


Powering Big Ideas Together

Highlights of
**Schneider Electric Global
Automation Conference**

Schneider
 Electric™

A Special Report from the the Editors of

C O N T R O L

FOXBORO

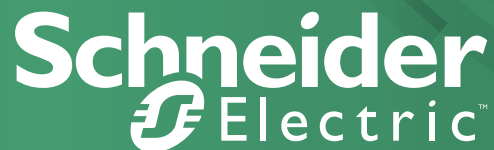
TRICONEX

MODICON

MORE THAN 500 process automation professionals gathered in Dallas April 27 to May 1 for the 2015 Schneider Electric Global Automation Conference. Under the banner Powering Big Ideas Together, Schneider Electric laid out critical insights, predictions and solutions that called for a more user-focused design in technology, safer and more secure systems, and an overall trend toward situational awareness to usher in an age of safer, more efficient and more profitable processes.

During the event, Schneider Electric announced new products, such as the Tricon CX safety system, new initiatives, such as the FLEX project execution methodology, and new business developments, such as the company's acquisition of LimeWare.

This Conference Report is a collection of the best content delivered at the event, as covered by the Editors of Control.



A Special Report from the the Editors of

CONTROL

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HOW CONTROL ENGINEERS CAN CHANGE THE WORLD

Technology should be a conduit to solutions, not a barrier to problem solving. Dr. Peter Martin shows how real-time-control can lead to benefits for all of humanity—really!

BASE OIL TO DRIVE NEW GLOBAL ENERGY MARKET DYNAMICS

Al Rivero, Schneider Electric’s lead for unconventional oil & gas, predicts that prices will continue to rise after the recent drop, bringing more unconventional production facilities online. In the meantime, he suggests optimization to ensure you are as profitable as possible when prices are right for production.

THE END OF SYSTEM INTEGRATION

Engineers waste too much time on mundane tasks—trying to make devices work. Instead, the devices themselves should tell the engineer how they work, how to represent them on screen and to maintenance and operations—focusing the engineer on using what is on the wire.

PHYSICAL SAFETY, CYBER SECURITY CAN’T BE SEPARATED

The processes for establishing safety and cyber security should be connected at a sub-atomic level. A security issue is often a safety issue, whether accidental or malicious. Strong procedures and experts leaving their silos and sharing a vocabulary can increase the integrity of both safety and security.

SHUTTING DOWN THE ENEMIES OF SAFETY AND SECURITY

Time, lack of visibility and complacency are the enemies of process safety in the constantly evolving realm of cyber security—constant vigilance is required to address constantly changing threats.

TRICONEX

SCHNEIDER ELECTRIC DEBUTS TRICON CX

Meet the Tricon CX: the first TUV-certified safety and security solution. It’s completely compatible with existing Tricon controllers—only smaller, stronger and more efficient. And that’s just the beginning of what it offers.

CLOSING THE LOOP ON PROCESS SAFETY

Abandoning post-event and failure-related indicators and moving toward leading indicators will improve plant safety. Continual evaluation of documentation and procedures—among other things—are the beginning of a “closed loop” safety system.

FOXBORO

LIMEWARE ACQUISITION TO EASE FOXBORO SYSTEM TASKS

Bringing the automated documentation, system analysis and change management of foxray to the majority of users, Schneider Electric plans to reduce non-value-added chores required of users.

THE ROAD AHEAD FOR FOXBORO EVO

Foxboro Evo, now integrated with many synergistic offerings, improves efficiency, minimizes obsolescence and increases insight across roles.

SITUATIONAL AWARENESS SMOOTHES OPERATIONS

Operators should be focused on value-add tasks, not putting out fires. Situational awareness helps achieve that. Grant Le Seuer provides 6 warning signs and 7 essential components for situational awareness excellence.

MODERN HMI PUTS “HUMAN” FRONT AND CENTER

An ongoing focus on technology and data, rather than people and information—data in context—is hurting operators instead of helping. By focusing on the “human” in HMI, information can be presented in its most usable form.

PREDICTIVE MAINTENANCE AIMED AT REDUCING PROCESS DOWNTIME

Unplanned downtime is a thief with its hand in the pocket of productivity. Superior predictive maintenance, embracing smart analytics and real-time data, can save an operation millions in lost profits—and an engineer’s valuable time as well.

MODICON

MODICON EPAC LAYS FOUNDATION FOR IOT

One day the Internet of Things will sweep away today’s proprietary networks—but that “one day” became closer than ever with the release of the Modicon M580 ePAC.

PROJECT DELIVERY

FLEX METHODOLOGY TO KEEP AUTOMATION OFF CRITICAL PROJECT PATH

By applying Flexible, Lean Execution (FLEX) to projects, Schneider Electric strives to streamline the execution of major products. Intelligent Marshaling, virtualization and cloud engineering all play a role in speeding delivery.

TELEMETRY AND REMOTE SCADA

WIRELESS SENSOR NETWORKS SEE RAPID GROWTH

This once-shunned technology has become the standard in multiple applications, thanks to easy installation, configuration and maintenance.

OVERCOMING OIL AND GAS MEASUREMENT CHALLENGES

Small errors in measuring large quantities of produced fluids can reduce profits significantly, so a properly calibrated flow measurement system is critical to pipelines.

SCHNEIDER ELECTRIC TO DRIVE VALUE IN ERA OF 'BIG IDEAS'

Bolstered by its stronger control and safety portfolio, Schneider Electric takes aim at critical customer issues

By Keith Larson

Industry today is clearly at an inflection point. The pressure to improve efficiency, safety and reliability continues to mount, even as many of industry's most experienced practitioners retire. Automation and other information technologies can be part of the solution, but they need to deliver value while simultaneously reducing complexity, boosting the effectiveness of those engineering and operations professionals charged with supporting these important and ongoing tasks.

Indeed, the time is ripe for 'Big Ideas' that will deliver unprecedented value for the hybrid and process industries, said Gary Freburger, president, process automation, for Schneider Electric in his opening remarks to the company's 2015 Global Automation Conference.

NEW OPPORTUNITIES

"Global technology developments represented by the Internet of Things, Big Data and Industry 4.0 have opened new opportunities for vendors and customers alike to look at the industrial landscape through a different lens and to drive more value in the face of unprecedented challenges," Freburger said.

"Schneider Electric, bolstered by stronger control and safety offerings, is uniquely positioned to power the Big Ideas our customers need to solve their most critical issues. Not only do they need to leverage and get more from existing assets, they need a partner who can help them increase productivity, reliability, security and agility with future-proof solutions that reduce risk and lower costs."

"Schneider Electric, bolstered by stronger control and safety offerings, is uniquely positioned to power the Big Ideas our customers need to solve their most critical issues."

Schneider Electric has accelerated its technology development plans, for example, quadrupling its Triconex safety system investments over the past four years, Freburger said. "Innovation continues to be our priority. We have the people, technology and resources in place. We continue to invest and be committed to our process automation offerings—Modicon, Foxboro, Triconex—as the core of our industrial solutions business."



Gary Freburger kicks off the opening session keynote at this week's 2015 Schneider Electrical Global Automation Conference.

DEEP PORTFOLIO

Adding the former Invensys brands to Schneider Electric rounds out an especially broad and deep portfolio that reaches across the industrial automation landscape, from highly discrete manufacturing facilities to continuous processing plants to highly distributed SCADA applications common to water/wastewater, mining and oil & gas sectors. Freburger also sees the opportunity to deliver increasingly integrated solutions that bridge the company's

automation, electrical and information technology offerings.

While many think of Schneider Electric as a leader in the energy management space, the company is now number two globally in discrete automation and number four in process automation, Freburger said. "We see a significant amount of leverage in the full portfolio we can bring to bear on behalf of our customers, and we are uniquely positioned to provide a measurable return on investment."

HOW CONTROL ENGINEERS CAN CHANGE THE WORLD

How automation empowers engineers to solve even mankind's biggest challenges

By Steve Diogo

Drawing a direct line between the day-to-day work of control engineers and the capacity to solve the world's biggest problems, Peter Martin, vice president, business value consulting, Schneider Electric, laid out a mission for industry to transcend technology fixations in favor of solutions, and to solve the real problems in their plants by providing tools that empower operations to make real-time decisions using real-time data.

"All of the biggest problems in the world today are problems of control," Martin told the audience at Schneider Electric's 2015 Global Automation Conference.

