking for good, qualified people to help us by passing along the knowledge you’ve acquired through the years to future generations. It’s a very difficult job, but very rewarding. Support your TAGs and TCs whenever and wherever you can.”

The View from Europe

Dietmar Reinert, deputy director at IFA, said that standards matter in Europe because of legislative issues. Before the harmonized EU standards, there were 27 countries with differing standards, particularly for goods imported from one to another. “Now for the machine builder, no EU country can have higher requirements,” he said. “The free movement of goods in the EU is protected by the Machinery Directives, which prescribe maximum protections. If you follow harmonized EU standards, then you fulfill the requirements of the Machinery Directive.”

So how does IFA work? “We have safety inspectors in the field to investigate accidents, but sometimes manufacturers come to us because there is no standard to fit their particular needs. They ask us to review it and accept it. Since we are a Notified Body, we can eventually certify that the solution is safe.”

For a first design, IFA creates a test specification and test procedure. “We discuss the testing concept with other Notified Bodies in Europe, and if all is in order, an EC type examination [certificate] is given to the manufacturer, and the new product then can be sold

in the European market.”

Reinert provided several examples of the work done at IFA to certify new safety products for the EU market. One of the more novel is work that developed a near-infrared spectral signature of

human skin for a new type of safety light curtain, which can discriminate skin from all other materials and objects, such as glass work gloves or materials that conventional light curtains can’t distinguish. Here again, the goal will be to create a harmonized standard for this technology.

Reinert concluded with a few thoughts about IFA’s view of the continuing evolution of safety standards. “The more we integrate safety into the process, the more it will be accepted by the user,” he stated. “Integration means to integrate safety technology into the production process with safe protection devices and safe control systems. As a consequence, safety technology becomes more complex within the design and by using it, so investigations for usability will become more and more important. It’s clear that the user has to be integrated into the design process of machinery. So, the new slogan is ‘human-integrated manufacturing.’”

In terms of the emphasis the United States puts on global standards, Miller reluctantly admitted that the country is a little behind in making national standards global, in some measure because we have many standards organizations. “We’re still learning how to play in the big sandbox,” he said. “We’re still writing a lot of national standards. There are a lot of reasons for that, but one of them has to do with our legal system and the differences in the liability of users and machine builders here compared to Europe.”



“The new slogan is ‘human-integrated manufacturing.’” IFA’s Dietmar Reinert on the effort to integrate safety considerations into machine design processes.

MANUFACTURERS SHARE SUSTAINABILITY WINS

Energy Savings and Environmental Compliance Delivered for Goodyear, Colorcon and Energenic

By Jim Montague

Energy is just like speed, vibration, temperature and flow. It's just another variable that can be controlled and optimized—but thinking about it in those terms is something relatively new.

For many decades, power was just turned on and off, bills for it were paid, and nobody thought about much beyond that, as long as the lights didn't go out. Well, times have changed. \$4-per-gallon gas and other forms of energy become more precious, and everyone wants to run more sustainable operations and produce greener products.

To help users save power and compete on all these sustainable fronts, the Energy & Environment Industry Forum and the Energy Management exhibit were highlights of today's activities at the Rockwell Automation Automation Fair 2012 in Philadelphia.

"Rockwell Automation is the world's largest company dedicated to industrial automation and information, and we make our customers more productive and the world more sustainable," said Mary Burgoon, Rockwell Automation energy and environment market development manager, who moderated the forum.

"How do we help manufacturers meet the challenge of smart, safe and sustainable production? Our approach is based on our core technology—the Rockwell Automation Integrated Architecture," Burgoon said. "Through it, companies can optimize a fragmented environment comprised of disparate systems into a connected, information-enabled plant and supply network. Integrated Architecture combines automation control and information technologies in a converged Ethernet environment.

"As a result, companies can gain access to what's happening directly in their production processes through their business systems. This plant-floor data collected from automation systems provides the

real-time intelligence necessary for the optimal use of resources."

Data Organized for Renewable Energy Producer

Energenic (www.energenic-us.com), for example, is working with Rockwell Automation's Power & Energy Solutions Group to organize data and improve operations at 14 of the central energy centers (CECs) it builds and operates, and do the same for several solar plants and landfill-to-gas facilities it runs nationwide, reported Doug Demian, applications engineer at Rockwell Automation.