"And when we can properly define the problem, then we can begin to design the solution. Security is a real-time-control problem; safety is a real-time-control problem; environmental risk is a real-time-control problem."

Martin said technology needs to be a conduit, not a barrier, to solving these problems, and seeing the difference can depend on which lens we choose to view it through. He pointed to several developments in the past few decades, which, because of their focus on technology instead of solving real problems, became "solutions in search of a problem." Among them he listed expert

"All of the biggest problems in the world today are problems of control."

systems, CIM, lights-out manufacturing: movements that Martin said were as ill-conceived as they were well-intentioned.

He warned that today's most promising developments—IoT, Big Data—have the same potential to become technology fetishes instead of solutions to real problems, and he urged everyone in the business and operation of industry to view them through the lens of



"Let's solve world hunger." Peter Martin, VP Business Value Consultant, Schneider Electric, called on the audience at the company's 2015 Global Automation Conference to accept the challenge to solve the world's biggest problems.

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the problems they can help solve.

"We used to focus on automation as way to eliminate people from industry; now we see that automation can free people to do their best in and through industry."

SOLVE WORLD HUNGER

The first step to solving world hunger is to solve the problem of world energy, Martin said, explaining that once you solve the problem of access to affordable, reliable, safe power, then you have what you need to move on to the next problem, which is water.

"Half a million children per year die because they don't have access to clean drinking water," Martin said. "And yet we can build golf courses in the dessert. If we can build a green golf course in Dubai, we can build gardens in Africa."

And the way we get there, Martin said, is to see connection between what control engineers do every day and the larger value they can create.

"We can make plants run cleaner and better," he said. "Tuning leads to greater efficiency and reduced emissions. When you clean up a single loop, you make progress toward reaching these goals of solving the world's biggest problems. There is a straight line between cleaning up a loop and solving world hunger."

"When I was young, I had a tendency to bite off more than I could chew. My teachers and my parents always told me, 'don't try to solve world hunger.' Well, today I am challenging all of us to do just that: Let's solve world hunger."

BASE OIL TO DRIVE NEW GLOBAL ENERGY MARKET DYNAMICS

Led by U.S. shale oil capacity, new era of 'base oil' to replace 'peak oil' model

By Keith Larson

The price of oil has dropped by nearly half since early summer of last year. But Al Rivero, Schneider Electric's lead for unconventional oil & gas in North America, sees a moderate rebound in store. Indeed, abundant unconventional energy sources in the U.S. may have altered the global energy landscape, but the relatively high prices of tight resources will act to buffer prices in the \$60 to \$90 per barrel range for the next several years, Rivero predicts.



Now's also a good time to pursue optimization projects that drive efficiency and reduce energy consumption, Rivero added. "So when that wave of energy costs comes up, you're more profitable." Schneider Electric's Al Rivero over the coming months.

**"Indicators are pointing to further price increases to come."
Schneider Electric's Al Rivero is bullish on continued but moderate
increases in oil prices over the coming months.**

Rivero shared his views on the price of oil, how we got here and where we're likely to go next, in his introductory keynote to the oil & gas industry track this week at the Schneider Global Automation Conference in Dallas.

The current 57% percent slump in the price of oil in the 207 days since June 2014 is well in line with the past five "corrections" in the market, according to Rivero. The market essentially recalibrates itself every four to five years, with prices dropping relatively precipitously then slowly recovering. From 2008 to 2009, for example, the price dropped 77% over 169 days then took 472 days to recover half of that value.

"On average, it's 160 days to recover 50% of value," Rivero said. "It's a cyclical business, and this is not our first rodeo."

The price of West Texas Intermediate (WTI), an important bellwether for the North America energy market, was \$48/bbl on January 22nd, and it's \$57/bbl now. "Indicators are pointing to further price increases to come," Rivero said.

IT'S ALL ABOUT THE BASE

More fundamentally, Rivero sees increased production capability from unconventional sources in the U.S. as setting a new global baseline for output that will cycle on and off based on market demand. This base-oil theory should replace past peak-oil models for understanding market dynamics, Rivero said. "Today there is a base level of U.S. production that can come online within

months of a sustained price signal of \$80/bbl," Rivero explained. "This base production will not disappear at lower prices, but will be put on hold; it will act as a cap, regulating the price."

In the near term, Rivero sees two potential scenarios for the price of oil. In the face of global economic growth (and energy consumption), resilient production will keep volumes growing for the next two years, at which point demand will respond to low prices and the price of WTI will reach \$80/bbl in 2017 and \$91/bbl in 2020. If, on the other hand, the global economy begins to contract, production volume will continue to grow through 2015, but begin to be throttled back in 2016, with the price of WTI reaching only \$65/bbl by 2020.

Rivero also picked some winners that today are benefitting from lower costs of oil as well as natural gas. "If you're in refining, you're in a very good place; crack spreads are very strong," Rivero said. Chemical companies, too, are benefitting from lower energy and feedstock costs. Now's also a good time to pursue optimization projects that drive efficiency and reduce energy consumption, Rivero added. "So when that wave of energy costs comes up, you're more profitable."

THE END OF SYSTEM INTEGRATION

Field device integration should be automated so engineers can spend their time adding value

By Paul Studebaker

Discussions about easing the job of connecting field devices shouldn't center on the fieldbus protocol. The focus should be on standardizing the way devices self-identify and the information they provide the control system for automatic integration.

"Traditionally, on any major project, 60% of the I/O is soft I/O - gateway-related I/O - on Modbus," said Grant Le Sueur, senior portfolio director, control and safety, Schneider Electric. "Despite its age, Modbus has failed to be superseded by anything superior. It's a reliable old friend that does what we ask it to do."

On current projects, "When we do our analysis of all the things on our gateways, it turns out that 97.5% of it is on Modbus," Le Sueur said. "Today, it's in an IP stack so it's faster and runs on a different kind of wire, but it's really the same. It's been there for 30 years, and we expect it to be around for another 30 years."

Profibus and Foundation fieldbus are more sophisticated, but that sophistication "makes the technician's job harder, not easier," Le Sueur said. "We want to make the technician's job easier. So the next evolution will not come by integrating a new protocol. Instead, we're organized around ways to use Modbus better."

But today, when engineers look at a

proposal and see a gateway with 500 soft I/O, the estimated engineering cost goes up. What does that I/O do? How will we represent it on the screen? Who designed the thing on the end of the wire?

"OPC UA doesn't help - it just transfers the same bunch of tags from a familiar protocol to one we don't know much about," Le Sueur said.

"Today, we integrate by browsing for tags with individual bits. Instead, we want the devices to describe themselves and present us with instructions on how to integrate them," Le Sueur said. A pump connected to a variable-speed drive, with I/O for control and diagnostics, should announce itself. It should say, 'Here are my inputs and outputs. Here's how to render me on the screen, how to represent me to maintenance and to operations. Use me.'"

Le Sueur said, "We want to get out of the business of engineering devices and protocols and into the business of using the stuff on the wire."

"We want the devices to describe themselves and present us with instructions on how to integrate them."



"We want to get out of the business of engineering devices and protocols, and into the business of using the stuff on the wire." Grant Le Sueur spoke about the future of integration at Schneider Electric's 2015 Global Automation Conference today in Dallas.

Today, Schneider Electric's closest capability is through PlantStruxure PES (process expert system) and industrial libraries. "You can browse a library of devices and push them to the PLC," Le Sueur said. "It has the I/O and a faceplate instead of ladder logic or function blocks. Instead of a weird, interposing representation of software functions, we have the thing on the end of the wire."

With Modicon and Unity Pro, devices also can be self-describing. "It's wicked cool," Le Sueur said. "It makes us into more powerful engineers."

Instead of assembling pumps, tanks, heat exchangers, valves and thermocouples, engineers can focus on how devices are used and on steering logic: the processes, procedures and activities that add value.

"For the vision of ISA 106 (procedural automation) to work, we must remove the mundane task of describing logic," Le Sueur said. EDDL is trying to do this, but how devices describe themselves

should be independent of protocol. "Then we can move on to a structured way of organizing steering logic - the purpose of ISA 106 - and control systems can really support it."

When you connect it up, a device should say, "I'm a flowmeter. Here's what I do and how to talk to me. Here's how to represent me to your operator. Here's what can go wrong and how to troubleshoot and repair me.

"Engineers' jobs are to make money for companies by doing valuable things, not to cookie-cutter data trying to get things to work," Le Sueur said. "In the future, there will be no integrating," Le Sueur said. "Devices are self-describing and self-integrating.

"And after that, why not be able to just scan in the P&ID and let a robot do the programming?"

PHYSICAL SAFETY, CYBERSECURITY CAN'T BE SEPARATED

Three questions to guide assurance of operational integrity in process automationoperational and productivity gains

By Steve Diogo

When it comes to ensuring operational integrity in process automation, safety and security cannot be treated as separate issues. In fact, the only way to assure integrity is to follow a single framework for both, and security standards, existing and in development, strongly mirror longstanding safety standards.

That's the message delivered during a discussion titled, "3 Steps to Ensure Operational Integrity," presented at the Schneider Electric's 2015 Global Automation Conference by Scott Mourier, global process automation SIS expertise area leader, Dow Chemical Company, and Andre Ristaino, managing director, Automation Standards

Compliance Institute of the International Society of Automation.

During the presentation, Steve Elliott, senior director, offer marketing for process automation, Schneider Electric, moderated a conversation between Mourier, representing the user-side safety perspective, and Ristaino, the standards-side security expert. Together, they provided a framework for assessing safety and security's impact by presenting three questions that all suppliers, integrators and asset owners must ask:

1. Do we know what could go wrong?
2. Do we know what our systems are to prevent this from happening?

3. Do we have the information to assure us these systems are working effectively?

While safety risks are well established through years of experience, the same cannot be said for cybersecurity, a young field in which even the most up-to-date awareness can provide only a view of the risks that existed yesterday.

"Tomorrow's risks will be different," said Mourier.

"It's unfortunate that [with safety] we learn through accidents and incidents; the standards have evolved to address these," said Mourier, who laid out the process his company follows. "The standard that we follow as a user company is IEC 61511, which lays out the safety lifecycle."

"This isn't about technology. It's about people and procedures. It's about having a shared vocabulary where the same words have the same meanings. We need to make the same commitment to security that we have made to safety."

In practice, it looks like this: "Start with a process design, and the design will drive the identification of the hazards," Mourier said. "Then you go through the consequence analysis. As you do that analysis, you define your specific areas of protection. You identify the risk, how the risk gets mitigated and as you go through these, you determine the level of integrity you require. As you do all these things, it ultimately drives your design."

"If you substituted the word 'security' for 'safety,' you'd pretty much be there," Ristaino

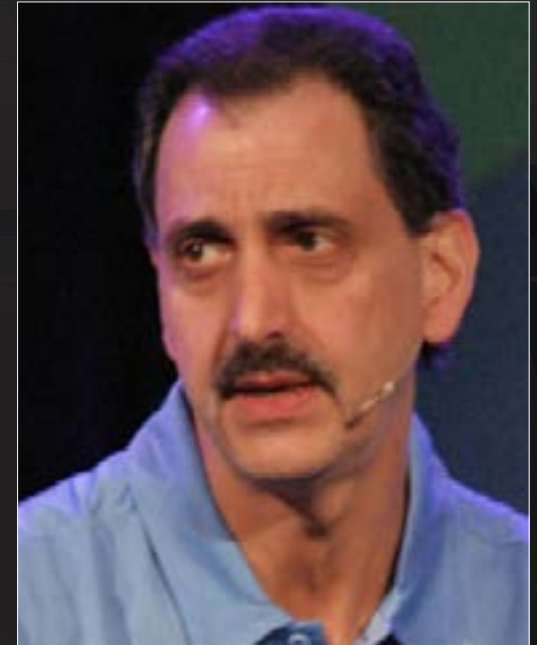
said of Mourier's explanation. "The security lifecycle is very similar to the safety lifecycle. The only thing that's missing for security is that we don't have 35 years of maturity in the security paradigm."

What we do have, Ristaino said, is ISA 62443. "That's the reference starting point for assessing what could go wrong. You can't do anything if you don't have a known starting point. So we start with this: Are the products secure?" These standards, Ristaino said, provide measurability that can be missing from suppliers' answers to that question. "'Really, really secure' isn't good enough," he said, pointing to the importance of TUV's safety and security certifications.

Working their way up the lifecycle from suppliers who design and manufacture the COTS control systems through the engineers who integrate them into site-specific systems, to the asset owners who operate and maintain them, Mourier and Ristaino showed how safety and security need to be aligned across technology, processes and people, and between business and operations.

"We need to move safety and security out of their silos, because often security issues are safety issues," Ristaino said, adding that security incidents that can lead to safety emergencies can as easily be accidental and internal as they can be malicious.

"This isn't about technology," Ristaino said. "It's about people and procedures. It's about having a shared vocabulary where the same words have the same meanings. We need to make the same commitment to security that we have made to safety."



"Tomorrow's risks will be different." Scott Mourier, global process automation SIS expertise area leader, Dow Chemical Company, speaking at Schneider Electric's 2015 Global Automation Conference in Dallas.

SHUTTING DOWN THE ENEMIES OF SAFETY AND SECURITY

Time, complacency and lack of visibility open process industries to ever increasing threats, say cyber security experts

By Steve Diogo

More than 300,000 new malware programs are released onto the Internet every day. There were 245 reported industrial control system (ICS) attacks in the United States in 2014 (emphasis on "reported"), according to the National Cybersecurity and Communications Integration Center; 79 of these involved the energy sector, and 65 targeted critical manufacturing. Every day, cybersecurity incidents create

"The best that we can ever hope for when it comes to cybersecurity threats is to be totally on top of what we knew yesterday. The threats are always changing."

consequences for industry including damages to profitability, productivity, company reputation and safety.

These were just a few of the bombshells dropped on 2015 Schneider Electric Global Automation Conference attendees by speakers Nasir Mundh, global director, safety services, and Joshua Carlson, systems cybersecurity manager, both of

Schneider Electric.

"But the problem with facts like this is that they are already out of date," said Carlson. "The best that we can ever hope for when it comes to cybersecurity threats is to be totally on top of what we knew yesterday. The threats are always changing."

The ever-changing nature of cybersecurity is what makes time, lack of visibility and complacency the enemies of process safety, according to Mundh and Carlson. The first enemy is time. "Things change; the risks are constantly evolving," said Carlson. "And yet we often believe that we can establish a cybersecurity system and let it run. We need to continually be identifying the risks, containing them and measuring the effectiveness of our systems."

Carlson said this vigilance needs to apply to the entire lifecycle, not just the two to three years required to ensure design integrity, but the full 20 years of the operational lifecycle. "It is a constant cycle of risk identification, vulnerability recognition, containment, control and assessment."



"We need to continually be identifying the risks, containing them and measuring the effectiveness of our systems." Joshua Carlson, systems cybersecurity manager, Schneider Electric, speaking at the company's 2015 Global Automation Conference in Dallas.

The second enemy is lack of visibility. Carlson said it's not enough to have the right systems; everyone needs to know what they are.

But the biggest enemy of security, Carlson said, is complacency.

"As we do nothing, the risk rises," said Mundh. And while the traditional risks of corrupted or stolen data, nuisance and financial loss are ever-present, the stakes in process industries are much, much higher. "Cyber threats are not just a nuisance anymore," Mundh said. "They can kill people."

CYBERSECURITY AS SAFETY RISK

This is the reason there is increasing pressure on industry to consider security a safety issue and to comply with standards that

adhere to the same rigor as safety standards. It is also a primary reason Schneider Electric views every product and service the company sell as including a cybersecurity component, Carlson said.

"It's a simple fact that you will not know where the next risk will come from—and you will not be prepared for it—unless you commit to considering security a safety issue and treating it with the same vigilance," said Carlson.

"When's the last time you tested your systems and procedures? Does everyone know what to do in case of an incident? These are the questions you need to be asking," Carlson said. "Always."

Schneider Electric's services include security assessments, workshops and remediation. The company offers cybersecurity news, lists of known vulnerabilities, white papers and more.

SCHNEIDER ELECTRIC DEBUTS TRICON CX

Safety system boasts security-certified technology and meets stringent demands for protection, risk reduction and asset availability in high-hazard industries.

By Paul Studebaker

The Tricon CX is designed for enhanced safety and critical control applications in the oil and gas, power, refining, chemicals, pharmaceutical and biotech industries, where safe operations are critical and reliable operation is paramount. A certified ISA Secure system, the high-integrity and highly available Tricon CX is designed to ensure operational integrity, protecting against inherent risk and hazards as well as external threats such as cyber attack.