"Energenic needed to monitor energy use, chiller and boiler efficiencies, and many other parameters, and capture it all in a historical database," explained Demian. "So we came up with an integrated solution using our RSEnergyMetrix server and FactoryTalk platform that included variable-speed drives (VSDs) and controls, interfaces and links to third-party systems.

"This is allowing Energenic to monitor real-time data from its controls through firewalls in its VPN; calculate power going to the VSDs and motors control centers on condensers and pumps, for example; compare present performance to benchmarks; trend that data for future analyses and energy-use optimization; and distribute it



"We estimate that this solution is going to save about \$10 million over about 10 years for all the plants using it." Goodyear's Aiman Abdrabou on the energy savings it hopes to capture using dashboards developed with Rockwell Automation's RSEnergyMetrix tool.

to anyone who needs it via web pages. So far, this solution has saved Energenic about 15% on its operating costs.”

Drugmaker Bolsters Compliance Reporting

Likewise, Alex Jushchyshyn, site manager at Colorcon (www.colorcon.com/), reported that his firm makes colors, coatings dyes, binders and other products for the tablets produced by many pharmaceutical companies, and added that it’s using Rockwell Automation’s Manufacturing Intelligence solutions to report on the wastewater it sends to its municipal treatment facility near West Point, Pa., and document compliance with new permit requirements.

Basically, Colorcon’s water discharge has to be regularly checked for pH and chlorine, so it replaced the chart recorder monitoring I/O in a remote shed with Rockwell Automation’s FactoryTalk VantagePoint and FactoryTalk Historian solutions.

“This means our operators can do much less data entry and get back to making product,” said Jushchyshyn. “However, we can also identify and diagnose upset conditions much faster and access this data from anywhere. Our metering is also about 10% more accurate now, and the few water discharge issues we had each year have now dropped to zero.”

Goodyear Takes Aim at Energy Intensity

In addition, Aiman Abdrabou, global manager for energy and greenhouse gases (GHGs) at Goodyear Tire Co. (www.goodyear.com), explained that Goodyear has been developing and implementing more sustainable energy strategies for its 50 plants worldwide, including reducing the “energy intensity” of its production processes by 25% in 10 years and continuing to develop tires that save fuel for drivers.

“Energy management is exactly like a control loop that must be managed continuously, so we have to develop ongoing programs to achieve sustainability. It can’t be done as a one-time project,” stressed Abdrabou.

Consequently, Goodyear organized teams at plants in North and South America, including the world’s largest tire factory in Akron, Ohio. Next, it developed energy performance metrics (EPMs) that it posted on online boards, which now include energy-use trends, charts and action plans, and are even used to host monthly meetings. To aid

its sustainability program, Goodyear is also using Rockwell Automation’s RSEnergyMetric to monitor about 10,000 meters, organize and centralize their data, put KPIs on Rockwell Automation’s VantagePoint dashboards, and generate reports to aid its optimization and sustainability efforts.

“The part that made this affordable was that Rockwell Automation only charged by the number of licenses we implemented and didn’t add on charges for different sites and facilities,” said Abdrabou. “We’ve already saved two or three times over on the initial costs of this system. We estimate that this solution is going to save about \$10 million over about 10 years for all the plants using it.”

CIP Energy Eases Communication Tasks

To generate even more efficiencies and savings, these and many other applications can now use the new CIP Energy protocol recently developed and launched by ODVA (www.odva.org/) with help from Rockwell Automation and its other members. CIP stands for “common industrial protocol” and includes a comprehensive suite of messages and services for the collection of manufacturing automation applications—control, safety, synchronization, motion, configuration and information.

“CIP Energy is just energy-related data in a structured payload,” explained Cliff Whitehead Jr., strategic applications manager for Rockwell Automation. “It’s an extension to the existing CIP protocols and is a native and transparent way to transmit energy-use information, instead of burdening users with all the code, spreadsheets and translation requirements of the past.”