“This year, we’re celebrating 1 billion hours running Tricon systems without a single failure on demand,” said Steve Elliott, senior director, offer marketing, Process Automation, Schneider Electric. “With Tricon CX, we’ve turned up the performance, advanced the capabilities and increased the value. We’ve reduced the response time, increased the run time, and allow modifications without halting the process.” And Tricon CX is completely compatible with existing Tricon controllers.

CERTIFIED SAFETY AND SECURITY

Tricon CX meets ISA Secure EDSA level

1 requirements. “Tricon CX is the first system TUV-certified for functional safety and security,” said Mike Chmielewski, vice president, process systems offer management, Schneider Electric process automation business. “You can’t separate the two anymore - each is a threat to the plant. So we’re first in the new TUV program.”

The new controller is 50% smaller, 67% lighter, faster and more powerful than the existing Tricon. Along with a 300% increase in controller tag capacity and five times faster peer-to-peer performance, advanced functionality enables online upgrades without operational interruption, and it supports advanced monitoring and control capabilities, including:

- Supervised DI/DO with advanced line-performance diagnostics
- Fast analog inputs with integrated HART
- 1 ms SOE digital input
- Choice of direct termination or external termination panel

The Tricon CX uses the same logic as Tricon. “There are no changes to the



“It’s all built in ... the goodness of Tricon in a compact form factor ... It’s the same peer-to-peer network ... And it’s future-proof: a 30-year-old Tricon is as good today as the day it was built, and Tricon CX will still be good 30 years from now.” Steve Elliott, senior director, offer marketing, Process Automation, Schneider Electric.

“With Tricon CX, we’ve turned up the performance, advanced the capabilities and increased the value. We’ve reduced the response time, increased the run time, and allow modifications without halting the process.”

safety circuitry. We use the same circuits as Tricon, but now in ASICS – just miniaturized and with improved communications,” said Chris Lyden, senior vice president, strategy and offer, Schneider Electric.

“It’s all built in – all the goodness of Tricon in a compact form factor,” said Elliott. “You can mix and match it with Tricon. It’s the same peer-to-peer network, the same engineering tools. And it’s future-proof: a 30-year-old Tricon is as good today as the day it was built, and Tricon CX will still be good 30 years from now.”

CLOSES THE LOOP ON SAFETY

With Safety View software, “Priority 1 alarm management ability is enhanced so you can prioritize and present the alarms operators need without flooding them,” said Elliott.

Automated testing cuts the time and takes out the human error. With SIF Manager software, “You can monitor safety functions. It tells you whether they will operate where and when they’re needed. If not, it tells you what you have to do about it. You can monitor the integrity of the safety barriers you rely on every day to protect your operators, your operations and your plant.”

Chmielewski added, “You can bring operations and maintenance into the loop, so they understand what could go wrong, what systems are doing to prevent it, and the information they need to assure us that the systems are working effectively. It’s making

safety into a closed loop, not just protecting the plant with an emergency shutdown (ESD) system.”

Closing the loop empowers operations. “Now you can make balanced decisions,” said Elliott. “Whether it’s deciding whether it’s safe to take a pressure relief valve out of service to add a bypass, or assigning the right priorities to alarms to be sure the critical ones won’t be lost in a crowd, you can make decisions about what and when to do something that takes into account the operational risk.”

COMPLETELY COMPATIBLE WITH EXISTING SYSTEMS

The compact size, higher power and better value are important in existing applications where additional safety functions are needed. “If you want to add capabilities, say, as part of an upgrade or revalidation, you can fit more functionality into an existing space,” said Elliott.

“In migrations, Tricon CX runs Tricon and the I/O is compatible,” said Chris Stogner, brand director, Triconex Safety, Schneider Electric. “From Tricon v4, the code will auto-convert.”

Safety and security have always been a top concern for industrial facilities, and now new threats, such as cyber-attack, have challenged the traditional approaches they have taken to protect and secure their people, property, communities and

the environment. “Our clients demand the highest levels of safety and security to keep them safe and ensure the systems they rely on are immune to external threats,” said Chmilewski. “Our high-performance, future-proof Tricon CX safety system does just that. With more performance and capability, it can help clients maximize productivity, reliability and security while minimizing risks and the likelihood of business interruption. It’s another example of why Schneider Electric is uniquely positioned to power the big ideas our clients need to solve their most critical issues.”

SCHNEIDER ELECTRIC OFFERS DEFENSE IN DEPTH

Through its Triconex brand, Schneider Electric offers industry-leading safety and critical control solutions for managing risks in hazardous environments. Triconex solutions enable safer operations by maximizing compliance to mandated safety regulations and minimizing both unscheduled downtime and the likelihood of business interruptions. The systems improve operational efficiency, helping clients achieve gains in production availability, asset uptime and ROI. Based on industry-leading Triple Modular Redundancy technology,

Triconex solutions are also easy to operate and maintain, and they provide a higher total value of ownership over competitive offers.

“Throughout changes in ownership, we have continued development,” Chmilewski said. “Schneider Electric just asked us to make the best system, and increased the investment in R&D. We have a great plan going forward.”

In addition to leading technology and solution sets, Schneider Electric’s process safety offer includes more than 650 safety engineers who provide a suite of services that help clients better manage their operations. These services include:

- Safety Instrumented Functions Management services
- Process safety consulting services
- Functional safety learning services

Process safety consultants also provide technology paths to help future-proof Triconex technology investments and ensure systems adhere to the latest safety standards.

CLOSING THE LOOP ON PROCESS SAFETY

Process safety metrics based on leading indicators can help head off incident and injury

By Keith Larson

Industry puts substantial effort into ensuring that plants are designed and built to run safely. By their very nature, however, the safety instrumented systems (SIS) that often carry a lion’s share of the plant’s risk reduction measures are seldom called into action. How then can operating companies be sure that operations continue to be as safe as they were 20 years ago when the plant was built?

Indeed, the passage of time and poor visibility can conspire to erode the ability of a plant’s established safety instrumented functions (SIFs) to provide adequate risk reduction, according to

“Leading indicators determine how likely things are to go wrong, and consequently, how likely they are to have an incident or injury in the future.”

Nasir Mundh, global director, safety services, Schneider Electric. Mundh, together with colleague Farshad Hendi, safety services practice leader, discussed how Schneider Electric is helping its customers to better understand and track the leading indicators that point to increased risk—before an incident or injury occurs.

Unlike lagging indicators such as are revealed in post-event data collection or a running tally of incidents and injuries, leading indicators work like a yellow traffic light between green (safe) and red (unsafe) states. “Leading indicators determine how likely things are to go wrong, and consequently, how likely they are to have an incident or injury in the future,” Mundh said.

Leading indicators of increased risk typically can be found in three areas: functional safety documentation, operational data and maintenance data.

“Often it’s the quality of the functional safety documentation that may indicate increased risk,” Hendi said. For example, mismatch between documented operational and maintenance procedures and what the operators and maintenance techs actually do is one red flag of

increased risk. Other documentation to check for accuracy and currency include hazard and risk analyses, safety requirements specifications, functional design specifications, SIL verifications and change records.

While such measures are primarily qualitative checks that rely on people and work processes, technology also can help to identify and provide visibility of leading indicators in the midst of operational and maintenance data. Schneider Electric’s SIF Manager software, for example, can be used to gather and plot metrics related to SIF performance, such as trip frequency and time in bypass. These metrics, in turn, are compared against design expectations to pinpoint any troubling drift.

These types of process safety metrics are but the first step in a “closed loop” approach to process safety that Schneider Electric has begun to promulgate across its process automation and safety offering to ensure that design integrity translates into ongoing operational integrity. “It requires a continuous cycle of measurement, comparison, validation and correction,” Mundh said, “all while providing visibility to safety leadership.”



Schneider Electric’s Nasir Mundh discussed the need for industry shift its focus from lagging to leading indicators of process safety performance.

LIMEWARE ACQUISITION TO EASE FOXBORO SYSTEM TASKS

Schneider Electric brings foxray developer in-house, sees opportunity for broader use by installed base

By Keith Larson

According to Grant Le Seuer, the decision by Schneider Electric to acquire LimeWare, the Brazilian developer of foxray software, was in many ways an easy one. As director of product management for Schneider Electric's Foxboro control system software, Le Seuer sees his job as enabling customers to do their jobs more effectively and efficiently, and to spend less time doing non-value-added tasks. LimeWare's foxray

"5% of current Foxboro system customers use foxray... 'By acquiring them, we can bring the value LimeWare has created to the other 95% of Foxboro system users who can benefit from it...'"

software does just that, providing automated documentation, system analysis and change management for Schneider Electric's Foxboro control systems.

"LimeWare doesn't have a user base, it has a fan base," Le Seuer said of the many Foxboro customers who find foxray an essential everyday tool. But only 5% of current Foxboro system customers use foxray as well. "By acquiring them, we can bring the value

LimeWare has created to the other 95% of Foxboro system users who can benefit from it," Le Seuer said.

"Foxray software is the go-to tool for working with our control system database on a daily basis," said Scott McWaters, process control engineer, Hunt Refining Company. "From easily locating and reserving spare I/O to improved troubleshooting and insight with the 'where used' function, system health reporting, operator action reports, alarm history, inhibited alarm tracking and many other functions, foxray has greatly increased our efficiency. The software has been instrumental in our recent alarm rationalization efforts, and the alarm shelving tool will be used to help cut down on the number of call outs to our on-call engineers for nuisance alarm silencing. This contributes to our overall confidence in the integrity of our operation."

LimeWare was founded in 2006 and is headquartered in Porto Alegre, Brazil. Its foxray system management software sits atop Foxboro Evo process automation and I/A Series distributed control systems, automatically interrogating and reverse-documenting them. It also offers capabilities for configuration



"LimeWare doesn't have a user base, it has a fan base." Schneider Electric's Grant LeSeuer on the company's recently completed acquisition of the Brazilian software developer.

management, alarm management and operator action analysis.

Features include:

- Change tracking with a complete change management workflow process;
- Graphics visualization of the control block loops;
- Integrity checks to solve configuration issues;
- Scheduled reports;
- Alarms and operator action management and tracking;
- I/O and FBM (fieldbus module) spare reserve and tracking;
- An advance query engine that can quickly fetch any DCS information.

LimeWare and its offerings will be fully integrated into Schneider Electric's process automation business and will continue to be managed by its existing executive team. The foxray product name, however, will give way to System Auditor in the months to come.

“Acquiring LimeWare and its foxray software is an integral part of our strategy to help our customers improve their operational integrity and operational insight, while future-proofing their operations,” said Gary Freburger, president of Schneider Electric's process automation business. “With additional investment in our flagship process automation offerings, we have even more power to address critical challenges around safety, reliability and efficiency. The ability to more easily tackle pain points while driving value across the entire process automation chain, is one of the big ideas we are discussing with our customers in Dallas this week, and it remains a major differentiator for our process automation business.”

THE ROAD AHEAD FOR FOXBORO Evo

Schneider Electric reveals plans to improve and integrate Foxboro Evo, Modicon, PlantStruxure and more

By Paul Studebaker

In many places and many ways over the course of Schneider Electric's 2015 Global Automation Conference, the company revealed its near- and long-term plans to develop and integrate its product lines. From the process control point of view, the plans center on the role of the Foxboro Evo process automation system.

Introduced 18 months ago in September, 2013, “Foxboro Evo today is in more than 200 sites in more than 60 countries, in all aspects of major industries,” said Grant Le Sueur, senior portfolio director, control and safety, Schneider Electric, to a packed session on the Foxboro Evo roadmap and vision. “Our beta testing is done with real data in real sites—we test it with you and exercise the new features in the real world before we release it.”

The Foxboro Evo user audience has expanded into other disciplines. “To protect security and safety, we've enhanced the Tricon safety controller and made it so when you create a point in it, it's automatically revealed in the control system,” said Le Sueur.

For engineering, the use of SAMA instrumentation representations eliminate the busy work and enable value-based creative aspects. “So does our acquisition of LimeWare and its foxray application, which is so exciting,” Le Sueur said. “But if you have it, you already know.”

For operations, Foxboro Evo Control HMI helps make operators more productive and effective. Operational insight gives them the right information to make the right decisions.

“Our beta testing is done with real data in real sites—we test it with you and exercise the new features in the real world before we release it.”

“Today, maintenance personnel must encounter and deal with a wide variety of technology,” Le Sueur said. “They need a wheelbarrow full of handheld configurators. We’re working with Field Device Manager and Maintenance Response Center applications to reduce that load.

“For management, we work to minimize obsolescence and increase value, so they can make products more profitably. Operational integrity lets operations continue to run by keeping systems always available, and future-proofing means we don’t come to you with upgrades that require you to buy new hardware and software.”

The roadmap includes a plan for the next 12 to 18 months, with an eye to 10 years and beyond.

MORE DISTRIBUTED POWER AND CONNECTIVITY

A new M580 high-end ePAC offers new levels of performance and redundancy. These and other Schneider Electric devices will be integrated with Foxboro Evo. Additionally, the M580 range will extend into SIL 3-rated PLC applications in 2016.

“I don’t want to enter data twice to integrate a device into the system,” said Alain Ginguene, director of offer management, Foxboro Evo, Schneider Electric. Near-term developments include

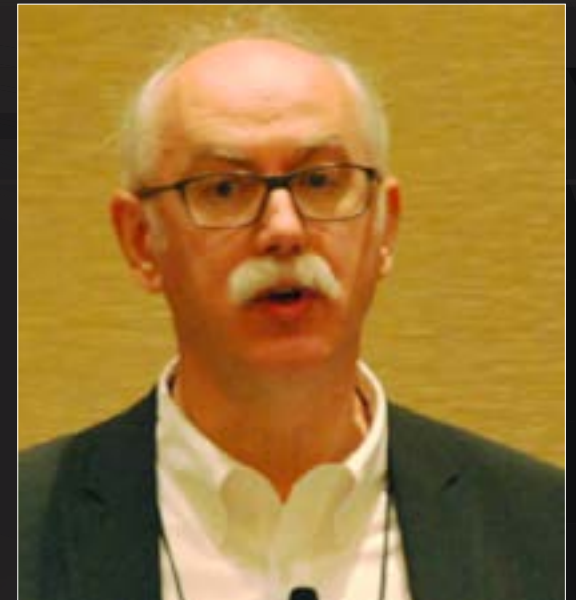
low- and medium-voltage (LVMV) drives, M580 PAC and other device integration via tested, validated documented architecture (TVDA) applications that offer proven, pre-engineered templates for an ever increasing number of common industry and integration challenges. Using them, “Drives and PLCs are integrated into Evo, including in the HMI,” Ginguene said.

For other devices, an embedded external device integrator will bring PLCs and drives into the DCS, handling large amounts of data and multiple protocols in a compact format.

Discovering and connecting electrical devices and motor drives into the DCS provides value, with the ability to configure and collect diagnostics in one system. And it offers a broader solution, ranging from a small PLC application to full Foxboro Evo.

Going forward, SCADA and telemetry will be connected to Evo. “In wireless instrumentation, we’ll have a complete product line, much of it already done by Schneider Electric,” Ginguene said.

“In cybersecurity, the big numbers about risk are being met with security and safety standards like ISASecure,” Ginguene added. “We are working continuously to implement all the services for a secure solution. Any new product will have this as part of the mental process, as cybersecurity is a daily concern for us.”



“I don’t want to enter data twice to integrate a device into the system.” Alain Ginguene, director of offer management, Foxboro Evo, spoke to a packed room in the Foxboro Evo Roadmap and Vision session today at Schneider Electric’s 2015 Global Automation Conference.

INTEGRATING ELECTRICAL CONTROLS AND MORE

Later this year, the company will complete its additions to Compact I/O to give space savings and allow expansion in place in existing plants that need new capabilities. “As Evo extends into the Schneider Electric product line, we keep finding new value in the Schneider Electric portfolio,” said Mike Chmielewski, vice president, offer management, process automation, Schneider Electric. “We’ve been working since before the acquisition on the many possibilities.” These include:

- Integrating intelligent drive and motor control center (MCC) into Foxboro Evo;
- Schneider Electric electrical house (e-house) capabilities for building control and safety modules and delivering them ready to install on site as part of comprehensive solutions;

- Cybersecurity: “There’s an entire division in Schneider Electric devoted to that,” said Chmielewski.

Some plants see value in integrating electrical and process control, for example, the ability to integrate switchgear with refinery controls to optimize energy. Chmielewski said, “That’s part of a larger journey involving a lot of equipment.