Philip Kaufman, business manager for Industrial Energy Management at Rockwell Automation, added that, “In the past, gathering data from 300 I/O points in a typical application and configuring it to report to an HMI could take a couple of weeks, but now we can use CIP Energy to get up and running in a couple of hours. This is all just another part of our Integrated Architecture for Energy Management.”

Kaufman added that CIP Energy is already native on Rockwell Automation’s PowerFlex 755 drives and SMC 50 drives, and it will also be coming to other products soon. A toolkit will also be available shortly to help users apply CIP Energy in their devices and systems.

FOOD MANUFACTURERS SEEK SAFE AND SECURE PRODUCTION

Food Safety Regulations and Supply Chain Security Among Top Industry Concerns

By Joe Feeley

Sustainability, globalization, productivity and innovation top the list of key challenges confronting the food and beverage industry. In the face of regulation and customer concerns, manufacturers look for ways to improve margins while delivering the quality assurance that consumers expect.

During today's Food and Beverage Industry Forum at Rockwell Automation's Automation Fair in Philadelphia, suppliers and manufacturers provided experiences and thoughts about how manufacturers today can improve product consistency, throughput, data gathering and reporting.

Kris Dornan, marketing projects manager, Rockwell Automation, began the session by outlining what Rockwell Automation finds to be the key needs and interests of food and beverage consumers and, by default, the food and beverage industry that serves them. He broke this down into a few categories. "There's a demand for new products," Dornan said. "So how do you innovate to provide that? You might make beer. How do you make yours better than your competitors? As suppliers, how do you support those needs?"

Next, there's customer satisfaction, Dornan said. "If you buy an Oreo cookie, it always has to taste like an Oreo cookie, today, tomorrow and in the future." Supply chain integration is critical, too. "There's capacity variability, many other companies involved in that process, so how do you manage that?" Dornan asked.

And of course there's food safety and its accompanying regulations such as the Food Safety Modernization Act (FSMA) of 2011, a sweeping legislative action that in the United States will impact the data gathering and sharing activities of food and beverage companies with its eventual implementation, particularly in food processing segments that previously were not regulated.

New Regulations

JLS Automation (<http://www.jlsaautomation.com/>) provides automation solutions for the food industry focused on primary and secondary packaging operations, and its president, Craig Souser, presented a brief overview of its implications to machine builder and, by extension, the industry's manufacturing companies

"FSMA is a mandate of best practices," reported Souser. "The good news is that it's science-based. I think they did it right."

The measures will envelope all food, including dry food products, provide authority to inspect records, mandate recalls and "They also can close you down for inaction, so it's not to be taken lightly," warned Souser. "It has the scope of ObamaCare for this industry."

The elements mandated by FSMA are similar to the Hazard Analysis & Critical Control Points (HACCP) management system, in which food safety is addressed through the analysis and control of biological, chemical and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product.

"To me this is about food safety, and it is preventive in nature," Souser believes. "About 3000 people in the U.S. died last year from food-borne illnesses."



"It has the scope of ObamaCare for this industry." JLS Automation's Craig Souser discussed the extensive impact of 2011's Food Safety Modernization Act for food and beverage manufacturers.

This also impacts the products packaging industry and drives the need for collaboration between equipment suppliers and their end customers. “Ease of sanitation and subsequent validation requirements will impact design considerations,” Souser stated.

Towards its steps in this new user requirement, JLS has begun to integrate Rockwell Automation’s FactoryTalk Historian Server in its automation system to provide tracking, traceability and validation data throughout the packaging process. “These are new items that we’re starting to integrate into our solutions. We’re starting to do this now because we know the customer is going to have to down the road.”

Souser concluded by saying that FSMA is here to stay. Its actual implementation is probably three to four years away, but he counsels to start now and stay ahead of it. “If you try to deal with it then, you could be in big trouble,” he warned.

Supply Chain Security

With today’s business climate becoming more remote and spread out, information is key, added Douglas Bellin, senior manager, industry business development, Cisco, who spoke about the value of secured industrial intelligence for food and beverage companies.

“Consumers demand to know where their goods are coming from and who was a part of the supply,” he emphasized. “Data security is key to this drive toward a full understanding of the supply chain, both internally and for your customers.”

Bellin offered up Cisco’s aggregated list of things that CEOs worry about in that regard, which also forms a to-do list for Cisco’s efforts:

- Use of information to reduce costs and drive innovation;
- Flexibility in production capability;
- How to meet OEE metrics;
- Reducing energy consumption with sustainability success; and,
- Information systems to address government reporting and compliance.

Bellin went on to address today’s supply chain hot buttons. The typical supply chain that was mostly internal to a company has changed, he said. “That has expanded to outside the wall, to the place where I’m getting billing done, how and when the product gets to the customer’s dock. It’s expanding even further to suppliers, the ones that make the packaging or raw goods for you. That relationship has to go down to

your Tier 2 suppliers, other partners and ultimately to your customers.”

A good example of that, Bellin said, is your carton supplier. What happens when his conveyor breaks down, and he can’t supply those boxes? You find out about it when you run out of boxes, and that’s probably too late. What if that supplier was integrated in a way that you were alerted when that conveyor broke and the consequences were realized? You probably could affect a contingency plan for alternate supply.

“49% of intrusions are though the corporate WAN and business network.”

“It gets worse, though,” Bellin stated. “Remember, those suppliers have suppliers, who have suppliers, so we have to somehow connect all those sources. Supply chain complexity has doubled in recent years.” This can be handled, Bellin said, but once your information flow is outside your walls, your control breaks down. “So does your security,” he added.

So how big are these risks, even inside the firewall? That’s hard to know, Bellin explained, since only 2% of incidents are reported, as companies try to protect their reputations. “But of those we are aware of, 49% of intrusions are though the corporate WAN and business network,” he said

Bellin stressed that companies should think in terms of “defense in depth.” That’s looking at all the areas in the organization and designing the architecture right behind that. “If you look at the physical architecture, and if you have routing and switching down on the factory floor, do you have lockouts in there? Securitizing computers is pretty easy. You can virus protect them or put a firewall between them and sensitive areas.”

Other devices pose other problems, but have to be looked at carefully. “But if you bring all those defenses together, if one area is breached, the others can be there to back them up, and stop [an intrusion] from spreading across the environment.”

AUTOMOTIVE GLOBALIZATION PUSHES STANDARDIZATION

Ford, American Axle Among Companies Reaping Benefits of Global Automation Approach

By Aaron Hand

Since the beginning of automated assembly, the automotive industry has been at the forefront of automation innovation and has led industrial manufacturing into several emerging technologies, including on-machine and mobile technologies, safety and the deployment of EtherNet/IP communication networks, noted Mark Joppru, global director of the automotive and tire business for Rockwell Automation, as he kicked off the Automotive Industry Forum this afternoon at the Automation Fair in Philadelphia.

The automotive industry has been operating on an increasingly global level, and where the car manufacturers go, so must their suppliers. “We don’t call them suppliers anymore; they’re partners,” said Peter Daenen, chief program engineer for body construction engineering for Ford South America, who discussed Ford’s globalization efforts during the forum. “It’s critical that as we go global, they go global with us.”

American Axle & Manufacturing (AAM) is a tier-one powertrain supplier that has had to make that move and now has 35 facilities worldwide. “We have gone global to follow the brands around the globe,” said Jeff Smith, technology lead at AAM in Detroit.



“I can walk into any place in American Axle globally, and I know how to use the HMI. I know how to program it; I know how it works and how to fix it.” Jeff Smith of American Axle Manufacturing on his company’s standardized approach to automation and controls.

Smith described his company’s move from Interbus to EtherNet/IP in late 2006, which was prompted by increasingly global manufacturing capacity and the need to shake up its controls architecture. It was August, and the company was launching a new assembly system in January. Smith and his team were tasked with deploying a completely revamped controls architecture in just a few months.

The “Other Guys” Win

“I thought we would stay with the current architecture, given the timing. But I had to go through the process. I had to do my due diligence,” Smith recalled. “And I’ll be darned if the other guys didn’t win.” The “other guys” were Rockwell Automation and its Logix5000 control system, instead of the mishmash of devices AAM had been using.