“Schneider has a lot of technology that’s complementary to what we want to do. We’re exploring, finding capabilities, building new and more extensive solutions. There’s a lot more to leverage and a lot more to come.”

SITUATIONAL AWARENESS SMOOTHES OPERATIONS

How to help your operators save lives, avoid incidents
and reduce waste

By Paul Studebaker

“**T**he successful operator does nothing. When he’s busy, it’s because of a bad situation,” said Grant Le Sueur. “How can we let them spend more time doing nothing?”

The key to a better life for operators is situational awareness, Le Sueur, senior director, process and safety software, Schneider Electric, told attendees of the Downstream Oil & Gas session at the company’s 2015 Global Automation Conference.

Situational awareness (SA) becomes possible when controls are tuned so the plant runs smoothly, alarms are rationalized so the operators are not overwhelmed, and interface graphics are properly designed so the operator can see problems, make fast decisions, and act in the plant’s best interest.

Le Sueur cited a case in which proper loop tuning has saved \$1.9

million per year at a power generation facility by reducing valve travel, valve reversals and process variable standard deviations, allowing the plant to increase production 2.5% by running closer to the limits.

“How many of your loops are in manual and why?” asked Le Sueur “Usually it’s because they’re out of tune or unstable, maybe due to an undersized valve or a sloppy actuator. They’re a nightmare for the operator, so he puts them in manual. Fix them and your process will also run better.”

In another case, Le Sueur said, alarm management has netted a 6500-MW facility \$500,000 per year by reducing configured alarms 44%, reducing prioritization levels to within EEMUA standards and reducing startup time and manpower by 50%.

"Intelligently design your operator environment and how you tell your operators how to operate your plant [...] making a 3D tank image gives no more information to the operator. It's useless and distracting."

"When it comes to improving alarm response, you generally can get 80% of the benefit with 20% of the effort by tuning alarms," Le Sueur said. "Too many alarms per minute render the operator useless."

Graphics redesign has netted \$1 million annually for a 1.6-billion lb/yr ethylene facility by decreasing operator response times 40% and increasing identification of rising problems from 70% to 90%.

"Flashy graphics are not the way to inform operators," Le Sueur said. "Intelligently design your operator environment and how you tell your operators how to operate your plant. It's fun, but making a 3D tank image gives no more information to the operator. It's useless and distracting."

SEVEN ESSENTIALS FOR SITUATIONAL AWARENESS

Experts define seven facets of situational awareness:

1. A fully functional automation system.
2. Rationalized alarms: Real alarms that call for real actions.
3. Graphics that reveal information, not just data. "Beauty adds no value," Le Sueur said.
4. Operator training simulations. "A refinery operator should have experience before he needs it, just like an airliner pilot," said Le Sueur.
5. Proper operator loading. Don't ask the operator to do too much; and provide guidance, not just a dusty procedure manual.

6. Control room design to meet human factors. Not reclining chairs so the operators fall asleep, but comfortable in a way that keeps them rested and alert.
7. Communications among different production units and areas, so they'll know if the seal water pressure has failed. "Use Skype," suggested Le Sueur.

SIX SIGNS THAT YOU HAVE A PROBLEM

Le Sueur advised attendees to answer these six questions to see if attention to situational awareness might profit their plant:

- Do you see a lot of operational variability between shifts?
- What percent of downtime is caused by people and work errors; i.e., opening valve C instead of valve B?
- Are operators reactive rather than proactive due to overload?
- Are experienced operators retiring and taking critical knowledge?
- How long does it take to train a new operator?
- How many near misses – do you even know? You should find out.

"Situational awareness is not a science experiment," Le Sueur asserted. "Billions of dollars have been invested by industry, and many standards agencies, guideline consortiums and specialized consultants recommend situational awareness practices."

Schneider Electric has driven the latest thinking in graphics across product lines from



"How many of your loops are in manual, and why?" Grant Le Sueur, senior director, process and safety software, Schneider Electric, challenged attendees of the Downstream Oil & Gas session at the company's 2015 Global Automation Conference in Houston.

Wonderware to Foxboro Evo to Triconex, Le Sueur said. “We can create a level of consistency, a palette that might not exist otherwise in your operations, so an operator on Unit C can move to Unit A with consistency.”

The company has subject matter experts trained on its situational awareness library (SAL) in each of more than 30 regions worldwide, developing SAL templates for common unit operations and versed in the proper use of alarm management and loop-tuning tools.

Le Sueur said, “Answer the questions to see if you have a problem, and if you do, situational awareness may well provide the solution.”

MODERN HMI PUTS ‘HUMAN’ FRONT AND CENTER

Situational awareness focuses on undoing decades of data overload that’s potentially costing billions of dollars in lost profitability

By Steve Diogo

Studies show that poorly performing alarm systems and poorly designed human machine interfaces (HMIs) are contributing factors to major accidents and poor operating performance. Speaking at the Schneider Electric 2015 Global Automation Conference in Dallas, Barbara Martinez, principal solutions architect, explained the real cost of this problem and delivered a presentation on the ways that using color, shapes and data in context can deliver the most effective, reliable and safe means of operations management.

“Data is not information,” Martinez said. “Information is data in context. For years,

we have been throwing more and more data at operators—too much data for them to be able to use—and the results have been accidents, incidents and lost profitability.”

This trend toward more data is an example of a problem that has been a major theme running throughout the week-long Global Automation Conference: allowing technology, not people and solutions, to drive development.

“Our goal is to put the ‘human’ back in HMI,” Martinez said. The Foxboro Evo Control HMI was one of many products and services showcased during the



“Our goal is to put the ‘human’ back in HMI” Barbara Martinez, principal solutions architect, Schneider Electric, at the company’s 2015 Global Automation Conference.

"Our goal is to put the 'human' back in HMI."

conference that centered on commitment to functional design and human factors engineering.

"Understanding how people process information and giving them the information they need the way they need it is the absolute heart of human factors engineering," said Grant Le Sueur, senior director, control and safety software, Schneider Electric. "If you don't get this part right, you'll never reach true functional design."

In HMI, the problematic trend of technology-focused, rather than

solutions-focused, design has coincided with three major industrial trends:

- Plants are larger and more complex, which has led to increased monitoring load and a lack of understanding;
- Increasing levels of automation have led to operators becoming overloaded with data and becoming disengaged. As a result their role has been reduced to dealing with upsets;
- Centralized operations have led to loss of direct awareness.

PREDICTIVE MAINTENANCE AIMED AT REDUCING PROCESS DOWNTIME

Maintenance Response Center brings best practices in asset management to I&C systems

By ????????????

On a deepwater oil platform in the Gulf of Mexico, they call it "unplanned deferred production." They planned for 1.4% and ended up with 11.5% - \$190 million in unplanned deferred revenue. The typical rate of what most people call "unplanned outages," or simply "downtime," costs Gulf rigs "more than \$1.5 billion annually," said Jamie Stapleton, global product manager, Foxboro Evo, Schneider Electric. That's 160% of their total OpEx, and it's not just a problem on oil rigs.

Savvy facilities folks recognize the well established hierarchy of maintenance practices with reactive (breakdown) maintenance at the bottom, scheduled preventive maintenance (PM) and reliability-centered maintenance (RCM) as rungs, and predictive maintenance (PdM) as the best practice.

When it comes to instrumentation and controls, most plants are somewhere between reactive and preventive maintenance,

spending their resources on doing a combination of emergency repairs and tasks on a fixed schedule, whether or not they're needed. RCM uses asset information and histories to improve the effectiveness of PM, and it helps, but it can't cope with random failures and outliers, so downtime often remains unplanned.

Predictive, on the other hand, is "uber-profitable," said Stapleton. By collecting information on the condition of field devices and other assets, plants can see which equipment needs maintenance attention to prevent downtime. "We can have a very clear view if we gather information from smart instruments," he said. "We can optimize OpEx, and minimize unplanned downtime."

Schneider Electric's Maintenance Response Center software collects and presents that information, supports mobility, provides decision support and is connected into a work order system. "It collects everything in real time, provides a unified view in a common dashboard, and offers asset health information for the operational life of the asset," said Stapleton. "It gives you the insight to make smarter decisions."

"Predictive maintenance is uber-profitable."