AAM made the switch to Rockwell Automation controls and EtherNet/IP. The plan was to launch with one small system with five 1756-L61 processors. “We were going to test EtherNet/IP on that one little line,” Smith said. Instead, they were asked to launch with four systems, three of which were significantly larger in scope and function. “One had 28 stations with 800+ EtherNet/IP edge devices from a wide range of vendors. And of course that one had to launch first.”

Nonetheless, all four assembly systems launched over a four-month period flawlessly, and with only a single controls engineer needed on-site in Silao, Mexico. Though people often present it as such, EtherNet/IP is not a 10-ton elephant, Smith insisted. “It is a controls fieldbus, period. It is not complicated. If you have DeviceNet, and you want to go to EtherNet/IP, it’s that easy. It is an enabling fieldbus technology.”

“When the next vehicle comes along, we can run it through with a minimum amount of investment and rework.”

Today AAM has in place DLR, CIP Motion, PowerFLEX 755 with and without CIP Motion, RSLogix 5000 and 1756-L61 processors, and has “never looked back,” Smith said.

Production has standardized globally on controls, HMI and more. “We provide our suppliers logic references, HMI references,” Smith said. “I can walk into any place in American Axle globally, and I know how to use the HMI. I know how to program it; I know how it works and how to fix it.”

Along with globalization, economies of scale are forcing standardization across car models, Joppru noted. “And it affects automation,” he added. “They want standards and standard plants.”

“One Ford” Includes Global Automation Strategy

Ford’s system of standardization around the globe is called One Ford, and it applies across 70 existing plants, as well as nine new plants planned for Asia-Pacific. “Ford’s been on a journey of transforming itself into a One Ford global company,” Daenen said. “That globalization approach applies to all functions, including manufacturing.”

Manufacturing is focused on a common set of standards in the Ford Production System (FPS) to build a less standard set of automo-

biles. It’s not a one-size-fits-all approach for its customers, Daenen said, but rather standardizing on parts and techniques to provide more choices, with all vehicle models available with a variety of powertrains. “It’s the face of changing market demands,” he said. “We have to become more global. While flexibility is key to our ability to deliver products to market faster, in the same process, we need to drive down our investment.”

To implement flexibility in major areas of production—the body shop, paint shop and final assembly, as well as some opportunities in powertrain operations—Ford is concentrating on three main pillars: global bill of process and global bill of design, which limit the design and content of a vehicle; and a modularity strategy. “We combine these three, and we are able to get to global product flexibility,” Daenen said.

Ford’s goal has been to move away from relatively non-flexible lines with asset-intensive tooling systems that can run three models. “We were looking for a much higher level of flexibility,” Daenen said. Ford found it with a new line capable of running six or seven models using lighter-duty, more flexible tooling systems.

“Last year about 55% of the body shops were flexible,” Daenen detailed. “Our plan is to crank that up to 65% by end of this year. As we launch new plants, mainly in Asia-Pacific, we’re supplying flexible body shops.”

Ford defines flexibility as 80% of the body tuning not being vehicle-specific, Daenen said. “When the next vehicle comes along, we can run it through with a minimum amount of investment and rework.”

Ford is also expanding its use of virtual tools to assess the way it builds vehicles, Daenen said. “By studying the best way to install a seat into a vehicle, you can obviously assess beforehand the potential ergonomic risks or accidents without being on the line, and still deliver quality.”

Since implementing virtual tools, Ford has been able to reduce build issues by about 90%, Daenen said. “Investment efficiency is absolutely key, and virtual tools have helped.” By leveraging supplier partnerships, globalization and the application of lean, flexible engineering principles, Ford has been able to reduce its investment for new vehicles by about 20%, and by about 50% for new vehicle derivatives.

MARINE FORUM TAKES CONTROL TO SEA

Shipboard Power Systems Benefit from Rockwell Automation Technology

By Jim Montague

Just like the famous Navy SEALs, good control and automation solutions don't care if they're on land or water. This is lucky because more traditionally plant-based process control software and hardware is going out to sea on ships, support vessels and oil platforms.

"Our control solutions are being used to support everything from drive systems on diesel-electric ships to emissions monitoring for environmental compliance to on-ship heating and ventilations systems," said Joe Motta, marine industry manager at Rockwell Automation, who moderated the Marine Industry Forum today at Automation Fair 2012 in Philadelphia.

Holistic Approach to Power Needed

For instance, Willie Wagen, director of concept development and innovation in the ship power division at Wartsila Corp. (www.wartsila.com), reported that the power plants on ships typically transmit only 34% of the total fuel energy they consume to the actual propellers, and advanced energy management principles, variable-speed drives (VSDs) and hybrid electric and mechanical systems can help.

"A holistic approach is the key to reducing transmission losses in shipboard electric power plants. A modern electric plant on board a ship is the enabler of greater efficiency through the

drive train," said Wagen. "Based on the operating profile of a vessel, power plant configurations tightly coupled with integrated ship systems can offer huge reductions in the total losses from the plant. For example,

enabling the prime mover to run with a lower RPM or with a higher utilization by using VSDs, optimum efficiency can be achieved in different operational modes. The electric plant can also enable the integration of renewable energy sources, such as wind, solar and heat recovery, as well as other future technologies such as fuel cells and energy storage systems." He added that Wartsila's WIAS econometer software and interface can display and help optimize many of these variables.



"Users end up with cost-effective monitoring, regulatory compliance, and highly accurate, reliable emission reporting." Rockwell Automation's Joseph Miller on the growing number of CEMS installations moving from onshore power plants to marine applications.

CEMS and Transformerless Drives

On the emissions-monitoring front, Joe Miller, global technical consultant for Rockwell Automation's environmental division, reported that, "Ship owners and operators will soon be required to meet the strict emissions reduction and monitoring requirements of the International Marine Organization (IMO) and the new rules detailed in MARPOL 73/78 Annex VI global regulations. These requirements include nitrogen oxide (NOx) reduction on ships constructed as far back as January 1990.

Accuracy and verifiable emissions reporting, as well as reporting system uptime, are keys to avoiding fines when docking assets in foreign ports. As regulations become more stringent, processes that were once exempt now find themselves required to account for their impact on the environment. Finding the right solution is paramount.”

Fortunately, software-based continuous emission monitoring systems (CEMS) are also going out to sea, and they require no more space than a server, while being easy to install and highly accurate. As an alternative to costly hardware-based systems, Rockwell Automation’s Software CEMS uses the Pavilion8 Model Analytic Engine to calculate NOx, CO, greenhouse gas and other emissions.

“Software CEMS continuously monitor emissions by means of an online model using historical and real-time source data,” explained Miller. “With software-based CEMS, users end up with cost-effective monitoring, regulatory compliance and highly accurate, reliable emissions reporting.”

Electric Propulsion Boosts Performance

In addition, Richard Piekarz, senior marine industry solutions manager for medium- voltage (MV) drives at Rockwell Automation, explained that, “Propulsion systems must meet the rising performance and environmental demands of ship builders, operators and designers. To meet those demands, many owner/operators are selecting electric systems over traditional diesel-mechanical systems. Proper electric system selection requires an understanding of the benefits of electric systems over diesel-mechanical systems, the advantages of MV drives over low-voltage (LV) drives, and how transformerless MV drives differ from standard MV drives.”

Piekarz added that, compared to diesel-mechanical propulsion systems, electric systems enable increased vessel speed, better maneuvering, reduced noise and vibration, improved ship layout and flexibility, lower fuel consumption, less air pollution, higher efficiency and reduced maintenance. “The enabling technology in these highly efficient electric propulsion systems is the variable-speed MV drives, which are typically 3300 V to 6900 V,” he said. “Reducing the current and allowing more cost-effective and compact electrical

components reduces short-circuit bracing requirements for electrical equipment and lowers installation cost and complexity.”

Rockwell Automaton offers a variety of MV generator circuit breakers; AC motors for propulsion and auxiliary services; drive isolation and power transformers; VSDs and other components that can be used on ships and other vessels.

Enabling Ship-Wide Control

For example, Troels Severinsen, managing director at Logimatic Engineering (www.logimatic.com/) in Denmark, reported that his firm has developed a new and innovative Integrated Platform Management System (IPMS) for the five biggest vessels in the Danish Navy. “Their control system requirements have been achieved with COTS equipment, mainly from Rockwell Automation,” said Severinsen.