Smart analytics identify impending failures and trends toward quality problems. When it determines a problem is developing, Maintenance Response Center gives users clear and understandable alerts with recommendations for action, in context and with criticality per NAMUR

107. A simple alert is least critical, and ascending levels add urgency. "You can see without reading how serious the situation is," said Stapleton.

The software automatically generates a condition summary for a quick overview of assets that need attention. Their problems and recommended actions are described in the asset vendors' own terms, "not 'bit 27,'" said Stapleton, with the tag number, area, manufacturer, type and timestamp.

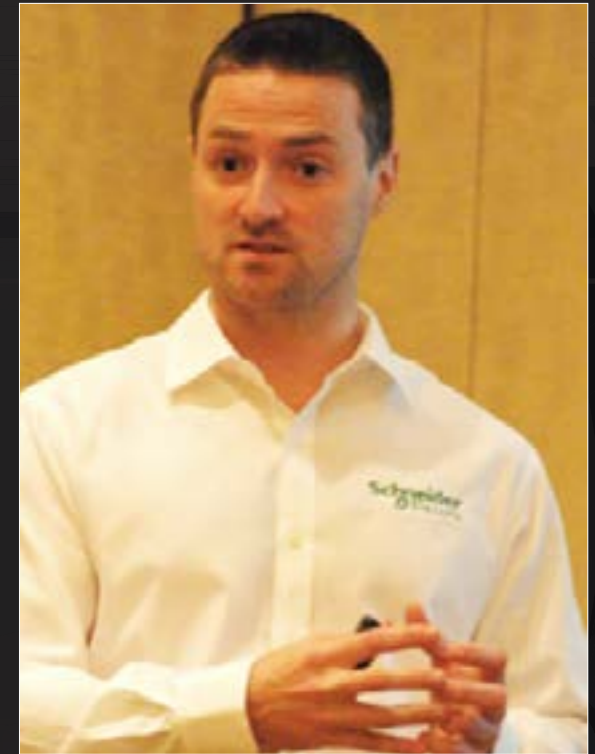
You can explore assets by tag, drill down into asset history, and track assets even when they are removed, reconditioned and placed in another area.

Users can directly enter work orders, and assign work to the appropriate technician. A targeted reporting feature improves shift turnovers by presenting the information the next shift needs to minimize disruption. "It makes the next shift far more productive," Stapleton said.

It's a browser-based application, so users can access it from anywhere and take targeted action through mobile devices if desired. Security features limit access to users only, with configurable limits on what they can do. Stapleton said, "It doesn't allow any changes to the field devices."

The system retains knowledge for re-use, so it can capture the experience of aging workforces and makes it available to new technicians.

The initial release is dedicated to Foxboro Evo. The platform is hardware-agnostic -- we're planning to add Triconex and Modicon, and to integrate it with Avantis and other facilities-level asset management systems.



"We can have a very clear view if we gather information from smart instruments ... We can optimize OpEx, and minimize unplanned downtime." Jamie Stapleton spoke on instrument asset management at Schneider Electric's 2015 Global Automation Conference today in Dallas.

MODICON ePAC LAYS FOUNDATION FOR IOT

New controller embraces Ethernet, is designed to meet tomorrow's application demands

By Keith Larson

While the brave new world of the Internet of Things (IoT) has only begun to take shape across industry, some of its outlines are clear. First, controllers and other plant-floor devices will feature ever more powerful processors and handle more data than ever before. Second, standard Ethernet networks will increasingly be used to weave these devices together, displacing the proprietary networks of yore.

To prepare for this not-so-distant future, Schneider Electric introduced at its 2015 Global Automation Conference in Dallas a new and more powerful Modicon M580 ePAC. "We first introduced the M580 last year—it was not only a new Ethernet-enabled programmable automation controller, or ePAC, but the beginning of a new architecture," said Dafir Lamdaouar, Modicon PAC director, Schneider Electric. "It brings Ethernet and other open standards further into the core of the architecture."

AN EXPLOSION OF DATA

"We recognize that there's an explosion of data coming," Lamdaouar said. "Devices are getting smarter and are generating more data. They've created bottlenecks for older PLC architectures."

The new, higher-end M580 introduced this week has a processor that is five times more powerful, includes eight times as much memory and sports native Ethernet communications with five times the bandwidth of the first generation M580. It

"Devices are getting smarter and are generating more data. They've created bottlenecks for older PLC architectures."

also includes redundancy for high-availability implementations and is designed to easily extend current and future system performance, Lamdaouar said. "The M580 is backward compatible with 20-year-old systems, but also brings us forward into the open architecture of Ethernet."

"Cutting-edge functionality allows us to drive true customer benefit with a future-proof solution designed to meet the most pressing industry challenges," added Jose Bonomo, vice president, offer management, Hybrid Systems, Schneider Electric. Other advances inherent in the new ePAC include reinforced cybersecurity through the Achilles Level 2 and ISA certifications. It also features the ability for users to make online configuration changes without stopping the process.

NEW HORIZONS FOR PLANTSTRUXURE PES

The new M580 ePAC also is central to Schneider Electric's ongoing development plans for its PlantStruxure PES (Process Expert System), the company's solution for hybrid industry applications that demand "the flexibility of a PLC with the operational value of a DCS," Bonomo said. Typical PlantStruxure PES applications include water treatment, mining, and food & beverage, where



"Cutting-edge functionality allows us to drive true customer benefit with a futureproof solution designed to meet the most pressing industry challenges," said Dafir Lamdaouar

applications are somewhat smaller, less complex and include a relatively high ratio of digital-to-analog input/output points. PlantStruxure PES also is delivered to market primarily through third-party systems integrators rather than sold direct, as are the company's higher end Foxboro Evo process automation systems.

Recent development efforts for the PlantStruxure PES platform have been aimed at making the system easier to engineer while delivering greater performance and value. Enhancements to version 4.0, which now can handle up to 20,000 tags, include:

- Incorporation of the M580 ePAC into the system architecture;
- Built-in energy management capabilities leveraging Wonderware software;
- Tested, validated and documented architectures (TVDA) that provide a detailed configuration baseline for specific vertical applications.

“Other key values that continue to drive the PlantStruxure PES system forward include a common visualization and operations experience as well as improved device management,” said Erhard Bartl, PlantStruxure roadmap director. Devices that now integrate with the system include a broad range of Schneider Electric and third-party instruments, drives and power distribution system components. Meanwhile, extensive libraries and templates boost operational and engineering efficiency, “allowing users and integrators to build applications more quickly,” Bartl said. Energy management and advanced process control algorithms are among the many options. Device connectivity provides access to equipment diagnostics and a “first level of asset management,” Bartl added.

FLEX METHODOLOGY TO KEEP AUTOMATION OFF CRITICAL PROJECT PATH

Intelligent Marshalling, virtualization and cloud engineering combine to streamline project delivery

By Keith Larson

While automation typically represents a small slice of the total investment required in a given capital project, it can have an outsized effect on project risk.

Because automation system design necessarily is dictated by process design, automation work typically begins only after the process design work is substantially complete. Those inevitable late changes in process design cascade through a partially completed automation system design, necessitating costly and time-consuming rework, and confounding attempts to get ahead. As a result, automation often has remained stubbornly on the critical path to project completion.

Schneider Electric has set about to change all that by combining several of its key technology advances into a new project methodology called FLEX, for Flexible, Lean EXecution. "FLEX is how we execute major projects," explained Chris Lyden, senior vice president of strategy and offer management, Schneider Electric.

FLEXIBILITY FOR LATE CHANGES

"Whether it's a mega project or a small expansion, the push for greater efficiency

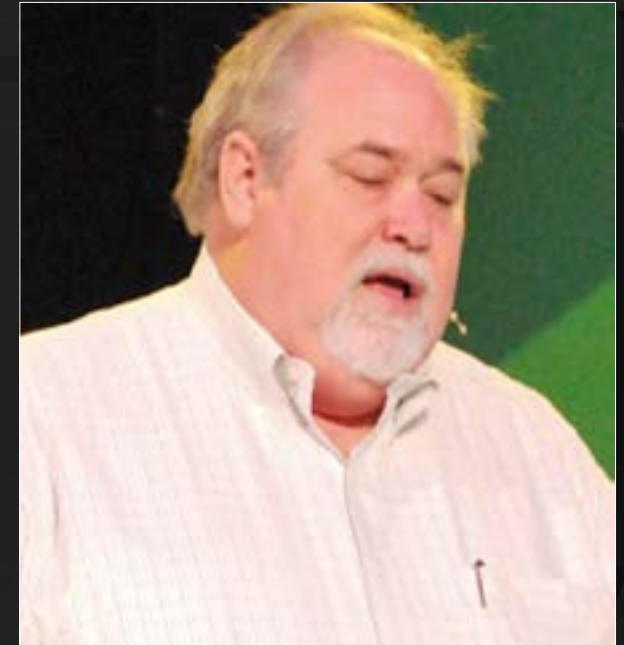
is there," Lyden explained. "FLEX is all about using technology and work processes to increase automation design flexibility in order to decrease project costs and compress project schedules."