“Systems integrated under the IPMS umbrella include: propulsion control system (PCS); power management system (PMS); ship systems including fuel supply, cooling systems, hydraulics, sanitary sys-

“A holistic approach is the key to reducing transmission losses in shipboard electric power

tems, etc.; damage management system (DMS); fire detection and control system; conning displays; alarm system, including extension alarms for unmanned machinery; loading computer for ship stability; navigation equipment interface, including gyro, speed log, autopilot, echo sounder; GPS; meteorological instruments; and warfare systems interface.”

To control all these systems, Severinsen added that Logimatic used Rockwell Automation’s FactoryTalk platform, ControlLogix PLCs and software, I/O-modules, and PanelView displays, as well as standard, marine-approved PCs.

GET WHAT YOU WANT IN LOW-BID PROJECTS

Don't Let Low-bid Suppliers Make Decisions They Shouldn't

By Walt Boyes

“In 1972, the Clean Water Act mandated that the bidding process provide maximum free and open competition,” said Gerald Robinson, senior project manager from Hatch Mott MacDonald (www.hatchmott.com/), a large water and wastewater consulting engineering firm, “yet the General Accounting Office and a study by the University of Illinois both clearly show that the ‘or equal’ clause in bidding documents is the most significant contributor to water and wastewater project failure and designs that don’t work.”

It really doesn’t matter what the wording is, Robinson opined. “It could say Manufacturer A or equal. It could say Manufacturer A, B, C or equal. In each case, the owner and the engineer are allowing the supplier to make the engineering decisions that they should not be making.”

Robinson pointed out that the bidding process is hectic, and the contractor fields phone calls and emails with varying scope letters and prices and every one of them says, “as equal to the specified.” The contractor doesn’t have time to read through every single document the suppliers send him, and he tends to go with the lowest bidder, because if he doesn’t, he’s likely to lose the job.

Then it becomes a face-off in the approval stage, Robinson pointed out.

Include Controls with Equipment Packages

“There are three ways to make this problem less difficult to deal with,” he said. “You can sole source. You can use the ‘base bid with deductive alternate’ technique, or you can use the evaluated, pre-selection method.”

Robinson pointed out that the civil/sanitary and process engineers have figured out how to get the products and services they want by using variants on these approaches. “So why should the electrical and controls part of the project be different?”

“Civil engineers specify packages all the time. It is ridiculous to try to put together a clarifier if all the different subsystems come from different vendors,” Robinson said. We could produce potential equipment packages like emergency power systems, with emergency generators, fuel systems, automatic transfer switches and paralleling switch-

gear. We could add the motor controls package too. That would put MCCs in the package, along with PLC-based control panels, the control system networks and maybe even the field instruments. We could even consider including the integration as part of the package. The advantage of doing these things is that the owner gets to be in charge of selecting the major equipment for the project, and the project’s likelihood of successful completion goes up,” Robinson said. “And you can sole source, if you are willing to. The Supreme Court has said that if an engineer states that in his opinion there are valid reasons to sole source, you CAN do it.”

Justify Sole-Sourcing

In the project Robinson just completed for Emerald Coast Utility Authority, which moved its Hurricane-Ivan-devastated Water Reclamation Plant 15 miles north to a more protected location, Robinson said that he selected Rockwell Automation as the controls supplier and simply told other vendors that they would have to use Allen-Bradley controls regardless of whose control systems they typically use, “or we just wouldn’t use them on this project. There were no vendors who did not comply. We justified sole sourcing Allen-Bradley by pointing out the increased safety, lower lifecycle costs and operation and maintenance factors.

“I suggest you look at this as a paradigm shift,” Robinson said. “Are you in control? Are you willing to put in the contract wording insisting on what you want?”

“You can get what you want, at a fair price, in a low-bid environment, as long as you control the process,” he closed.



“Are you willing to put in the contract wording insisting on what you want?” Gerald Robinson of Hatch Mott MacDonald challenged attendees of the Water & Wastewater Industry Forum to not relinquish control of the bidding process.