Key technology elements of FLEX include the company's Intelligent Marshalling configurable input/output (I/O) solution together with virtualization, reusable libraries of control system functionality, integration with SmartPlant

"FLEX is all about using technology and work processes to increase automation design flexibility in order to decrease project costs and compress project schedules."

InTools design software, and a cloud-based design environment that allows personnel from around the world to collaborate on automation projects.

Together, these technologies help to break the longstanding dependencies of hardware and software design, and between geography and engineering resources. With FLEX, for example, all that's needed to order and begin installing I/O is an approximate total count. The



"FLEX is all about using technology and work processes to increase automation design flexibility in order to decrease project costs and compress project schedule." Chris Lyden, senior vice president of strategy and offer management, Schneider Electric, spoke today at the company's 2015 Global Automation Conference in Dallas.

control logic and graphics are developed along a separate path on Schneider Electric's project management cloud. Virtual factory acceptance tests (FAT) replace expensive and time-consuming travel, and only late in the project is the software downloaded to the control system hardware and bound to the I/O, so changes can be more gracefully accommodated along the way.

"Our mission is to help address and minimize risks to project execution," added Grant LeSeuer, director of product management for Schneider Electric's Foxboro control system software. "FLEX also elevates engineering talent from a cookie-cutter engineering resource to a value-adding engineering resource."

WIRELESS SENSOR NETWORKS SEE RAPID GROWTH

Rapid deployment, low cost, ease of use make wireless the fastest growing product line in the history of Schneider Electric

By Paul Studebaker

Defined as all-in-one battery-powered field devices connected wirelessly to base radio gateways, wireless sensor networks have gone from taboo to default in a rapidly increasing number of applications. "It's the fastest growing product line in our history," said Steve Goodman, senior product manager, Telemetry and Remote SCADA Solutions Group, Schneider Electric. The CAGR is 40% over the past five years.

The process industries buy most of it to relieve pain points including:

- Processes at a distance where information is stranded due to the cost of wiring;
- Rapid network deployment, for example, for urgent regulatory compliance such as leak detection;
- Easy network deployment, without engineering.

"Wireless is easy to install, configure and maintain," said Goodman. "Today, it offers long battery life, long distances, a wide range of sensors, and immunity to noise as well as harsh and hazardous environments."

The main area of implementation has shifted from water/wastewater to oil & gas, "but it can be used anywhere," Goodman said, "to monitor temperature, pressure, flow, level, on/off, and

digital and analog I/O." It also can be used to control a valve, to monitor acoustics, and on moving equipment such as the drum of a cement kiln.

License-free bands include 900 MHz in North America, Australia and Brazil, and 2.4 GHz in the rest of the world. "900 MHz bounces off the walls and travels a kilometer or more, giving a very good signal," Goodman said. "2.4 GHz

Wireless sensor networks have rapidly gone from taboo to default because, "Wireless is easy to install, configure and maintain."

goes about half as far, which is still good."

Schneider Electric's Accutech field devices are Class I, Div. 1 intrinsically safe. "Their lithium thionyl batteries have tremendous energy density - at least three years at once every 10 seconds - and are easily replaced," Goodman said.

Their proprietary WiSTAR protocol allows one base radio to handle as many as 100 field units, and as many as 256 networks can coexist. "They're not pinged," said Goodman. "They're almost dead when they're sleeping, then wake up on schedule at a time that's previously



"Their lithium thionyl batteries have tremendous energy density - at least three years at once every 10 seconds - and are easily replaced...most people just use their thumbs [to install the devices]..." said Steve Goodman

arranged by the receiver, to deliver their measurement in milliseconds. That's why the batteries last so long."

The units are easily deployed using a built-in interface and two thumbs. "You can connect to them from the base radion using a PC, but most people just use their thumbs on the devices," Goodman said. They mount on a single fitting or with a U-bolt. Remote antennas and sensors are available for odd applications such as manholes and hot areas.

The base radio communicates to a PLC, RTU or long-distance radio via Modbus RS485/232, or to a DCS via an analog/discrete output module. Security comes from not using any IP addresses and through optional use of a built-in capability for a four-digit authentication code.

OVERCOMING OIL & GAS MEASUREMENT CHALLENGES

High stakes and contaminated, multiphase fluids are met by a combination of purpose-built hardware and software

By Paul Studebaker

Upstream and downstream operations meet in the pipelines, where produced oil and gas are often metered to determine well productivity, assess production costs and transfer custody from producers to users. "Pipeline transportation companies need to know how much is being delivered and what inventory is in transit, to measure gas in storage and determine how much needs to be put in the pipe so the customer gets what they expect," said Dale Symington, senior product manager, measurement applications, Schneider Electric.

"Pipelines transport very large quantities of oil and gas, and when you measure large quantities, small errors add up to significant dollars," Symington said. "Calibration and proving are important."

VARIABLE COMPOSITION POSES CHALLENGES

Downstream products such as dry gas tend to be more valuable, but upstream products, which may contain a mixture of oil, water and/or gas, present the major measurement challenges. "Produced fluids are stuff that comes out of the ground.

We have to measure whatever we come up with—water, contaminants, sediments—stuff that can't be sold, but has to be measured to determine and allocate the costs of production."

A flow measurement system typically consists of:

- A "meter run" of pipe of known dimensions and properties;
- A primary measurement device, typically an orifice plate, Coriolis, vortex or other flowmeter;
- A transmitter or secondary device, for example, if with an orifice plate, a Schneider Electric 4102 multi-measurement transmitter that measures pressures and temperature;
- An isolation valve to allow access to the transmitter for calibration;
- Communications: cellular, IP modem, or local SCADA; and,
- A SCADA host and data management system, typically in a remote location accessing many transmitters.

Flow computing software, such as Schneider Electric's RealFlo, typically runs as an embedded package in a local controller, such as the company's



Dale Symington spoke on oil and gas measurement at Schneider Electric's 2015 Global Automation Conference.

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SCADAPack 32, 330/334, or 350/357, or it may be included in the transmitter (as it is in Schneider Electric’s model 4203). A companion configurator runs on Windows, typically in a laptop, to view, collect and export flow data. It includes wizards that help install, configure, diagnose and troubleshoot the flow measurement system.

Oil and gas are measured in units of volume, and volume varies by temperature and pressure, so flows must be calibrated and corrected to give accurate measurements at standard temperatures and pressures. A 100 °F difference in oil temperature results in a 3.5% change in volume, and gas volumes are sensitive to pressure as well as temperature.

So Realflo corrects oil volumes per API 11.1 and gas volumes per API 11.2.4, API 11.2.5. and AGA 8.

DATA COLLECTION AND COMPUTING

To deliver an auditable record, Realflo collects 35 days of hourly and daily data, as well as up to 200 well test records for each meter connected to the flow computer. (As many as four liquid or 10 gas meters may share one Realflo implementation, depending on the

capacity of the SCADAPack.) Its configuration template is designed to handle complete setups, but with field access allowed only to the necessary information for field operations. Calibration logs are stored in accordance with API 21.1 for gas or API 21.2 for liquids.

Realflo stores as many as 300 alarms and 700 events over 35 days, with an auditable flow history of alarms and events so if necessary, users can reconstruct flow history after an event such as a lightning strike. A user-assignable database allows storage of additional information, such as casing temperature and pressure.

Even with the finest flow measurement equipment, “Production measurement of produced fluid is not fun stuff. It’s difficult,” said Symington. Fluid separators are often used to separate oil, gas and water, but “separation is never perfect,” he adds. With a Coriolis meter, the flow computer can detect gas or water in oil and if it happens too often or for too long, it can notify operations to check the separator.

Realflo can be combined with Terminal Bus truck and rail terminal management software that runs in SCADAPacks, determines the amounts of fluids delivered, issues truck tickets and manages documentation. ■